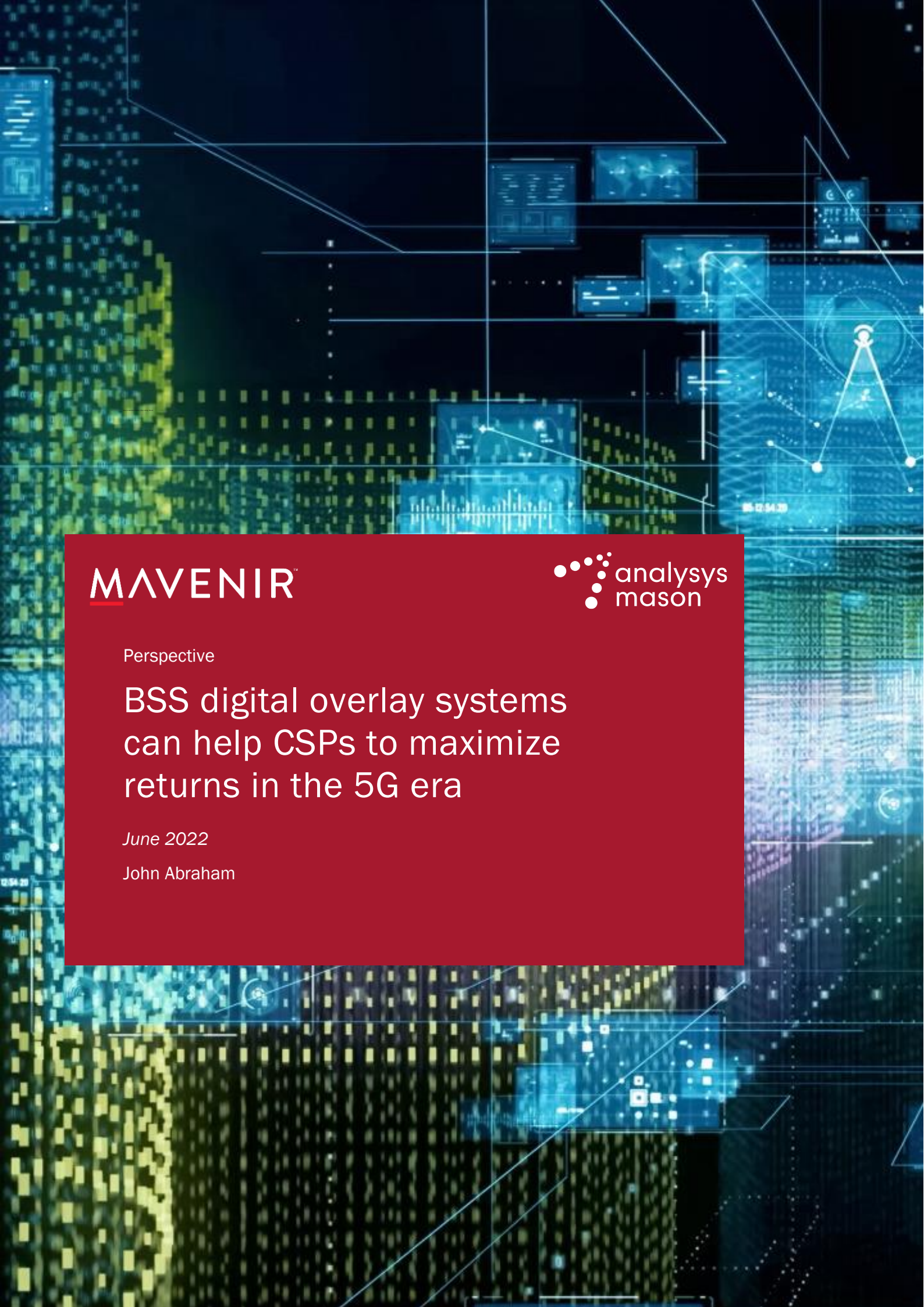


MAVENIR

analysys mason

Perspective

BSS digital overlay systems can help CSPs to maximize returns in the 5G era

June 2022

John Abraham

Contents

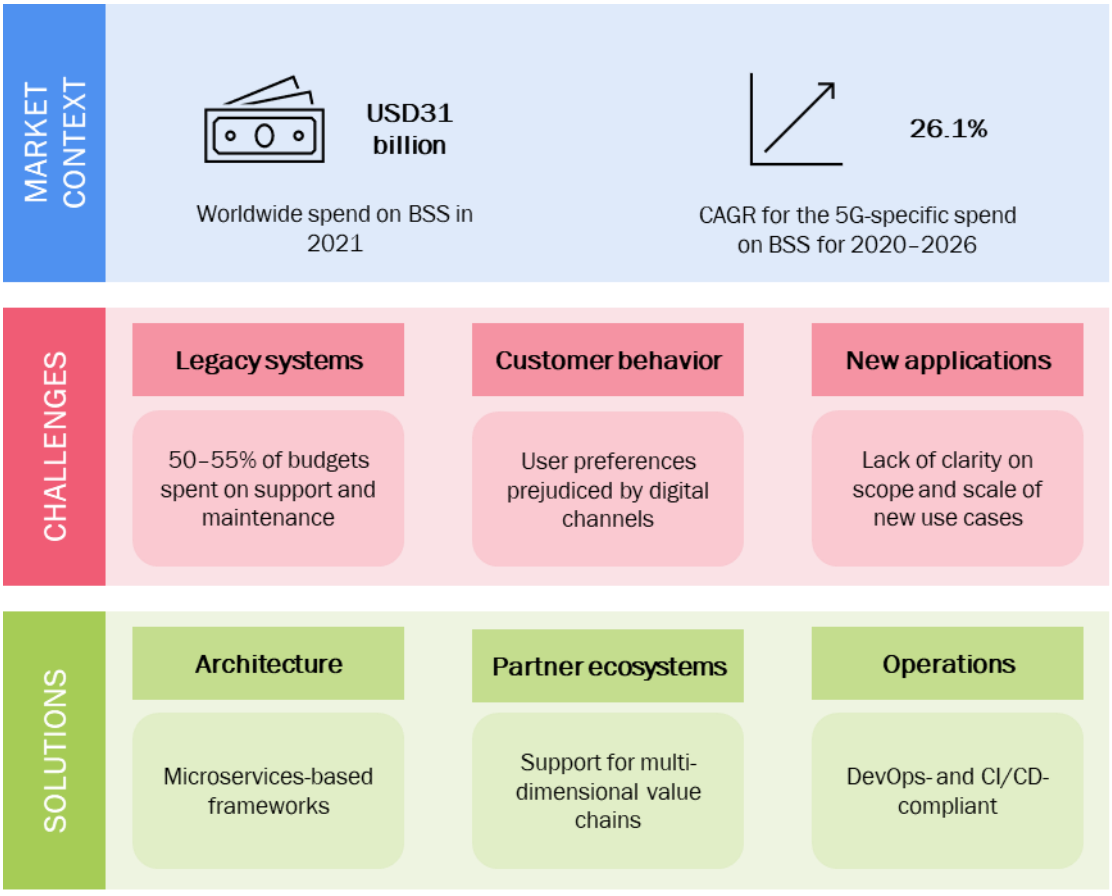
List of figures

This perspective was commissioned by Mavenir. Usage is subject to the terms and conditions in our copyright notice. Analysys Mason does not endorse any of the vendor's products or services.

1. Executive summary

Communications service providers (CSPs) are preparing to radically overhaul their monetization and customer engagement capabilities in the short-to-medium term in response to new mobile and fixed network deployments, high total cost of ownership (TCO), changing customer preferences and emerging opportunities. 5G roll-outs will be the primary driver of new investments in the short term, and CSPs' spending on business support systems (BSS) will grow by 26.1% annually between 2020 and 2026 (Figure 1.1), according to Analysys Mason's forecast.[1] Extensive changes to architecture and framework caused by 5G mean that CSPs are prioritizing upgrading their charging systems because legacy online charging systems (OCS) cannot support new digital use cases. The transformation of customer engagement systems, which can include omni-channel management and configure, price, quote (CPQ) systems, is being driven by external factors such as the competitive environment and pandemic-induced behaviour changes, as well as internal factors such as the focus on cost reduction, improving Net Promoter Scores (NPSs) and the automation and digitization of enterprise offerings. It is clear that CSPs that are upgrading to 5G must update their BSS in order to capture new services revenue.

Figure 1.1: Overview of the CSP BSS ecosystem and the key challenges in the 5G era



Source: Analysys Mason

[1] For more information, see Analysys Mason's *Telecoms software and services: consolidated worldwide forecast 2021–2026*.

Many CSPs have been through multiple iterations of BSS transformations over the years with little to show in terms of improved customer engagement or new revenue. Some CSPs attempted 'rip and replace' end-to-end BSS transformations, but many of these ended up as failures because they were unable to keep pace with new service innovations. CSPs are