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ORDER MANAGEMENT FOR THE 5G ERA

Author: Dean Ramsay, Principal Analyst
Editor: Joanne Taaffe, Editor in Chief, Inform

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Report Author:
Dean Ramsay
Principal Analyst

Report Editor:
Joanne Taaffe
Editor in Chief, Inform
jtaaffe@tmforum.org

Chief Analyst:
Mark Newman
mnewman@tmforum.org

Managing Editor:
Dawn Bushaus
dbushaus@tmforum.org

Editor, Digital Content:
Arti Mehta
amehta@tmforum.org

Customer Success & Operations Manager:
Ali Groves
agroves@tmforum.org

Commercial Manager, Research & Media:
Tim Edwards
tedwards@tmforum.org

Global Account Director:
Carine Vandevelde
cvandevelde@tmforum.org

Digital Marketing Manager:
Anna Kurmanbaeva
akurmanbaeva@tmforum.org

Report Design:
thePageDesign

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TM Forum
4 Century Drive,
Parsippany,
NJ 07054
USA

www.tmforum.org
Phone: +1 973-944-5100
Fax: +1 973-944-5110

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Order management for the 5G era

We hope you enjoy the report and, most importantly, will find ways to use the ideas, concepts and recommendations detailed within. You can send your feedback to the editorial team at TM Forum via editor@tmforum.org

The big picture

The telecoms industry has already reached the point where traditional order management (OM) systems and processes are incapable of efficiently processing complex new B2B service order models, or providing the dynamic automation required by a modern service operations ecosystem. Lead times of weeks and months are now greatly at odds with customers' expectations, generating negative experiences before services are even live. For these reasons, a new breed of OM systems has emerged to sit at the heart of the orchestrated service fulfillment process.

Communications service providers (CSPs) are engaging their vendor partners to significantly modernize OM solutions as part of their larger systems evolution. In doing so, the goal is to drive greater customer satisfaction, catalyze operational efficiency, integrate more tightly with technology changes in the network and improve intelligent service operations for CSP staff internally.

This transformation is a response to evolving mission-critical requirements:

The need to efficiently fulfill digital service orders beyond the traditional connectivity-based telco model

Empowering CSPs to innovate complex and dynamic new B2B service models, provided over new network technology

Eliminating age-old telecoms OM problems such as order fallout

Ensuring legacy operational and business support systems (OSS/BSS) architectures interoperate efficiently with new service operations platforms

Pushing service OM to the upper feasible limit of automation

Becoming agile and flexible enough to be truly competitive in previously unaddressed markets

Reacting quickly to huge market changes such as the migration of workforces to home working during the Covid-19 pandemic

Responding to a rapidly changing world

Even before the Covid-19 pandemic CSPs were renewing their focus on service operations. However, the events of 2020 and 2021 have greatly accelerated the trend. Suddenly the telecoms industry had to adapt to a marked shift in B2B telecom customers' requirements as offices closed around the world and employees started working from home. If ever there was a test of CSPs' ability to pivot on delivering B2B services, this was it.

TM Forum's recently published *Digital Transformation Tracker 5* shows how the pandemic has accelerated the digitalization roadmap for many operators (**see graphic on page 5**).

The report quotes Chair and CEO of Telefónica José María Álvarez-Pallete, speaking after the company's annual general meeting: "During the initial confinement, digitalization advanced as much as it would have done in five years. Every month of confinement, we made a year's progress in digitization."

CSPs around the world had to suddenly fulfill change orders for millions of B2B services and define new ways of working to provide enterprise grade fixed-line and mobile broadband connectivity to homes. This was a unique test of the performance of their OM functions that can help inform future OSS transformation decisions.

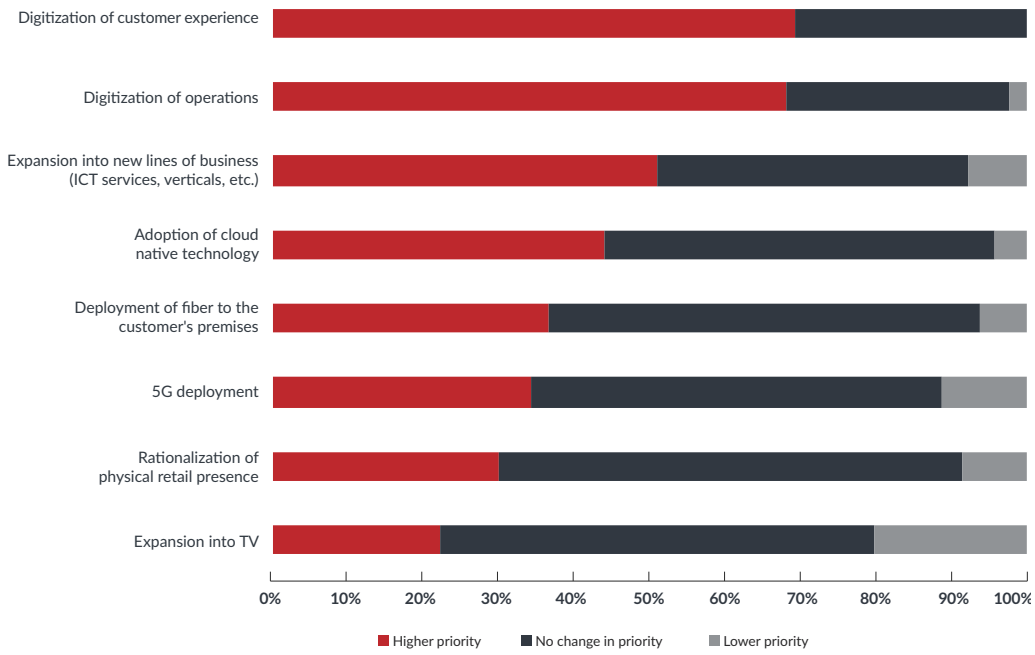
Covid-19 is not the only force reshaping CSPs' service operations ambitions. Many CTOs and CIOs see service fulfillment as a key piece of the 5G-era operational model and are sharpening their focus on service order management.

