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A WHITEPAPER ON

the tech-driven telco:

SEPTEMBER 2021

Unlocking growth beyond connectivity through an open digital architecture

OBJECTIVE(S): To set out the business case for the "tech-driven telco" that uses a single architecture, across network and IT, to launch new products and services quickly, partner rapidly and operate at the cost point and with the flexibility required by the market.

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Executive summary

There is no question that the ongoing COVID-19 pandemic has accelerated digital transformation by seven years[1] and pushed companies past a 'digital-first' tipping point, with impacts on every industry. Digital adoption has taken a quantum leap at a personal, organizational, industry and governmental level. The most notable driving forces of this boom are irreversible changes in consumer behavior, specifically the shift to online channels, which have caused the telecoms industry and enterprises of all sizes to rapidly accelerate their digital transformation plans. This acceleration signifies a broader shift towards a digital economy and society which means telcos need to act now to capture a share of the new value being created.

At the same time, the pandemic clarified the critical role and purpose of communication service providers (CSPs) in a world which depends on ubiquitous connectivity. Despite this dependency, the market is predicted to remain stagnant (+0.1% CAGR) up to 2024[2] and shareholder returns continue to disappoint. CSPs understand the urgent need to transform themselves from telcos to techcos, that is moving beyond selling traditional connectivity in isolation to providing customers (both B2C and B2B2x) with platform-based products and services as part of an ecosystem.

By playing a role in ecosystems techcos can unlock at least $700 billion in new revenues[3], mostly in industrial 5G and B2B2x opportunities, by leveraging open standards and common interfaces such as TM Forum's Open APIs[4]. If holistic business transformation is done correctly, it could excite investors as Reliance Jio has done: Since April 2020 it has raised $21 billion from selling a 32.97% equity stake in Jio Platforms[5] to big-name investors.

TECH TRANSFORMATION: A CATALYST FOR CHANGE

CSPs are taking on this once-in-a-generation challenge, reinventing their operating model and processes, go-to-market and partnering approaches, company culture and ways of working. All these change programs are underpinned by the systems that support them, but many legacy systems are still in use that lock in legacy processes and behaviors. Earlier expensive attempts at technology transformations could also hinder ambitions.

CSPs need to move now to an open, modern, software-based architecture like those used by the hyperscalers they so admire. CSPs need their IT architecture to be modular, reusable, cloud-native, AI-ready and made of standardized components. Without it, they will not be able to implement new concept-to-cash cycles or co-innovate with partners or operate at the cost point and with the flexibility demanded by the market.

Cloud can help modernize legacy technologies and the softwarization of IT and networks, plus encourage innovation and co-creation, and reskilling the workforce. Leveraging cloud, CSPs can build a new operating model to generate new business, offering novel horizontal services and commercial bundles. They can compete in the new software-enabled and platform-based ecosystem, using 5G and edge technologies to create new services for enterprise and vertical opportunities, such as where ultra-low latency is critical.

"It is no longer acceptable for commercial and business teams to not have a basic understanding of IT/ Architecture principles, and likewise, IT teams must understand the drivers of the commercial business they serve"

Jonathan Abrahamson,
Senior Vice President, Product and Digital,
Deutsche Telekom

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1   https://www.mckinsey.com/business-functions/strategy-and-corporate-finance/our-insights/how-covid-19-has-pushed-companies-over-the-technology-tipping-point-and-transformed-business-forever
2   *Connected Industry Solutions: Telecom IoT Market Landscape. 1Q 2020 - TBR*
3   https://www.ericsson.com/en/5g/forms/5gforbusiness-2019-report
4   https://www.tmforum.org/open-apis/
5   https://retail.economictimes.indiatimes.com/news/industry/reliance-raises-22-43-billion-from-stake-sales-at-retail-digital-arms/78287648

Taking advantage of all these new technologies, opportunities and ways of working means CSPs must reinvent themselves – a daunting but doable challenge. Less than a decade ago, Microsoft knew it needed to move from selling monolithic technology stacks, systems and applications with a traditional software licensing model. Its aim was to become a platform and cloud-based SaaS company. The Azure cloud platform has become the backbone of the company and a significant revenue generator. Microsoft is today valued at over $1.9 trillion[6] and is one of the most successful digital transformations ever. Not only did this take a bold and visionary leader who turned the whole operating and incentive model and culture of the company upside down, it took a leader who understood technology. By marrying the right tech foundations with new business models and ways of working, CEO Satya Nadella has been able to transform Microsoft's culture and reignite a growth mindset, with outstanding results.