therefore likely to favor a phased approach to modernizing their BSS that balances the risk of potential disruptions to operations with the timely pursuit of new revenue opportunities. Greenfield set-ups such as new digital brands will favor end-to-end solutions, while CSPs with incumbent legacy systems will be inclined towards phased transformation approaches that protect their existing investments while enabling new revenue streams. This will be crucial, especially for CSPs that wish to drive deeper engagement with enterprise and industry use cases that require modern, flexible BSS.

Adjunct system transformations have shown to be more successful in helping CSPs to meet specific requirements. However, these systems have a limited ability to support new services in the long run and end up becoming yet another silo. Large-scale, multi-year transformation projects can be particularly challenging because the dynamically shifting business environment makes it difficult to measure progress. 5G is expected to further exacerbate the issue because there is still no clarity on the type of use cases that it will enable, the revenue models that will be required or the specific customer or industry vertical that it will apply to.

The inability of incumbent legacy systems to support emerging functionalities and a lack of clarity around future applications are often cited as the reasons why many BSS transformations fail to achieve the desired results. The traditional approach of assessing vendors' solutions based on the number and type of use cases supported is unlikely to stand the test of time in the 5G era. A new approach is needed that allows CSPs to assess, define and procure vendor solutions that can evolve with their business needs. CSPs need to embrace a platform-based approach to transforming their BSS that is centered around the agility of the architectural framework. This will enable CSPs to swiftly reconfigure their support systems to quickly respond to market changes without requiring expensive customizations to support individual new applications. In addition, taking a UI-based configuration approach helps CSPs to empower their business teams by reducing their reliance on IT, improving their ability to experiment with new services and accelerating time to market for new products and offers.