Overcoming classic OM challenges

Our conversations with OSS specialists and CSP management reveal several key challenges for mature operators:

- **Siloed OM teams & systems** – disjointed operational and business structures within CSPs are one of the greatest inhibitors of fast time-to-market.
- **Ineffective order processing & orchestration** – linear inflexible processes and workarounds persist from previous technical eras.
- **Reactive approaches to service management** – being purely reactive means high OpEx costs, operational inefficiency and an inability to fully manage customer experience.
- **Lack of interoperability** – "swivel chair operations", which requires manual entry of orders into multiple unlinked software systems, is costly, error-prone and cultivates a culture of knowledge islands, with a small number of staff in isolated parts of the business developing specialist knowledge.

Effect of Covid-19 on digital transformation

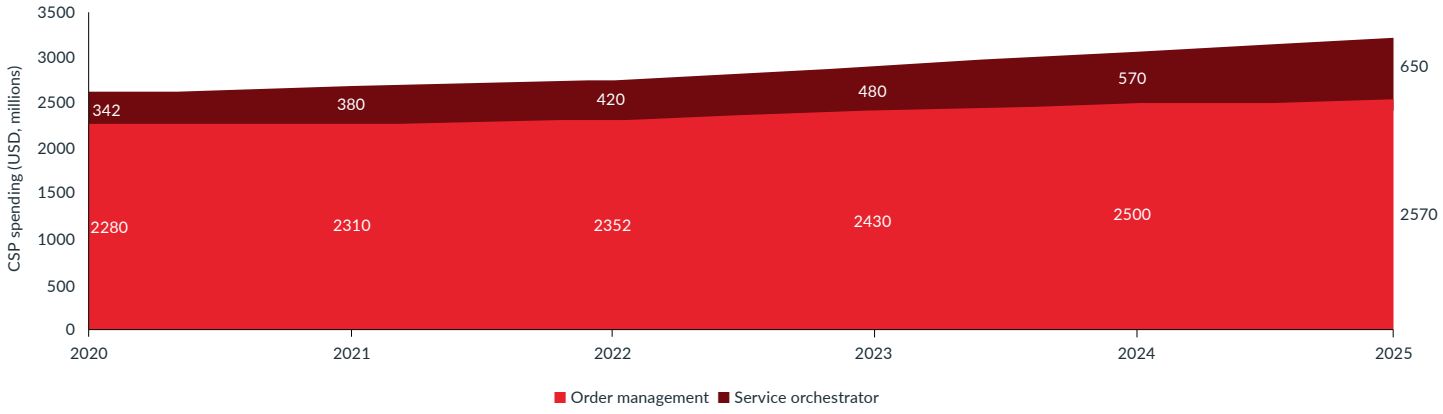


TM Forum, 2021

- **The coexistence of old & new** – Blending legacy systems with the new has always been a challenge for CSPs, but the rate of change in technology and computing advancements in recent years increases the difficulty.

The move to modernize OM systems has resulted in a surge of investment.

Order management investments are increasing



Order management and service orchestrator spending by CSPs forecast, worldwide, 2020-2025 (Source: Dean Ramsay/TM Forum)

Even with the introduction of 5G, little has changed in B2C telecoms services to push mass investment in OM systems. The enterprise market is a different matter. 5G presents B2B and B2B2X opportunities, and CSPs understand they will need to make IT investments to capture them.

The total global spending by CSPs on OM systems in 2020 was $2.6 billion, up 3% from 2019. Spending has been consistently flat for several years, so growth coming back into the market has been relatively easy to detect. CSPs were already shifting their focus to delivering an on-demand experience for the ordering and provisioning of current services like SD-WAN and preparing for new B2B service offerings, leading to increased investments in the automation of service orchestration and fulfillment processes.

Service orchestrator (SO) products are difficult to separate from OM when analyzing vendor revenues, but based on our calculations, SO software/professional services made up around 15% of OM revenues in 2020, and we expect the percentage to grow to 20% in 2025.

Section 1

OM at the heart of modern service operations

A mature IT application, OM spent a decade away from the spotlight with internal attention focused mainly on fixing bugs. This changed during the initial rollouts of network functions virtualization (NFV) and software-defined networking (SDN), which created new service orchestration possibilities, raising the question of how the next generation of OM functions will support them.

Conversations with communications service providers (CSPs) in 2021 indicate that their key requirements include:

Centralized product/service/asset catalogs – limiting the storage of mission-critical service fulfillment data to single instances in a catalog data store has many benefits for data quality, process streamlining, service definition and ecosystem interoperability.

Service orchestration centric – an OM that cannot expose data to an orchestrator in a standardized fashion isolates itself from the rest of a CSP's service operations architecture and leads to breaks in process automation. This ultimately means more manual intervention, increased OpEx and lost processing time.

Based on standards – CSPs are adopting common information models, DevOps methodologies, modular microservice architectures, open APIs and digital operations frameworks.

Contextually aware as part of an ecosystem – much of the "intelligence" that we talk about in modern OSS/BSS is really an understanding of service context. An orchestrated OM system that can understand the type of service being fulfilled can make better process decisions in that service fulfillment process.

Employee friendly – new OM systems need to adhere to the "single pane of glass" model, with intuitive graphical user interfaces. It is also hugely beneficial to the organization if the systems can eliminate the need for staff to have vast amounts of specialized knowledge to process orders.

Linear OM is giving way to dynamically orchestrated OM

Network operations for the 5G and cloud era will soon require real-time, dynamic service-level operations to support features such as network slicing. As a result, service-level operations systems must be able to adapt in the same dynamic manner to variable network and service contexts.

To achieve this CSPs need to do away with traditional linear OM processes. Linear process automation is still typical in B2C service fulfillment has been steadily transforming into a more dynamic discipline on the B2B side. The use of AI in service orchestration workflow management is catalyzing service management platforms' ability to be more intelligent, contextual and responsive.

OM today vs. OM tomorrow

CSPs have been shifting their focus to B2B lines of business. However, they have not excelled across the board in transforming revenues into opportunities. Our conversations with operators indicate several reasons for this:

Aggressive competitive pricing is driving down overall profitability.