While progress is being made, telcos are still searching for the value beyond connectivity to unlock growth. Unlike Microsoft Azure, which has global reach, the telecoms industry is too fragmented for individual telcos to effect the necessary changes alone. CSPs must work together, forming robust partnerships, coordinating efforts and leveraging standards, so that the industry can act as a single force to accelerate change and deliver new digital services. Then they will remain competitive, attract the right levels of investment and generate the return on invested capital that shareholders expect from technology-led, digital services companies.

THE TIME IS NOW

Given the speed of change over the last year, industry leaders are reviewing transformation plans and questioning how their change initiatives can be delivered faster. This whitepaper provides a blueprint for successful operational and technological transformation using TM Forum Open Digital Architecture[7] to shift to an open, modern, software-based architecture that is cloud-native and AI ready that meets market demands.

For this whitepaper, we carried out interviews with C-level executives from some of the world's largest telcos and the actions they recommended to ride the next wave of change can be summarized as:

📄 **Evolve the network and IT to exploit new cloud native technologies and revolutionize procurement, management and operations**
  • Cloud native uses standard components to avoid vendor lock-in and enable faster concept-to-cash cycles, co-innovation with partners and to operate at the cost point and with the flexibility required by the market and shareholders

📄 **Deploy AI-driven, autonomous operations to make zero-touch operations a reality**
  • To deliver the next generation of services and take advantage of ultra-low latency and massive connectivity, networks need to be zero wait, zero touch, zero trouble

📄 **Change the operating model by reimagining the business as a set of capabilities**
  • This supports the creation of new business and partnership models, as well as experimentation

📄 **Adopt a new mindset to embed the right business and technical DNA to succeed in a new operating environment**
  • Move away from the asset-heavy, hardware-based engineering ethos of telcos to the hyperscalers' asset-light, software-driven approach that encourages experimentation and innovation

📄 **Work collaboratively as part of the global industry to operate and compete at scale, with the right costs base**
  • Telcos collectively can become a huge force in accelerating change and gaining the scale to attract valuable partners

📄 **Make zero-touch partnering a priority**
  • It is important to reduce integration costs and the time it takes to engage with partners to develop new business models, and to offer new services and products

📄 **Invest in reskilling and upskilling the existing workforce**
  • CSPs need the correct skills to take their businesses forward, embrace new software-based technologies and realize the value from change.

"Leaning into technology can be highly disruptive but liberating also."

Colman Deegan, *CEO*, **Vodafone Spain**

"We are building the best connectivity for our customers, but growth will come through opening up our services, partnering and embarking upon new revenue models."

Colman Deegan, *CEO*, **Vodafone Spain**

"The industry is not moving fast enough and not in a coordinated way."

Ruza Sabanovic, *Executive Vice President and Chief Technology Officer,* **Telenor**

6   https://www.forbes.com/sites/jonathanponciano/2021/04/26/microsoft-nears-2-trillion-market-value-second-only-to-apple-in-the-us/
7   https://www.tmforum.org/oda/

The search for value

Recent times have been tumultuous for the global economy because of the pandemic, but communication service providers (CSPs) demonstrated outstanding resilience. They continued to deliver connectivity and services, despite traffic loads across their networks surging by up to 100%[8] and having to move their entire workforces to remote working exceedingly quickly. Like other businesses, CSPs rapidly adapted to new ways of working and their customers' changing behaviors and needs.