The digital overlay transformation approach is a platform-based approach that can enhance CSPs' ability to support new applications without losing continuity by co-existing with legacy BSS frameworks. This approach uses a digitalized overlay layer that is deployed adjacent to the incumbent systems with no interconnection. This approach offers lower risk, a shorter time to market and the ability to shift all future systemic expansions to a new software stack using a modern architecture that avoids the complexity of legacy systems. The digital overlay approach can also reduce costs considerably, and can potentially save CSPs up to 50% over 3–5 years when compared with traditional transformation approaches.

This report discusses the business and operating environment that is driving BSS transformations and reviews the common transformation approaches that are available to CSPs.

2. Recommendations

- **CSPs should embrace a phased, platform-based approach to BSS transformation that emphasizes architectural agility.** CSPs benefit by breaking down large-scale transformations into independent, bite-sized programs that are spread over a longer duration, thereby reducing risk, and providing greater control over the customer experience.

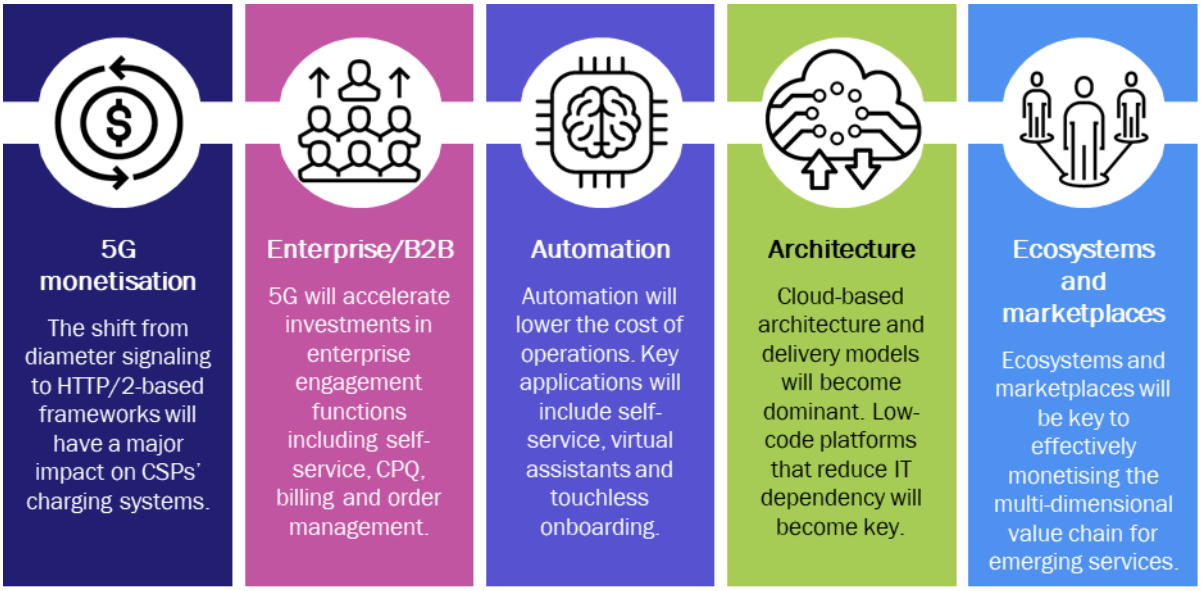
- **CSPs should choose an upgrade path that enables new revenue streams while minimizing the impact on existing operations.** Each option (digital overlay, adjunct and standalone) allows CSPs to customize their approach to new revenue streams while making full use of their existing investments.

- **CSPs should prioritise expandable solutions.** CSPs must plan for solutions that can seamlessly evolve and extend alongside their network and business expansions for long-term success and futureproofing.

3. Telecoms BSS carry a colossal technical debt

Emerging opportunities, most of which are tied to 5G, will drive extensive changes in how CSPs operate and engage with their customers. They will also have a significant impact on BSS (Figure 3.1). The lack of a long-term systems strategy has resulted in one of the biggest impediments to CSPs' digitization ambitions: a complex array of incumbent, and often insufficient, BSS. There have been waves of investment in monetization systems in the past, but complex legacy frameworks remain. Conversely, customer engagement systems have suffered from under-investment because they have remained on the fringes of CSPs' priorities. The rapid shift in the business environment over the past few years, the growing competition from digital-native companies and the rising importance of digitization in valuation and market perceptions have caused CSPs to prioritize the transformation of their digital touchpoints, with a strong emphasis on modernising legacy BSS.