Over-the-top specialist service providers are faster, cheaper and web-based.

Enterprises are increasingly using private networks for which CSPs are the primary contractor around only 20% of the time.

Lack of new service innovation within CSPs.

Inability to compete on time-to-market for new services, especially against hyperscale cloud providers.

Disconnection between what is being sold and what operations can actually deliver.

The Covid-19 pandemic has radically altered enterprises' service demands.

The refocus on OM systems and their place in the wider operational architecture has two distinct sets of drivers:

1. What will instantly improve CSPs' IT operations for today's varied service portfolio and satisfy current customers?

2. What developments on the near and medium horizon will help telcos diversify their core business model?

The evolution of 5G illustrates the need for an overarching roadmap for OM. So far CSPs have been able to get away with taking much the same approach to 5G's first, non-standalone form as they did to 4G LTE. In both cases clunky processes in legacy OM functions are impossible to fully automate. Lots of specialist knowledge is required by systems users, and there are high levels of order fallout.

However, standalone 5G will make it essential to modernize and refine the supporting software stacks for 5G B2B services if CSPs are to maximize their ability to monetize services. CSPs' history of rolling out new generations of network technology reveals a tendency to build a silo for the new, but this does not have to be the case for standalone 5G.

OM's potential to deliver customer experience excellence

For our recent *Digital Transformation Tracker 5* report, we surveyed CSPs and their suppliers about the key drivers of digital transformation. Stronger customer relationships came out on top, followed by operational efficiency/cost reduction. These industry macro trends are key drivers for OM transformation: CSPs have decided that customer satisfaction is the No. 1 differentiator for the coming decade and are investing to improve their capabilities accordingly.

However, the injection of modern IT intelligence into the telecoms OM space has been a slow process, and while it may seem like an obvious place to start when overhauling service operations there are some valid reasons why CSPs have not done so:

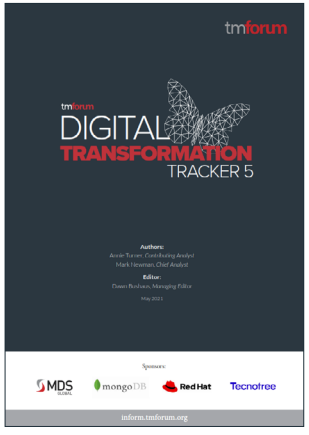
If it isn't broken, don't fix it - older service lines were set up with all the OSS/BSS architecture they needed at the time, often in a silo. They may still be generating lots of business and working fine for the needs of a specific line of business. CSPs have historically been disinclined to upset the apple cart, only instigating change as part of some larger cross-business transformation project.

Entrenched custom code – as OM sits at the top of the flow through service fulfillment, more mature systems will have custom code interfaces developed by vendors, systems integrators, outsourced IT consultants, and CSPs during the decades before the widespread uptake of standardized open APIs. As a result, the links between the OSS/BSS architecture will contain much impenetrable code. Attempts at replacement in live working systems have in the past affected service, making CSPs wary of change.

Customer expectation has only recently shifted – the cloud era has changed enterprise customers' expectations of CSP service fulfillment. Whereas before business customers accepted that a connectivity package would take months to install, their experiences with over-the-top IT service providers mean this is no longer the case.

Business has been ticking along – we read a great many stories of dwindling revenues and average revenue per user (ARPU) in the telecoms industry, but even though there is pressure, CPS' revenues are relatively stable and ARPU is not in sharp decline.

Read the *Digital Transformation Tracker*:



Section 2

Inside orchestrated fulfillment

For those who have never worked in telco operations, it can be surprising to discover how much disjointed manual work goes on to fulfill a customer order. Until recently some B2B operators were passing paper folders around the office between sales, customer service, service delivery and provisioning teams, adding printouts of order details as the process progressed. While the majority of operators today use an IT system to perform these tasks, the processes often mimic the manual passing of the folder – they have simply automated an existing process with software. However, this is beginning to change.

Service orchestration interconnects the many islands of automated processes that communications service providers (CSPs) have created, brings them under a master control and runs them with dynamic intelligence. As a result, the orchestrator is able to interact with systems' multiple legacy data stores, such as logical network inventory, to fulfill a service order with much less human guidance.

The data quality elephant in the room

Most order management (OM) transformation projects have failed because of the quality of data, which lies scattered across a vast array of systems and databases, developed by different vendors, from different eras, for different lines of business, and often originating from companies brought into the CSP through mergers and acquisitions.

In such complex environments formatting and standardization tend to be weak or non-existent, leaving data stores to be pieced together with custom code adaptors and interfaces. This allows for some interoperability without a human operator always having to manually collect and transfer data. However, if this data is from a free-type field on an engineering form, for example, and formatted in an unusual way, there is no guarantee that it can be used in an automated workflow as the surrounding systems simply won't recognize it.

This is an age-old issue. The difference now is that CSPs can address it using OM with service orchestration, centralized catalogs, closed loop integration, open APIs such as the TM Forum Open APIs (see page 14), and AI and machine learning. One European network operator interviewed for this report explains that it had 230 live OSS systems in use at the beginning of 2020 across seven countries. By the beginning of 2021 it had driven this number down to 150 and was still only halfway through its consolidation program. The biggest challenge in the project has been remaining consistent in its approach to database federation and data migration.

Centralized catalog is now the norm

The trend over the last decade has been to centralize the product and service catalogs accessed by the order management and orchestration software when putting together the processes needed to fulfill service orders. Centralizing in this context has meant doing away with many disparate databases containing snippets of information to create a single source of truth for all fulfillment activity. The main drivers are the improvement of data quality and making it easier to automate processes without recourse to huge quantities of custom code. This concept has now become the norm in new or modernized service management environments.

Now catalog centralization is becoming more important to the wider ecosystem. DevOps, microservices and the increased use of industry IT standards have impacted database technology and IT architecture, leading to a centralized catalog concept and paving the way to improvements in adjacent systems.