Network operators were in the global spotlight as never before as more people began to work and study from home, and businesses of all sizes (from SMEs to multi-nationals) looked to accelerate their own digital transformations, based on new technologies and services. This provides huge opportunities for the telecoms industry, yet despite the unprecedented surge in demand, CSPs have not been able to monetize this increased usage: They continue to deliver disappointing returns to shareholders while the value of the S&P 500 has increased by more than 40% in the past year.[9]

The resilience and reframing of what was possible during the ongoing crisis clearly demonstrates the value of CSPS' pre-pandemic transformation efforts. Now with recovery coming into focus in some parts of the world at least, industry leaders need to step up to the next transformation wave.

COMPLEMENTARY VIEWS

In our interviews with telecoms executives for this paper, we identified two complementary views on how CSPs can best respond to industry challenges. Colman Deegan, CEO, Vodafone Spain, highlighted the need to "replace the traditional telco business model", which relies on vertical integration in product silos to gain efficiency. In effect this outsources innovation to network equipment providers and vendors.

Deegan says that new technology is disintermediating CSPs' relationships with customers, so CSPs urgently need to reimagine customer experience, seizing the opportunity to play a meaningful role in customers' daily digital routines. This means shifting innovation from the fringe of the network into the center of the customer experience.

Connectivity is the cornerstone for such changes, according to Michaël Trabbia, Chief Technology and Innovation Officer at Orange. He stated, "Connectivity is our core business, and we believe it is more and more vital and as we go beyond connectivity, as it is the fabric that will power new ecosystem partnerships and services for consumers and businesses. We need to find solutions to bring real resilience to the network; make it more agile to enable delivery of these services."

Trabbia described what he calls "high-value connectivity", that is building new services on top of it to generate a new wave of revenue, especially in the B2B sector. Here traditional connectivity revenues are expected to be flat (+0.1% CAGR) to 2024 but connected industry solutions – such as IoT and professional services – are anticipated to grow at +28.4% CAGR up to 2024[10].

To understand where that new value will come from and to transform, reinvent and rebuild for growth in a post-pandemic world, CSPs need to look at the 5 Big Shifts identified by Accenture, which are affecting the telecoms sector. These shifts can be viewed through the lens of three meta-themes – Customer re-imagination, Business model re-invention and Technology re-volution.

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8   https://www.gsma.com/newsroom/press-release/covid-19-network-traffic-surge-isnt-impacting-environment-confirm-telecom-operators/
9   S&P 500 performance up 41.06% from 11 June 2020 to 11 June 2021
10 Connected Industry Solutions: Telecom IoT Market Landscape. 1Q 2020 - TBR

SHIFTS AND SIGNALS

CUSTOMER RE-IMAGINATION		BUSINESS MODEL RE-INVENTION		TECHNOLOGY RE-INVENTION
Life re-imagined	**A new contract for society**	**The search for value**	**Partnership growth models**	**Telco to techco**
Home is now central to our work, study and personal life	Internet access is a UN-recognized human right	Stalled growth and commoditization of connectivity	Competition from adjacent industries intensifies	5G is an inflexion point and gateway to new markets
Connectivity demand soars as status elevates to mission critical	Digital divide exacerbated by Covid-19	Low-trading multiples and high-dividend pressure	Growth beyond connectivity propelled by partnership	Network becomes an extension of cloud and edge emerges as the new control point
Consumers expect digital sales and service as default	Connectivity essential for economic prosperity and physical wellbeing	Absence of differentiation and moat/flywheel	Shift from vertical integration to open ecosystems	Cloud changing business models and barriers to entry
SMBs go digital	Governments investing billions in infrastructure and economic recovery	High-levels of CapEx and debt, propelled by 5G with low levels of R&D investment		AI is transforming front office, back office and infrastructure
Mobility disrupted with reduced travel and population dispersion	Customers and employees expect businesses to lead on sustainability and purpose	Platform business models delivering higher returns		Siloed opmodel and outdated product development process
		B2B expected to outperform B2C		Software is eating the CSP, requiring shift from sales- and service-dominated workforce