Figure 3.1: Key trends that will affect BSS in the next 5 years



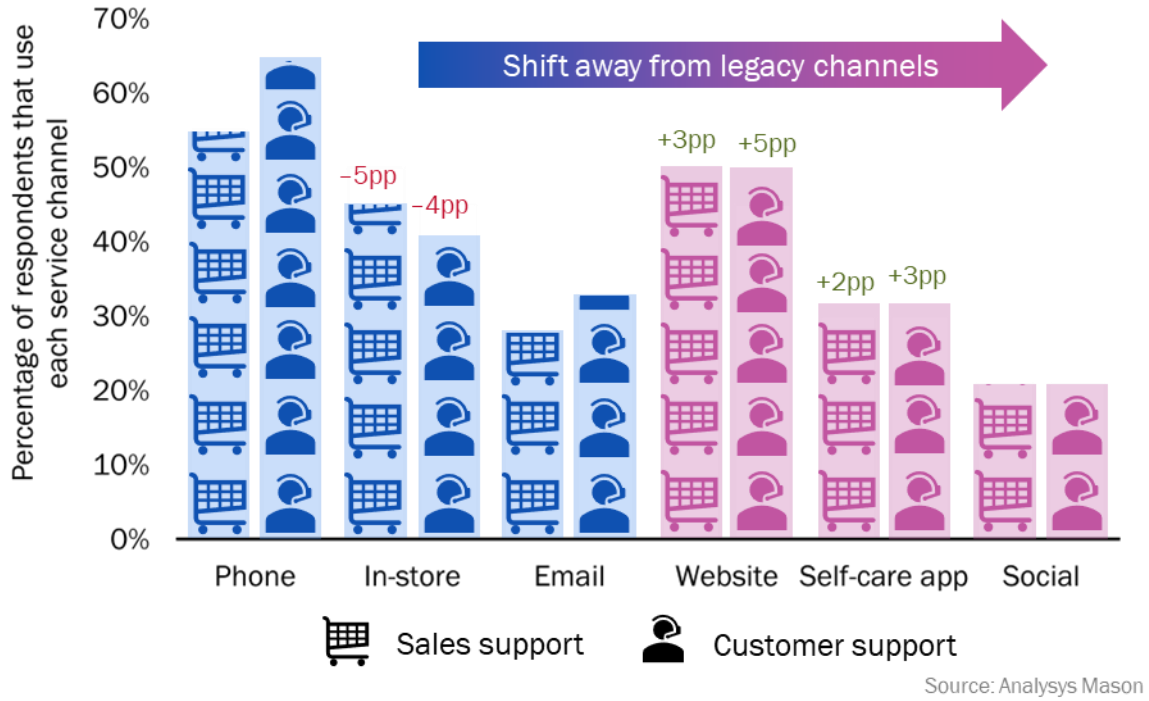
Source: Analysys Mason

The following three factors have played an important role in driving a shift in how CSPs approach transformation of their BSS.

- **Changing customer behavior.** Customers' preferences and expectations, especially in relation to service provider engagements, continue to evolve, driven in no small measure by the mobile-first and digital-only engagement models long-favored by digital natives such as Amazon, Netflix and Uber. Digital-native

companies have invested heavily in digital channels because the alternate approach of adopting the traditional model of serving customers across multiple channels involving several touchpoints was not feasible. Digitizing all (or almost all) customer interactions was the only way for digital-native companies to achieve scale at a low cost without compromising on customer experience. The majority of CSPs have invested in basic self-care functionalities, but these are far from being self-contained or engaging, and are insufficient to provide a seamless digital experience for the end customer. This remains an area of concern for most CSPs, especially as customers shift away from traditional channels towards digital channels (Figure 3.2). An increasing number of end users now prefer to be in control of their interactions with service providers and expect a completely digital experience, without the need to make direct contact.

Figure 3.2: Channels used by consumers for sales and customer support, Europe and the USA, 2021



- **Inflexible architecture.** The existing systems that most CSPs have in place are incapable of supporting modern customer experiences. The incumbent monolithic multi-vendor frameworks that are common in many CSP environments are often a barrier to transformation and CSPs are forced to design new models around them. Investing in a modern architectural framework may be the most-effective way to overcome the deficits of legacy systems in the medium-to-long term. An added issue with legacy systems is that customer and service information is often incomplete and is spread across disparate silos in multiple departments. Access to accurate data in real time is vital to ensure a satisfactory digital customer experience. Legacy systems are also incapable of understanding customer context or applying machine learning to gather deeper insights, which can be detrimental to effective engagement. CSPs with access to intelligent information management capabilities will have a distinct competitive advantage in the long term.

- **Total cost of operations.** CSP support functions remain highly complex and intricate, especially for BSS. The absence of a homogeneous architectural framework and the need to support ad-hoc interfaces between systems and functions significantly increases the architectural complexity and limits CSPs' ability to extract benefits from software upgrades. The support and maintenance of disparate multi-vendor systems can be complex, and customized software is often required to ensure disruption-free operations. Many mid-sized

and large CSPs have BSS from multiple vendors in their infrastructure; some run unsupported versions or systems from defunct vendors. In such an environment, the cost of supporting and maintaining legacy systems are unsustainably high. CSPs were willing to overlook these high running costs in the past, but margin pressures and the need to lower the TCO are making this impossible. The archaic and complex systems have come about mostly as a consequence of mergers and acquisitions and a lack of clarity and planning when deploying adjunct, point-based solutions. This has led to professional service providers building customized interfaces and systems to string together platform solutions from multiple vendors, which has resulted in high support and maintenance costs.

The above factors have blunted CSPs' competitiveness against more nimble and agile operators, which has had implications on how CSPs are perceived and valued by the public markets. CSPs' legacy frameworks and process models come with a high cost of operations that significantly exceeds that of digital natives that are of a similar or larger scale. A comprehensive overhaul of the digital experience is essential to transform the public and market perception of CSPs.

4. 5G is forcing a paradigm shift in CSPs' business and operating models

5G is unique and cannot be compared with previous network generations. The emphasis on a software-centric operating model is initiating deep-seated changes in how CSPs operate. Many of these changes are driven by external factors such as new business models and new customer profiles, but CSPs also acknowledge the importance of transforming internal aspects such as organization culture and structure to embrace emerging 5G-enabled opportunities. The following three factors stand out in how the ongoing roll-out of 5G is influencing CSPs' strategies.