For example, logical network inventory has long been a pain point for operators, but using dynamic inventory, legacy databases can easily be federated under a single interface, which acts as the gatekeeper to the service orchestrators. This allows all information about products, services and infrastructure to be stored in a single reference, which is dynamically updated and used consistently by all relevant systems. Conceptually, this is at the core of what many CSP OSS architects see as their role in digital transformation because of its positive impact on operational efficiency and customer satisfaction KPIs.

Workflows are working for CSPs

Service orchestration can be seen as the intelligent, automated progression of business processes by breaking them into shorter tasks, each completed using software workflows. Workflows can in turn be considered as a modular approach to processes, much as microservices are to application development. A CSP can build a library of pre-tested, pre-approved workflows for each task or sub-task within a process, making the design and implementation of new service fulfillment processes quick and fault-free.

Vendors are now differentiating on how they design and manage these workflows and how effective they are at improving the many processes that run the CSP's OSS/BSS. Several operators we spoke to during this research identified using new workflows to optimize processes as an important area of focus behind the scenes. Many successful vendors are looking at the role for OM workflows in the wider OSS/BSS and how the interconnected systems can use workflows to provide a more end-to-end approach to service management.

Platforms: inter-business orchestration

When we talk about service orchestration in telecoms, we are generally talking about that activity within a single operator. The next step is to connect a CSP's IT platform with a complementary platform within a business customer's IT platform. This would then allow end-to-end service management and orchestration for a B2B2X service which spans the IT domains of multiple companies.

TM Forum members have been collaborating on standards and best practices to enable end-to-end management and orchestration for several years. The Open Digital Architecture (ODA) and Open APIs help CSPs implement an evolutionary approach to modernizing IT systems including order management and service orchestration (see page 14).

> “Logical network inventory has long been a pain point for operators, but now we are seeing a dynamic inventory that can easily federate legacy databases under a single interface, which acts as the gatekeeper to the service orchestrators.”

Intent-based service management
An intent-based system is designed to allow administrators and line of business owners to decide on the desired outcomes of the orchestration workflows - and ultimately the fulfillment process - based on service level requirements. This allows the CSP to be very specific and accurate when defining the provisioning and full lifecycle management of any service type. This approach is becoming increasingly prevalent as part of an overarching digital transformation strategy, but what does it mean for OM?

During the introduction of NFV/SDN, a popular idea was the definition of an open, and interoperable northbound interface from the network that acts as an abstraction layer and is decoupled from domain-specific data and control plane technologies. We are seeing a mirror of this now in service management where abstraction used in workflow management allows CSPs to define outcomes with specific fine-tuning for each service model. Vendors are embracing intent-based orchestration methods using standard modelling languages like YANG to automate services across hybrid domains.

Managing services end to end

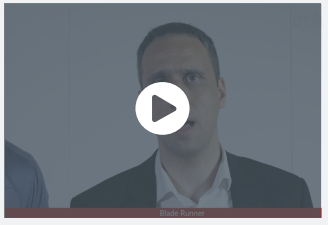
CSPs and suppliers are collaborating on development of the ODA, part of the Open Digital Framework (see page 28) to evolve to a component-based software architecture. The goal is a fully automated, cloud native operations environment that relies on analytics and AI to deliver zero-touch services.

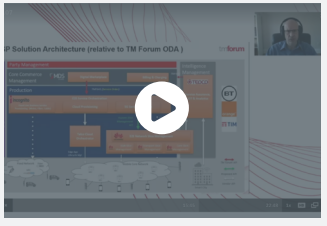
The ODA defines standardized, interoperable software components which expose business services through Open APIs that are built using a common data model. These components are independently deployable pieces of software, typically built out of one or more microservices.

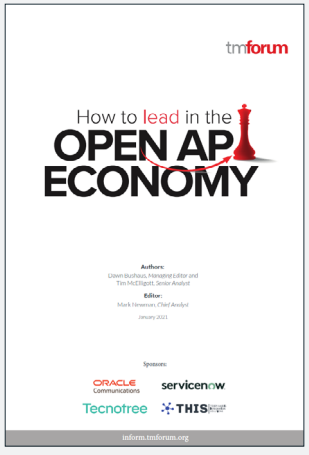
In December 2020 a group of TM Forum members including Accenture, Axiata Digital Labs, Global Wavenet, Globetom, Oracle Communications, Orange, SigScale, Sysbiz Technologies, Vodafone Group and Whale Cloud joined forces to create the ODA Component Accelerator project to build a test platform to validate ODA-compliant software components. Its roots stem from one of TM Forum's award-winning Catalyst proofs of concept called BOS – an implementation of ODA Core Commerce Management, which implemented a business operating system that helps CSPs to focus on innovation instead of integration issues.

Many other TM Forum Catalysts have explored end-to-end management using intent-based management and closed loop automation. For example, the multi-phased 5G Ride On! Catalyst demonstrated how to orchestrate and monetize a complex digital ecosystem made up of many partners.

Watch the Catalyst videos and download the report to learn more:







Section 3

OM empowers CSPs to chase the enterprise opportunity

The obvious question any CIO or CTO will ask when examining their current IT infrastructure is: 'Why change what we already have?' The answer lies in a much larger question: 'Are we ready to be more than a traditional telco?' Business diversification has been a constant theme in the telecoms industry for the last decade, but the existing shape and size of communications service providers' (CSPs') organizations makes it difficult. While the order management (OM) function is just a small part of overall transformation, its impact on both customer-facing and network-facing performance KPIs means it plays a key role in enabling business diversification.

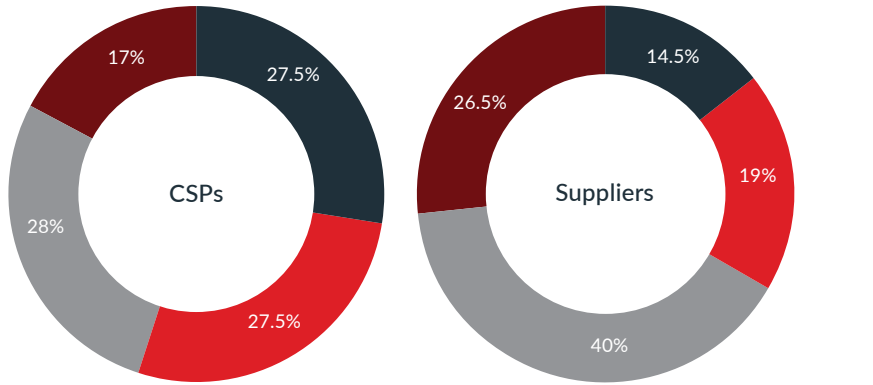
TM Forum's research shows that CSPs are still focused on being connectivity providers, but their post-connectivity ambitions extend beyond being the best-in-class telco.