OPPORTUNITIES

Design compelling home experiences	Engage with governments to bridge digital divide	Decouple from legacy architecture and processes	Identify strategic partners to amplify value of control points	Leverage cloud to accelerate asset-light business and commercial models
Accelerate shift to Digital sales and service Reinvent retail experience	Develop consortia to accelerate recovery and deliver next generation green infrastructure	Generate new sources of value creation beyond the core	Develop open architectures and align with standards to enable partnerships	Invest in R&D to continuously bring new services to market
Support SMB digitization	Make purpose central	Reduce time to market for new services	Co-create differentiated solutions with partners to maximize value	Make AI pervasive across the business
		Articulate growth narrative and KPIs to the market		Remove silos and empower employees
				Invest in reskilling and attracting software engineering talent

FIGURE 1: Table showing 5 big shifts & signals affecting the telecoms market

LIFE RE-IMAGINED

The first shift is Life re-imagined which details how the home is now central to our work, study and personal life. An Accenture survey[11] found that 74% of people who previously never or irregularly worked from home said they enjoyed the experience while 63% of consumers who expressed interest in work from home services are willing to pay for them. Despite this, CSPs have not capitalized on this opportunity and have been slow to develop and launch compelling new products to serve this market, with global smart home revenues expected to grow at 18.5% CAGR to 2025 when they are anticipated reach more than $183 billion[12]. Consumers are also now expecting digital sales and service as default as they have learned not to rely on physical stores.

Another finding from the Accenture survey was that 85% of consumers using a digital channel for the first time during Covid-19 were interested in using a digital channel again post-crisis. Further, 89% said that digital interactions were equal or better than previous in-person experiences. SMEs have quickly responded to these shifts with 60% of those surveyed planning to accelerate their digitization by 2024, offering CSPs who innovate and partner at speed a significant opportunity. Some CSPs are already jumping on the SMB opportunity. For example, Peter Leukert, CIO at Deutsche Telekom, recognizes that this is a key growth area offering the chance to build "on added value and solutions for the SMB market – especially in Germany where we have a large footprint, but more needs to be done, especially around partnerships and business models."

A NEW CONTRACT FOR SOCIETY

Accenture's second shift is a new contract for society, whereby important services like health and education are increasingly accessed from home, and SMEs sell many more products direct to consumers online. High-quality connectivity is no longer nice-to-have but essential: In 2016, the UN declared internet access is a basic human right. In 2021, five years after that declaration, 44% of U.S. adults with household incomes below $30,000 per annum do not have a home broadband service[13] which impacts children's education and families' access to healthcare. A new social contract is needed, quickly, between CSPs and governments to fix this.

Governments are spending trillions to "build back better": It is critical for CSPs to be at the center of digitalizing economies. By taking a leading role in driving recovery and shaping the future, CSPs can generate tremendous value for society. For example, a 0.13 percent increase in GDP per capita is possible with every 1% increase in the digital ecosystem development index[14] (that is, the extent to which a country has advanced broadband, digitization and ICT).

THE SEARCH FOR VALUE

In the era of Robinhood and Wall Street Bets, CSPs have underperformed on stock markets in recent years. They are feeling financial pressure from all sides as growth continues to stall, revenue stagnates, and commoditization gets a firmer grip. The continued decline in productivity from assets and return on invested capital (ROIC) runs in parallel with 5G-related CapEx being expected to grow by 34% annually to 2025[15]. Shareholders' returns from the industry increased by just 2.4% over the last five years[16], partially sustained through dividends, and investors still put CSPs' multiples below the high-tech and infrastructure sectors.

In contrast, platform companies continue to attract market confidence and Zoom is worth more than several of the top European CSPs combined. This calls into question the sustainability of the current commoditized CSP business model.

Boris Maurer, Accenture's Communications & Media Industry Lead for Europe, notes, "CSPs need to find a way to selectively pick and choose battlegrounds as they need to continue to defend some control points, and at the same time start new value creation – that needs modularization. To become more competitive on innovation, they need to increase scalability and fundamentally decouple the legacy from the customer engagement, service creation and delivery parts of their businesses to become more flexible and reduce time to market."