- **New use cases.** The lack of clarity regarding new use cases is changing how CSPs upgrade or replace their underlying support systems. CSPs have traditionally adopted a use-case-centric approach when investing in monetization systems. This means that they begin by identifying the use cases that need to be supported and then map the necessary requirements to existing systems. Wherever an existing system falls short, a decision is made to invest in a new system, either as an adjunct or as a new stack. The lack of clarity regarding 5G-enabled use cases has made CSPs apprehensive about investing in new support platforms that are designed with a particular use case in mind.

- **New customer profiles.** The initial wave of 5G deployments will be strongly focused on consumer use cases such as enhanced mobile broadband, but the long-term business case for CSPs' investments in 5G is heavily reliant on expanding to address use cases for multiple enterprise and industry verticals. This calls for wider engagement with an altogether new customer profile for many CSPs. Large-scale changes to CSPs' workflows will need to be made, and process models must become better at addressing new requirements. The underlying systems framework will need to be transformed to support a diverse and dynamic mixture of customer types and applications.

- **New business models.** CSPs should be willing to experiment with different business models in order to effectively support new use cases for new customer types. The degree to which CSPs are able to support dynamic business models will influence their opportunities in the 5G value chain. For instance, a key requirement for supporting new industrial and enterprise use cases is the ability to support multi-

dimensional, multi-step value chains. This requires advanced partner management, CPQ, order management and settlement capabilities.

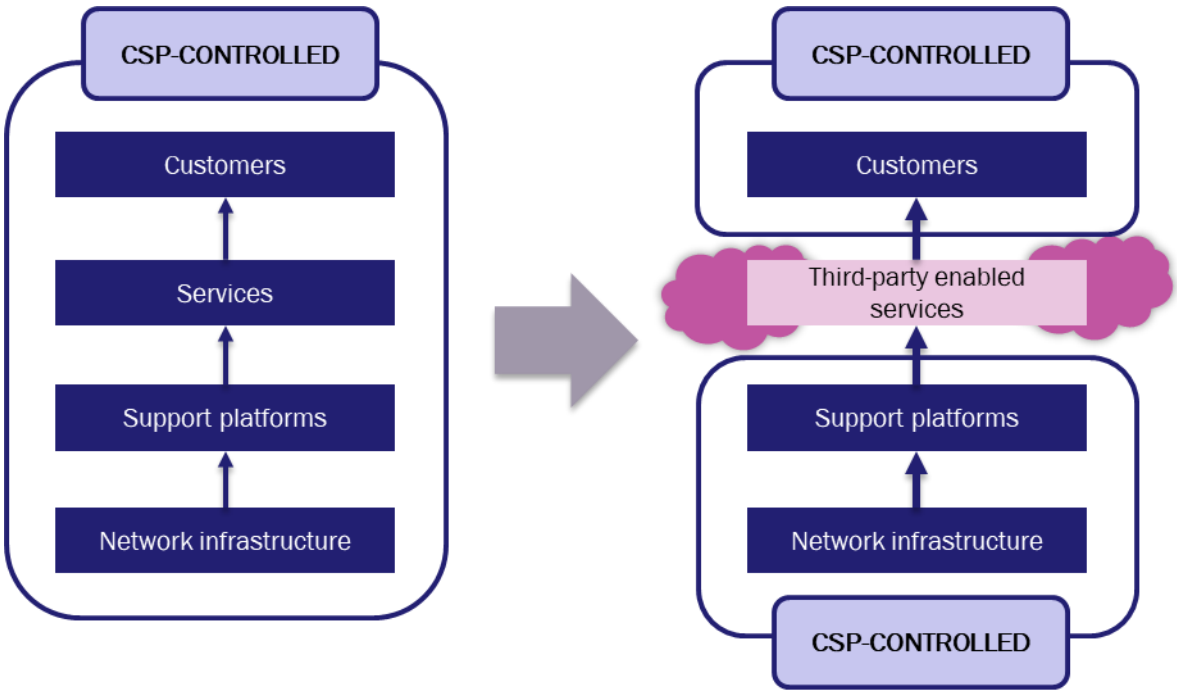
5. The platforms approach to transformation is likely to be a good option

One of the biggest technical challenges for CSPs to overcome is the heavily customized nature of legacy systems. This is a big barrier to supporting future business cases. CSPs should embrace an agile, configuration-based approach to replace the traditional customization-heavy approach in order to realize the complete benefits of modern architectural frameworks (namely automation, flexibility and cost efficiency). The platforms of the future are centered around modular reusable components that allow CSPs to swiftly reconfigure their systems to support new requirements. From a technology perspective, there are three key considerations for platforms of the future.