The formation of new business units within CSPs inevitably requires investment in IT and professional services. More than a quarter of CSP respondents to our Digital Transformation Tracker 5 (DTT 5) survey said that they are setting up a new business unit to address opportunities arising from 5G and IoT. The biggest proportion of CSP respondents to the DTT 5 survey (37%) intend to use their established B2B divisions to address the 5G enterprise market. So, there is clearly a need for OSS that can both address new business opportunities and run the existing processes for core business.

Much needed pragmatism on OpEx and margins

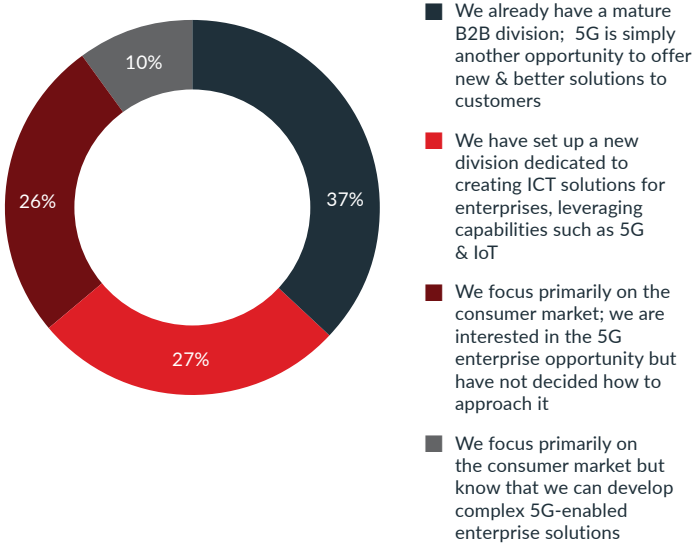
A great deal of the telecoms industry's dialog involving revenues and profit margin centers around the somewhat vague concepts of new service models, new technologies and optimism that boom times are just around the corner if we keep trying new things. When we actually look at the financial fortunes of CSPs across the globe for the last decade, however, we see a flat picture for service revenues. Margins on the other hand can be significantly improved by focusing on operational

What should CSPs' aspire to become?



TM Forum, 2021

CSPs' approaches to enterprise 5G



expenditure, and while it is commonplace to read about cost-cutting exercises, fundamental systemic changes can have a more profound impact on OpEx.

The good news is that systemic changes do not need to take the form of huge, complex transformation projects, but can be progressively achieved in incremental pragmatic steps, in line with an overarching, standardized plan. Out of all the incremental changes to IT systems, modernizing the OM function yields some of the most tangible and measurable benefits. This is because OM is a lynchpin in the greater OSS ecosystem and helps deliver operational efficiency and customer relationship improvements in the form of reduced churn and increased measurable satisfaction.

Visibility of the whole B2B2X value chain

For CSPs, the effective management and orchestration of services (be they connectivity solutions or other digital services) now requires visibility of the end-to-end infrastructure, out to the end customer. It's a visibility CSPs have traditionally lacked, relegating them to the 'dumb pipe' position in the value chain. However, CSPs are now better able to envisage orchestrating services across their own infrastructure and that of their business customers, a change catalyzed by 5G and the SD-WAN family of products.

CSPs are now looking beyond governance and operating models, where they play a fixed role, or engagements where they have absolute control, to become facilitators of digital economies. Architectures based on the TM Forum Open Digital Architecture (ODA – see page 14) enable CSPs to become platform-centered. While traditional telco competition is zero-sum, platforms focus on co-creation with others in the industry and beyond. In the digital age of the telco, CSPs must learn to compete with the likes of Apple or Google, while simultaneously collaborating in co-created ecosystems with them, as well as other independent software vendors, automobile manufacturers or network equipment suppliers on federated platforms.

Making self-service B2B ordering transparent

A great deal has already been done to remove the delays involved in the B2B sales process, which traditionally involved a salesperson visiting a business, taking an order on paper, carrying it around for several days and then doing the data entry into the system at the end of their sales trip. From there the service order would disappear into a black hole as far as the customer was concerned; they may receive a notification of when the service would be live once the fulfillment process was almost complete and the activation assessment was finished.

However, the time between the salesperson's visit and this notification would certainly be weeks, and maybe months. The recent focus on omnichannel self-service in the BSS has shifted service ordering to internet channels or customer service representatives in a call center. But further change is needed.

Why standalone 5G requires urgent change

The importance of the B2B2X opportunity created by standalone 5G cannot be underestimated for CSPs chasing new revenue streams. Network slicing is expected to provide programmable, individualized capabilities that enable new business models across a broad range of industries. CSPs will be able to to partition their networks to support specific services and deploy several logical network instances for different service types over a common infrastructure.

But with opportunities come challenges. The more slices CSPs create for various use cases, the greater the risk of more complexity. To combat this, CSPs and vendors are turning to an end-to-end orchestration view and automation to manage the slice service lifecycle. A great deal of initial work has centered on the technicalities of RAN slicing and how to orchestrate this network domain. The industry is now taking a more holistic view of end-to-end slice orchestration, which encompasses all appropriate BSS and OSS functions.

eBonding integrations

eBonding is the process that CSP's undergo in defining service catalogs for enterprise customers. In recent years it has enabled those customers to submit requests and track the service fulfillment of their orders from their own IT domains.

This enables process transparency and cuts down on routine communication cycles between the CSP and customers, allowing them to repeatedly check the status of their order without interaction with a CSR in a call center.