In short, the industry needs a new narrative for investors that is focused on growth, highlighting how connectivity is the foundation for new platform and service opportunities.

11   Accenture COVID-19 Consumer Research
12   Omdia - Smart Home Services Forecast Report: 2020–25
13   Pew Research Center, Jan-Feb 2019 survey
14   ITU, The economic contribution of broadband, digitization and ICT regulation, 2018
15   Analysys Mason, Mobile capex: worldwide trends and forecast
16   Accenture, Comms industry sector analysis, a financial analytics deep dive (Nov 2020)

PARTNERSHIP GROWTH MODEL

Competition from adjacent industries is intensifying – a sign that CSPs must seek growth propelled by high value strategic partnerships in growth verticals. CSPs sit at the nexus of core control points including data, the network and a B2B workforce. They enjoy a high degree of trust with their customers and continue to own those relationships, so CSPs are well-placed to build differentiated solutions with ecosystem partners. In addition, they can adopt user-centric and data-driven open platform architectures to onboard ecosystem-based services.

Shifting the business structure from vertical integration to open ecosystems presents even greater opportunities. CSPs that partner with players in adjacent industries – such as technology, finance, entertainment, retail, automotive and others – are designing next-generation use cases for greater long-term value. Some service providers like Axiata, are building upon a highly successful open API marketplace to build on partnership growth models. Anthony Rodrigo, CIO, Axiata, believes this is key for launching "products that solve customer problems, faster and at scale, and also generates a lot of new opportunities especially in the SMB space when we drastically lower the cost to create a new service." Recent entrants into the telecoms industry, like Rakuten Mobile in Japan and Reliant Jio in India, have exceled at building partnerships, SuperApps and platform-based experiences for customers that are centered on a membership model and a diverse range of services that keep customers engaged.

TELCO TO TECHCO

New technologies including 5G, cloud, and edge offer CSPs the chance to step beyond being a delivery system into the role of enabler. 5G is an inflection point for all industries and a gateway to new markets for CSPs. At the same time, cloud is changing business models and lowering barriers to entry while edge enables the quick delivery of contextual services, with a personal touch. Accenture says CSPs can realize a 40% saving in CapEx by moving to virtualized, cloud-based architectures.

Transformation will require more than technological advancements to be successful. How CSPs use and experiment with the new technologies and capabilities is critical as they migrate from telco to techco. Nik Willetts, CEO, TM Forum comments, "Telcos need to learn to experiment and roll out new features to their customers and have the ability to quickly scale up releases. Facebook can try out new applications with 1% of its customer base and then scale up or down as necessary. If telcos are to truly become techcos, they urgently need to achieve this level of agility and flexibility."

CSPs will need to invest much more in building product management functions and R&D, which is chronically underfunded at present, equating to just 1.7% of CSPs' revenues in 2019 versus 12.9% for software and cloud companies[17].

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The journey to techco

The telecoms industry has seen generational shifts in network technology since the launch of the first automated cellular network (1G) in Japan in 1979. To date, the typical gaps between generations is eight to ten years which allowed CSPs time to adapt their organizations to meet demands and develop applications and commercial models on a new scale.

The confluence of a bunch of new technologies – cloud, AI and blockchain – and the rapid pace of both their development and adoption alongside the quantum leap offered by 5G and the competitive paradigm of global platforms, does not give CSPs much time to accommodate with the intention of becoming fast followers. As the world becomes increasingly hyperconnected, they themselves need to rapidly leverage these new technologies and business models to solve their own customers' needs and preferences and unlock the so far elusive growth.