- **Architecture.** Microservices-based cloud-native architectural frameworks are the building blocks for next-generation software systems. The key traits of cloud-native computing include horizontal scalability, reusability, loosely coupled and open components, continuous integration and delivery and container-based deployment. Cloud-native computing offers CSPs the highest levels of efficiency due to the high levels of software reuse, resilience and speed. Traditionally, software applications have been designed as sets of tightly coupled functions that need to be deployed and executed together as monolithic entities. Such applications are purpose-built for each use case with limited reusability. This results in a process that is optimized for performance at the expense of flexibility and responsiveness. Even a small impact to a seemingly limited function can cascade into a systemwide impact due to tightly coupled and often single-vendor architecture. In addition, these monolithic systems have poor resource utilization because they cannot be dynamically scaled up or down and are typically dimensioned for the highest transaction rate expected for the year (which is typically only achieved on 4 or 5 days each year). Most use cases also require scaling at the level of specific functions, but the monolithic architecture does not support individual application scaling, which again results in poor resource utilization because the entire application must be scaled at a high infrastructure cost. The operating models of the future will rely on microservices-based cloud-native-compliant architectural frameworks. Applications that are designed for such frameworks are developed as loosely coupled microservices that can be independently scaled and dynamically reused within other applications, which radically improves system agility and offers CSPs a higher ROI.

- **Partner ecosystems.** Ecosystems are crucial to the success of 5G and future network generations. CSPs were previously the controllers and gatekeepers for all partner services used in their own infrastructure. However, the emergence of 5G and other digital economy initiatives means that CSPs must develop capabilities to support new value chains, improve customer engagement and build a thriving ecosystem of services around their key offerings for both consumer and enterprise customers (Figure 5.1). The ability to support multi-step, multi-dimensional value chains allows CSPs to expand their coverage and revenue streams well beyond connectivity services. CSPs are often unable to effectively monetize their large customer bases because of system-level limitations that restrict their role as a reseller or enabler of new services. In the 5G era, CSPs must be able to take on such roles to ensure effective partner participation and monetization of emerging enterprise-related opportunities. In the long term, this approach can help to create a thriving ecosystem around CSPs' core services, which will improve the loyalty and lifetime value of their customer bases.

Figure 5.1: Evolution of CSP value chain

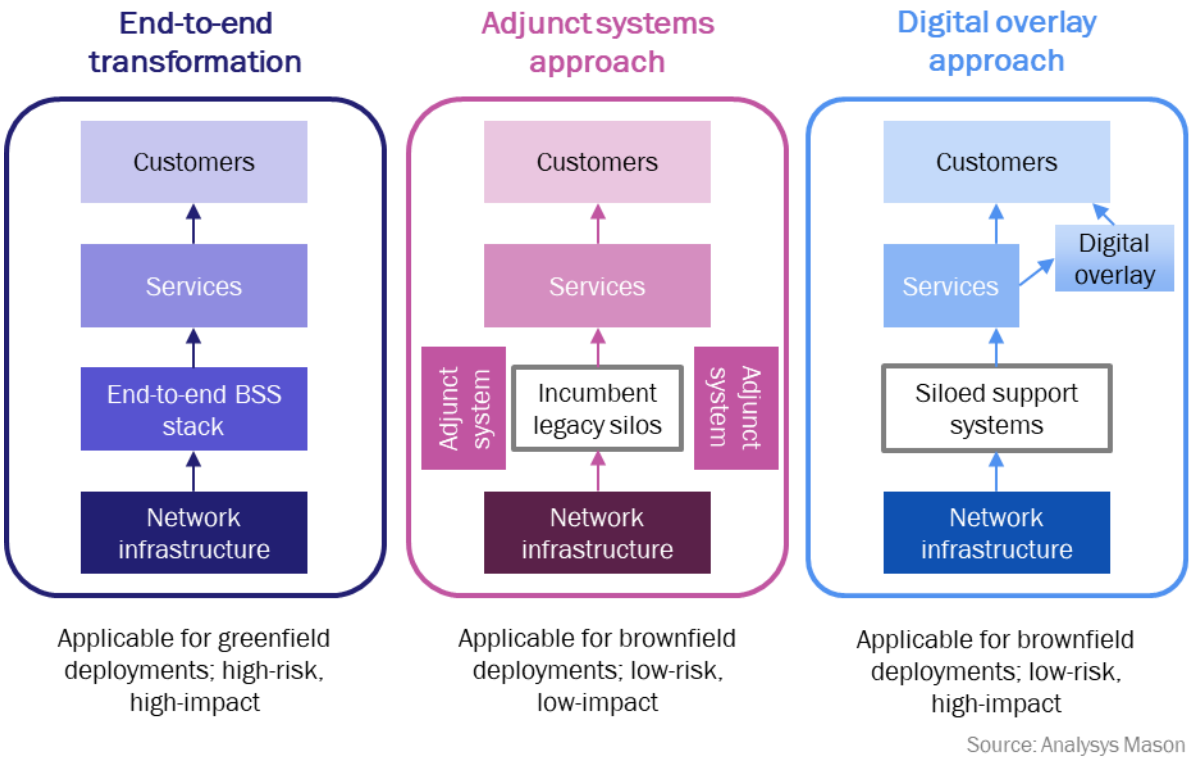


Source: Analysys Mason

- **Operations.** CSPs are increasingly keen to shift to an online support framework to improve their agility and perceived quality of service. Most CSPs today have separate teams for software development and operations. These teams are often disjointed and there is a limited flow of information between them. Modern cloud-based architectural frameworks demand a much more cohesive methodology for the development and deployment of software systems. DevOps and continuous integration/continuous delivery (CI/CD) are essentials of modern software delivery mechanisms and allow for extensive collaboration between development and operations teams and provide support for extreme automation. This will enable CSPs to rapidly deploy platform upgrades and reduce the time to market for new product launches. DevOps and CI/CD will also improve operational cost efficiency through automation and streamlined delivery processes.