From a customer project management point of view this is hugely beneficial for enterprises as it allows them to bi-directionally synchronize milestone task data in their systems using data exposed from the CSP's service catalog and OM systems. This synchronization means that no time is lost waiting for a manual update from the CSP, or in employing someone in the enterprise to chase fulfillment updates.

The impact on efficiency is as profound as the move from paper records to IT systems in the 1980s, according to one UK Tier 1 CSP. While eBonding has been around for many years in the IT world, in a telecoms OM context it is still not ubiquitous.

> "End-to-end orchestration is nice to have for 4G and 5G NSA, but is absolutely essential for 5G SA."

Section 4

Ecosystems have never been so important

The role of open APIs and standards in tighter integration and performance has gathered considerable momentum in recent years. As a result, multivendor environments are no longer the minefield they once were for communications service providers (CSPs) that are trying to architect unknown futures.

Bringing OM applications out of the silos

One common theme we see across most new orchestrated order management (OM) projects is a determination by CSPs to avoid past mistakes. In particular, they are striving to ensure no component of the ordering process exists within a silo. The existence of multiple OM systems across different lines of business or historically separate corporate entities with little or no automated interfacing created some of the most opex-heavy manual tasks in OSS. Where classic large-scale data migrations to unify systems and databases have been carried out, it is often to the detriment of data quality.

The new attitude to systems selection for OM is very firmly centered on a platform or ecosystem with proven interoperability and adherence to standards and open APIs such as the TM Forum Open APIs. While the concept of a "single pane of glass" for all ordering-related modules with an OM solution is still often viewed with skepticism, the fact that solutions are starting to provide such a view points to a future of increasingly joined-up underlying systems.

Vodafone Business has been explicit in its ambition to implement a single order management platform that could be used in multiple markets in Europe. During the process it has rejected manual reporting and processes and is instead heavily automating order creation and delivery. The company's B2B margins are critical to achieving targets on ROI, which in turn justify network investments, so Vodafone is pushing automation in the OM function to drive down OpEx spending.

A reduction in "cost to serve" was carefully managed to address both existing and future network technologies, while giving business users control of product configuration and service delivery options to increase customer satisfaction.

Abandoning the old development habits

Legacy IT, backed by relational database management systems and mainframes, has been a mainstay of CSPs' for decades. But when pitted against the demands of always-on customers and modern development practices — as well as new technologies like AI, IoT and 5G — these systems often come up short.

Legacy systems impede the adoption of modern Agile development approaches like DevOps continuous integration and delivery, microservices and distributed architectures, which are the cornerstones of digital transformation.

By design, the approach to data is more rigid, requiring a predefined schema that is difficult to alter once established.

Legacy systems limit a CSP's ability to scale cost-effectively, a necessity for handling a network of millions of people and billions of connected devices.

They struggle to accommodate unstructured data, which by some estimates makes up 80% to 90% of today's total data.

Adopting a unified information model

It is now widely accepted that there are great benefits in using a unified information model such as the TM Forum Information Framework. Many vendors are standardizing their information models to become more attractive to CSPs looking for the maximum interplay and data exposure in their multi-vendor network and operations environments.

Driving cultural change

Digital transformation is not easy and relies on employees across the business to play a part in effecting change. It is therefore important to give people good reason to embrace new ways of working, notably with tools that remove repetitive and mundane tasks from their daily routine. Improving employee engagement and productivity can be made possible with a workflow-centric service management platform.

Jurgen Lumb, Vice President of Solutions Design B2B at Deutsche Telekom presented DT's "B2B Powerhouse" vision at the ServiceNow Knowledge 2021 event. It involves bringing together T-Systems and DT capabilities to form a pan-European B2B telco unit, which Lumb described as a fully automated, workflow-centric multivendor CPQ, Order Management, orchestration and billing environment for B2B services.

He specified that the OM graphical user interface was essential to ensuring an enhanced user experience. DT achieved this in partnership with ServiceNow by using order entry with preexisting configurations, rules, clearly defined workflow tasks, as well as TM Forum APIs to bring the whole architecture together.

As a result, a sales agent can call up a complete inventory for a customer within the first contact from a single interface and initiate all OM-related follow up activities. This configuration empowers both enterprise customers and internal users with a single user-friendly interface which keeps all technical process details "under the hood", promoting higher quality engagement and productivity.

" Improving employee engagement and productivity can be made possible with a workflow-centric service management platform. "

Section 5

Make it happen – Strategies for modernizing OM

Order management (OM) is at the nexus of several key processes and challenges and improvements to OM will have positive repercussions throughout the surrounding architecture, making it a focal point for systems modernization as communications service providers (CSPs) undertake transformation. Below are some of the key considerations for CSPs re-examining their OM functions:

Ecosystem – Providing an orchestrated closed loop ecosystem is proving to have a profound impact on CSPs' key KPIs of customer satisfaction metrics, operations efficiency and error free automated processes.

Bring customers closer – OM does away with clunky, manual in-person ordering and creates an automated software bridge to the customer, thereby drawing them further into the CSP's domain in the way that successful OTT service providers have done.

Modern development characteristics – the new wave of OM systems cannot exist in a silo and must be equal in IT intelligence to 5G network technologies. DevOps methodologies, modular microservice architectures, cloud-based delivery models, standardized open architectures and catalog centric information models combine to deliver new OM capabilities.

B2B platforms – interacting with B2B customers in an automated, omnichannel, transparent way plays an essential role in significantly lessening friction in the ordering and fulfillment processes. The platform model allows CSPs to manage their customer touchpoints with more finesse and replicable success than before.

Service agility – it is important for CSPs to understand the details and context of their current service offerings, but it is also crucial for them to build an IT architecture that is agile enough to pivot suddenly to changing market circumstances and opportunities.

Workflows can be more than micro-processes – CSPs should not seek to replicate old processes with new software assets, the intelligent use of workflows in other IT-heavy industries such as retail has transformed process management.

Think proactively about service management – OM is not just about processing new customer orders, but also a question of constantly amending existing business to suit the needs of the customer. Being proactive in this function improves customer experience and drives additional revenue opportunities.

Co-existence is key – the 5G era will be typified by many technologies from the LTE era co-existing with the new. CSPs will be wise to mirror this in their approach to OSS/BSS, rather than separating 5G out into its own operational bubble.

5G's business model shift: A new playbook for order management

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Change is constant. In the telecommunications industry, change is not only constant, but it seems to have accelerated in the last two years with no signs of slowing down. The push to 5G and business diversification will create new revenue streams and partnerships, while new industries and new use cases start to emerge.

To succeed in this new 5G world, CSPs need to bring solutions to market faster, find efficiencies, and, most importantly, ensure the products and services work how they're supposed to. It's time for a new approach to order management.

What makes order management so difficult today?
Not long ago, CSPs were competing on price and only a handful products. Fast forward to today, the reverse is true. Price seems irrelevant and experience is king. What makes order management so difficult in today's digital environment? There are three key areas:

- **Catalog modeling.** For those who have spent time in modeling product catalogs and managing order management processes in telecommunications, this is an extremely tedious yet equally critical task. If done incorrectly, it can severely impact business processes and disrupt customer experience. Getting the product model right, whether in terms of being reusable components or granularity of how the products are defined, is critical to ensure order management workflows will continue to deliver to a CSP's use cases.
- **Order fallout.** In reality, orders are going to fail. This can be caused by integrations across backend systems not working or by data issues as orders get entered or enriched. Fallouts can cause significant delays in order fulfillment, which translates into delayed or lost revenue. Fallouts can also lead to manual resolution, further driving up operating costs while negatively impacting customer experience.
- **In-flight changes.** People change their minds all the time. But when this happens during an order, it often creates a web of complexity. In-flight changes are often the most complicated use cases in order management. The slightest change in a particular specification or characteristic of an order can yield hours of rework. Each task must be evaluated, and manual activities often proceed any need for rework.

5G and Edge are forcing business models to evolve
When it comes to 5G and edge, there is no one-size-fits-all when it comes to business models. ServiceNow sees its customers considering a variety of different models that span from CSPs being a platform enabler delivering dedicated edge hosting, to CSPs being and end-to-end provider for consumer applications. And depending on the vertical being targeted, the strategy can vary. While these are the extreme variations, many CSPs are also considering a middle ground by delivering network as a service (NaaS) or even sharpening their focus on B2B2x solutions.

44% of CSPs say in-flight changes will be the **greatest challenge** they face in 5G order management.

Source: Light Reading Survey. June 2021

The point being, 5G and edge business models will continue to evolve as customers and CSPs alike test them out. It's also likely we will see different business models dominate specific use cases for specific industries. For example, the business model for manufacturing may look very different than the business model for healthcare. These variations undoubtedly will be driven by the individual industry's key performance indicators (KPIs) and by the CSP's business objectives.

Regardless of where CSPs fall in the spectrum of business model evolution, there will be implications in the way products are delivered to your customers, which vendors you partner with, and how connectivity gets combined with partner applications to monetize your edge investments.

5G's business model shift: A new playbook for order management

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Collectively these variations will have significant impact on how orders are orchestrated across, not to mention the heightened SLAs and KPIs that 5G will demand. New technologies bring with them increased customer expectations, and 5G and MEC will amplify quality of service demands. Having a platform that can allow CSPs to expand into different services and different business models is going to be the key differentiator in this new 5G world.

Delivering the value chain of 5G/MEC

As customers and technologies continue to evolve, it has become apparent that traditional approaches to order management do not scale. At ServiceNow, we see what the customer wants, and what the CSP is guaranteeing each live independently of each other today. Ordering and assurance have historically been isolated across their systems, processes, and teams.

As CSPs look to deliver a new generation of services, these two worlds need to come together to deliver a single cohesive experience that customers will soon demand from 5G and MEC. Delivering this unified experience means breaking down silos to ensure every organization is looking at the same data model, the same view of the customer, and the same view of service quality.

Challenges of order management in the 5G/MEC era

Source: ServiceNow

The value chain brought about by 5G networks brings with it increased variability in terms of how services are delivered, making a cohesive experience all the more challenging. Business orchestration, service orchestration, application management and connectivity will span across the entire value chain. These different layers and moving elements will add new complexities, further adding to the challenges of order management in the 5G/MEC era as described in Figure 1 above.

- **Commercial catalog.** Order management systems historically had a strong affinity towards CPQ systems and older capture applications. With 5G, commercial complexity will move towards the delivery of exponentially more products and services. The process for selling and offering these new services must be simplified to accommodate for increased variations. Thus, making delivery critical.
- **Complexity in service delivery.** How services get delivered are determined from the technical catalog which manages service complexities. With the advent of new access technologies and the transformations taking place in the network, the workflows needed to navigate the web of these decisions will be higher on the service layer.
- **Service diversity.** As services become more and more diverse, and with most of MEC services being a combination of CSP connectivity and partner applications, customers will continue to test the boundaries of the value chain's ability to launch new services quickly and efficiently.

5G's business model shift: A new playbook for order management

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- **Service assurance.** The quality of and the pace at which next gen services get delivered and use could possibly redefine how customer experience gets measured in the 5G era. Assurance of these services becomes critical, and the service experience journey begins at the moment an order is placed.

A new approach to order management

With change, comes opportunity. As CSPs look to redefine themselves in the world of 5G and MEC world, ordering and assurance will be forced to collide and will spark a new strategy for order management.

As mentioned above, 5G-enabled services will require an order management solution where the product catalog can be exposed or can consume information based on standard APIs such as TM Forum, especially as ecosystems grow in complexity. Further to this, being able to publish the product catalog into the enterprise application of B2B customers provides a seamless integration path and while offering a self-service channel directly to the end customer.

As complex, next gen service orders come in, catalog-driven orchestration and decomposition workflows help accelerate order delivery. Automated dependencies, alerts, and handoffs reduce order fallout while automation helps reduce manual tasks associated with in-flight order changes.

And the most critical aspect, assuring the service. Having the relationship and topology across the service, product and resources all maintained within a single data model is now table stakes for delivering proactive customer experiences across complex 5G networks.