In light of the above, there are three primary approaches that CSPs can take to transform their BSS (Figure 5.2).

Figure 5.2: Possible CSP approaches to BSS transformation



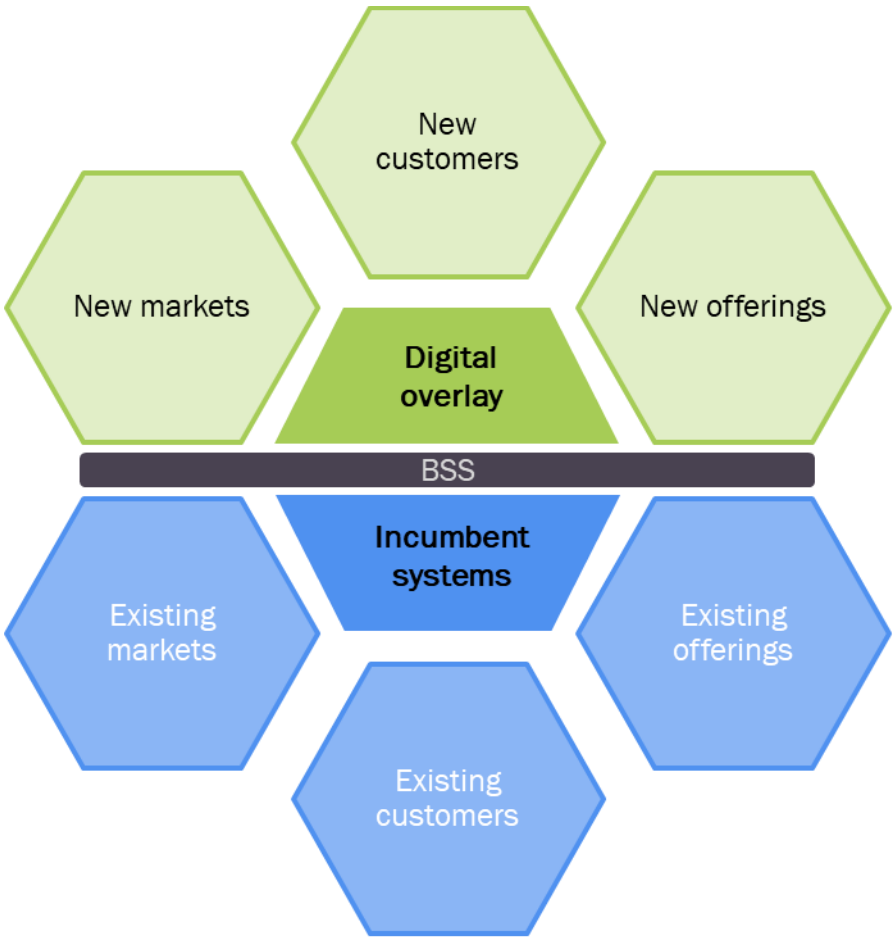
- **End-to-end transformation.** In this approach, CSPs replace their legacy BSS with a new, end-to-end stack. This is the most expensive and least popular of the three options, especially for mid-sized and large CSPs. Deploying a new stack offers CSPs the ability to start afresh and not be hindered by the legacy baggage of incumbent systems, but the risk of disruption to ongoing operations and continuity is very high, which outweighs any anticipated benefits. The few CSPs who have attempted this approach have had to alter their strategy midway due to various challenges. Nonetheless, this approach remains popular among CSPs that are setting up separate lines of business that are unrelated to their core systems. It is also suitable for greenfield operations.

- **Adjunct systems approach.** In the adjunct systems approach, CSPs extend the capabilities of their existing stack by deploying an adjacent system that meets specific requirements and is interconnected with the incumbent systems. This approach is usually adopted by CSPs that are attempting to add to existing system capabilities to support a new product or service launch in a time- and cost-effective manner. The benefit of this approach is that it can usually be deployed rapidly at limited cost, and it bypasses extensive legacy integrations, thereby insulating fragile legacy systems to some degree. However, this approach exacerbates the overall system complexity in the long term, which makes the eventual consolidation of support platforms even more challenging. In addition, the adjunct systems approach can offer only limited support for use cases that grow rapidly and demand dynamic scalability.

- **Digital overlay approach.** In the digital overlay approach, a digitalized overlay layer is deployed adjacent to the incumbent system without any interconnection with the legacy systems. The digital overlay layer, which is connected to the services layer through standardized APIs, will complement incumbent support systems and will be used exclusively for new services, at least initially (Figure 5.3). The overlay layer will be interconnected with the services layer, which will ensure continuity for CSP customers without the complexity of legacy integrations. The primary benefit of this approach is the low risk, short time to market and ability to shift all future systemic expansions to a new stack that is modern and that does not have the

cost or complexity of the legacy systems. The digital overlay approach can also help to drive significant cost savings of up to 50% over 3–5 years when compared with traditional transformation approaches. The digital overlay adheres to modern software methodologies such as cloud-native-compliant architectural frameworks, support for standardized interfaces (such as TMF Open APIs) and 5G and public cloud readiness, so will be well-positioned to help CSPs to swiftly support new applications and use cases. Incumbent legacy systems, which will continue to support existing services, will need to be supported for a period of time, but the digital overlay allows CSPs to phase out the legacy systems over time, thereby making it easier to control costs and improve overall agility.