Key tenants of order management in the 5G era

Workflow across core and partner services

Flexible catalog

Assurance combined with ordering to guarantee the experience

Standardization via Open APIs

Source: ServiceNow

Bringing ordering and assurance, together

When it comes to service fulfillment and service assurance, these two domains are going to collide more and more in the world of 5G and MEC. Fulfillment will drive the workflows that are required for assurance. At the same time, assurance workflows will highlight potential service changes which further spark change orders. Ultimately, this defines a modern digital CSP—uniting ordering and assurance on one platform for a seamless experience and visibility across the journey.

To learn more about ServiceNow's Telecommunications solutions, visit servicenow.com.

TM Forum Open Digital Framework

A blueprint for intelligent operations fit for the 5G era

The TM Forum Open Digital Framework provides a migration path from legacy IT systems and processes to modular, cloud native software orchestrated using AI. The framework comprises tools, code, knowledge and standards (machine-readable assets, not just documents). It is delivering business value for TM Forum members today, accelerating concept-to-cash, eliminating IT and network costs, and enhancing digital customer experience. Developed by TM Forum members through our Collaboration Community and Catalyst proofs of concept and building on TM Forum's established standards, the Open Digital Framework is being used by leading service providers and software companies worldwide.

Core elements of the Open Digital Framework

The framework comprises TM Forum's Open Digital Architecture (ODA), together with tools, models and data that guide the transformation to ODA from legacy IT systems and operations.

Open Digital Architecture

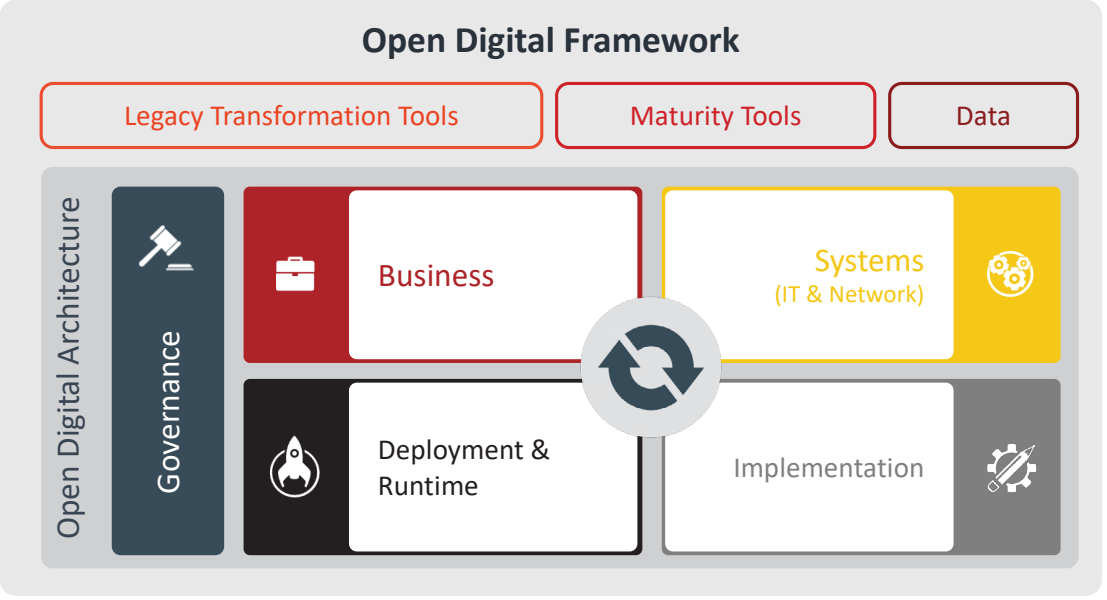
- Architecture framework, common language and design principles
- Open APIs exposing business services
- Standardized software components
- Reference implementation and test environment

Transformation tools

- Guides to navigate digital transformation
- Tools to support the migration from legacy architecture to ODA

Maturity tools & data

- Maturity models and readiness checks to baseline digital capabilities
- Data for benchmarking progress and training AI



Goals of the Open Digital Framework

The Open Digital Framework aims to transform business agility (accelerating concept-to-cash from 18 months to 18 days), enable simpler IT solutions that are easier and cheaper to deploy, integrate and upgrade, and to establish a standardized software model and market which benefits all parties (service providers, vendors and systems integrators).

Learn more about collaboration

If you would like to learn more about the project or how to get involved in the TM Forum Collaboration Community, please contact George Glass.

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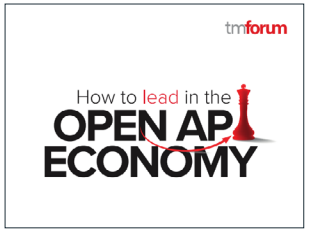
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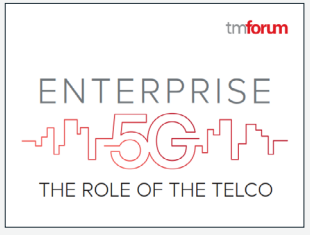
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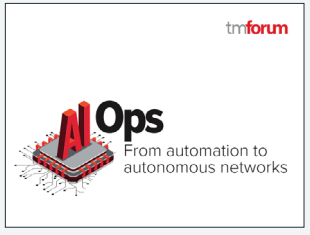
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Red Hat

Meet the Research & Media team

Report Author:
Dean Ramsay
Principal Analyst
dramsay@tmforum.org

Chief Analyst:
Mark Newman
mnewman@tmforum.org

Editor, Digital Content:
Arti Mehta
amehta@tmforum.org

Commercial Manager, Research & Media:
Tim Edwards
tedwards@tmforum.org

Digital Marketing Manager:
Anna Kurmanbaeva
akurmanbaeva@tmforum.org

Report Editor:
Joanne Taaffe
Editor in Chief, Inform
jtaaffe@tmforum.org

Managing Editor:
Dawn Bushaus
dbushaus@tmforum.org

Customer Success & Operations Manager:
Ali Groves
agroves@tmforum.org

Global Account Director:
Carine Vandevelde
cvandevelde@tmforum.org

To learn more about TM Forum's
Collaboration Community, please contact **George Glass.**