Figure 5.3: Overview of how the digital overlay is distinct from legacy systems



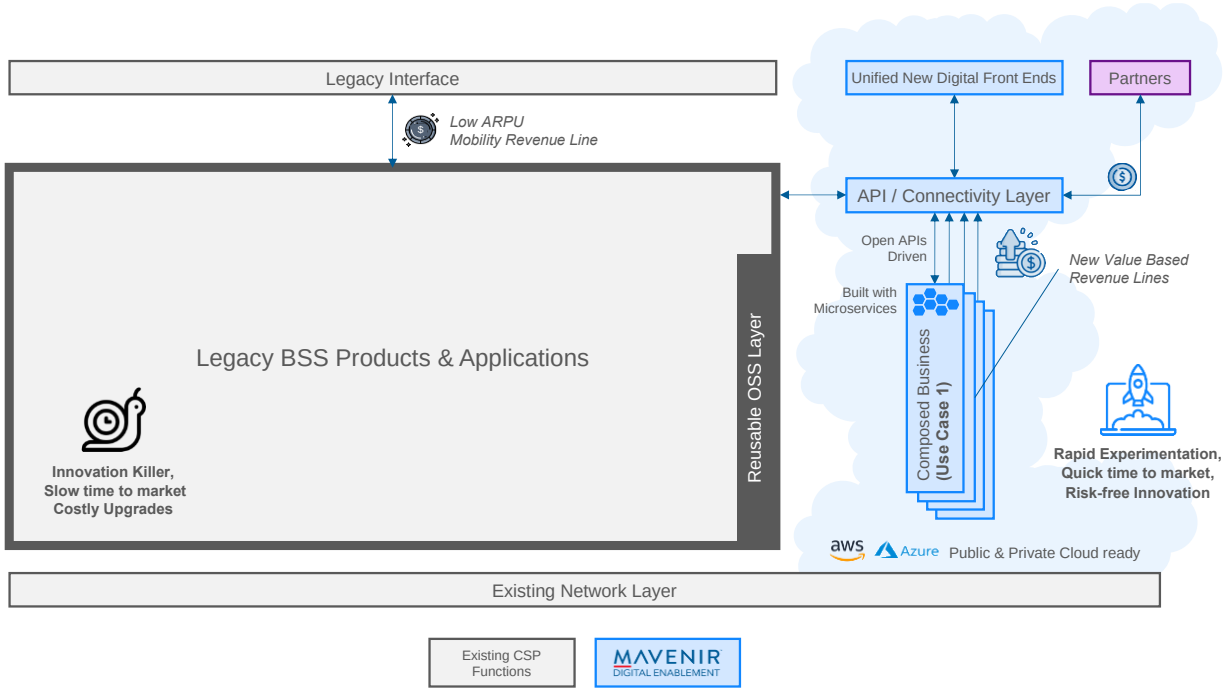
6. A Tier-1 CSP in Asia–Pacific has transformed its customer experience with a cloud-native digital overlay

A Tier-1 CSP in Asia–Pacific wanted to launch a new set of products and services, but it was unable to do so in a time-and cost-effective manner when using its legacy systems. The incumbent BSS was expensive, slow and offered limited scope for experimentation. The CSP also wanted to both adopt a cloud-native framework with

support for an active-active architecture framework and reduce the time to market for new releases from 9 months to a few weeks.

The CSP selected the Mavenir Digital Enablement (MDE) platform (Figure 6.1) to transform its BSS. The platform is UI-driven and includes extensive coverage of the BSS stack. The CSP was able to use the MDE platform to control the software deployed in-house, thereby reducing the risk of vendor lock-in.

Figure 6.1: Overview of the Mavenir MDE platform



Source: Mavenir

7. Conclusion

Ongoing 5G roll-outs will drive deep-seated changes in the telecoms operations framework, with a significant impact on BSS. Most CSPs have incumbent BSS that are incapable of supporting new use cases in a timely and cost-effective manner. To that end, the urgent transformation of CSPs' BSS is essential to ensure customer satisfaction while maximizing emerging revenue opportunities in the 5G era.

Transforming BSS is a multi-year, multi-step process. The long-term success of any transformation will depend to a large extent on the CSP's ability to implement a new services infrastructure that is not weighed down by legacy frameworks, thereby allowing it to be more modular, easily configurable and seamlessly scalable. CSPs have multiple options when transforming their BSS, but the digital overlay approach remains a strong contender because it can help CSPs to engage with, and monetize, new use cases and applications swiftly and effectively, and with lower risk. A digital overlay approach can also futureproof the network by placing greater control in the hands of business teams and can expand to support additional capabilities and new functionalities over time as needed.

8. About the author

John Abraham (Principal Analyst) leads our digital transformation research, including three research programmes: *Customer Engagement*, *Monetisation Platforms* and *Digital Experience*. His areas of focus include customer journeys and experience, the impact of 5G on BSS systems, telecoms enterprise opportunities, cost transformation, ecosystems and value chains, and micro-services-based architecture models. John has over a decade of experience in the telecoms industry. At Analysys Mason, he has worked on a range of telecoms projects for operators in Africa, Europe, India and the Middle East. Before joining Analysys Mason, he worked for Subex, a BSS vendor, and before that for Dell in India. John holds a bachelor's degree in computer science from Anna University (India) and an MBA from Bradford University School of Management (UK).