In 2019, research by Accenture found that tech leaders, representing the top 10% of organizations (ranked by adoption of key technologies, penetration of technologies adopted and organizational culture) were increasing revenues at twice the speed of tech laggards (that is, the bottom 25% by the same measures). Updated research conducted in 2021 found that over the course of the pandemic the gap has widened, with tech leaders increasing revenues five times faster than laggards.[18]

THE PANDEMIC GAP

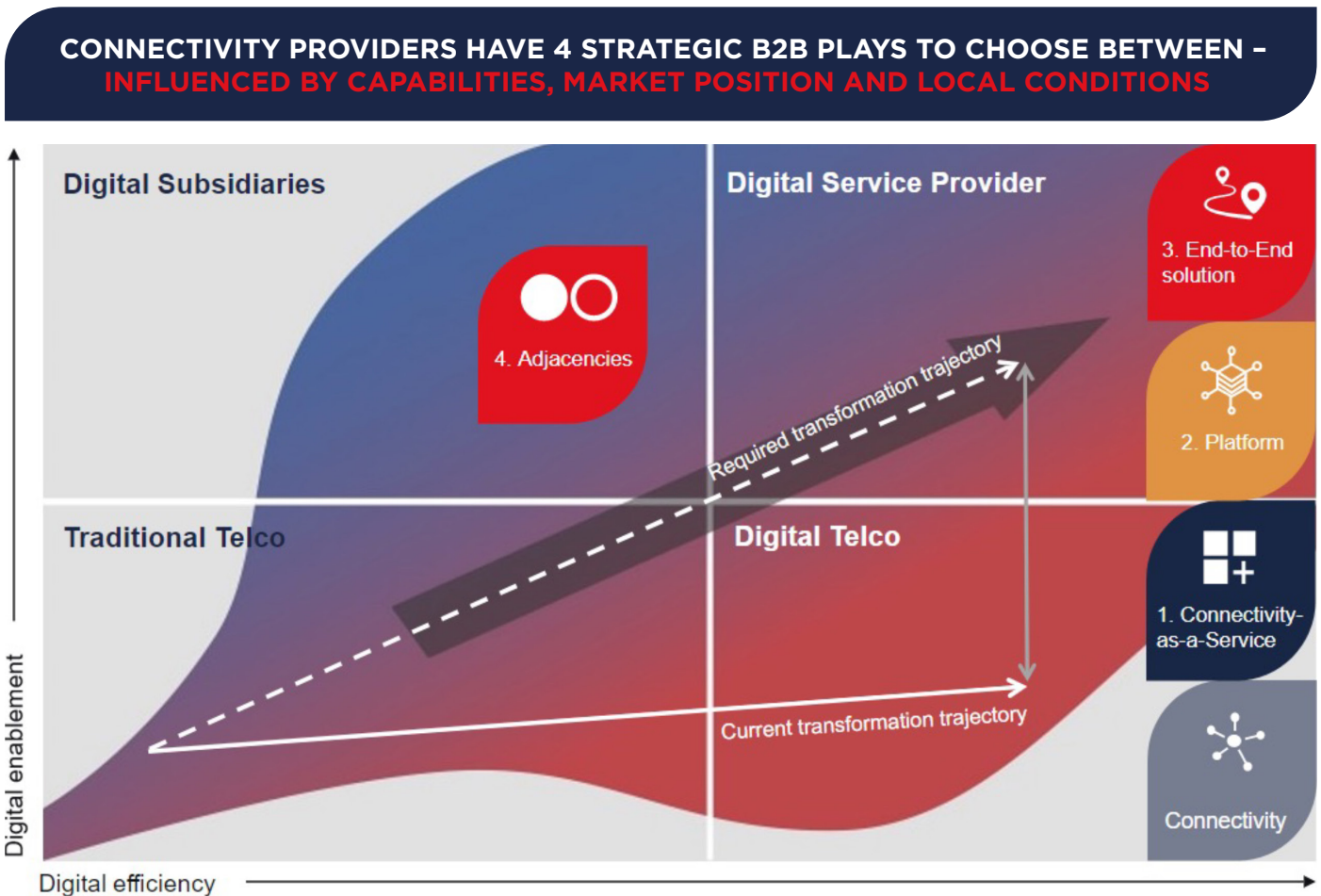|					
2021					X5
2019	X2				

0   1   2   3   4   5
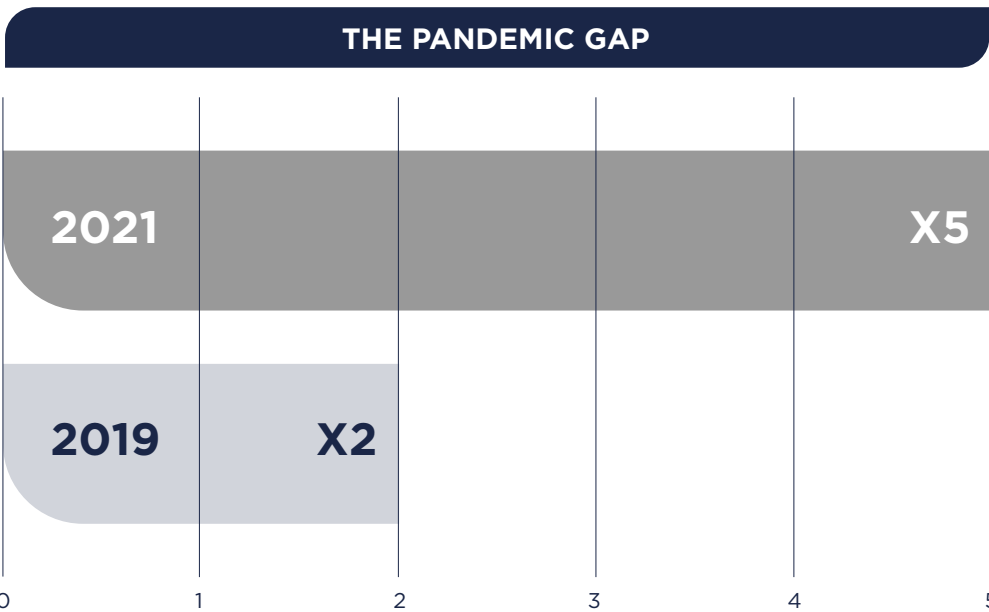
FIGURE 2: Revenue growth rate for tech leaders (top 10%) vs tech laggards (bottom 25%)

18 Make the leap, take the lead, Accenture (2021)

CHANGING TRAJECTORY

For CSPs to become tech leaders, many need to adjust their current trajectory because they are on course to become digital telcos, not techcos. A digital telco digitizes its systems, processes and experiences to realize the cost benefits of automation and taking a cloud-native approach, but they are not digital solution providers and their core revenues are still from connectivity.

A digital solution provider is a CSP that has gone beyond only offering connectivity and evolved to provide end users and customers (both B2C and B2B2x) with products and services built on a platform-based business model. Examples include delivering content to the consumer market or analytics and visual recognition systems to enterprises. TM Forum developed a model to illustrate this, indicating that correcting course means a shift to cloud-native IT and network functions, an Agile operating model and a change of mindset. It also means making core capabilities easily accessible to others so third parties can consume them, and having the desire and ability to experiment.

CONNECTIVITY PROVIDERS HAVE 4 STRATEGIC B2B PLAYS TO CHOOSE BETWEEN – INFLUENCED BY CAPABILITIES, MARKET POSITION AND LOCAL CONDITIONS

FIGURE 3: The change of course required to unlock growth beyond connectivity

STELLAR DISRUPTORS

The stellar performance of digital disruptors across key business indicators – such as revenue growth, investor returns, market leadership and customer engagement – is in sharp contrast to the stock market performance of CSPs in recent years. They need to move away from being network centric to become service and customer centric, seeing their infrastructure as the springboard for providing new services through a high degree of automation and softwarization, that is largely infrastructure agnostic.

Over the last 25 years, CSP's management focus has been on successfully defending physical assets, i.e. the network their business is built on, but new technologies make it so cheap and scalable to create superior experience and adapt faster, that this is fundamentally undermining the traditional CSP business model and ability to invest.
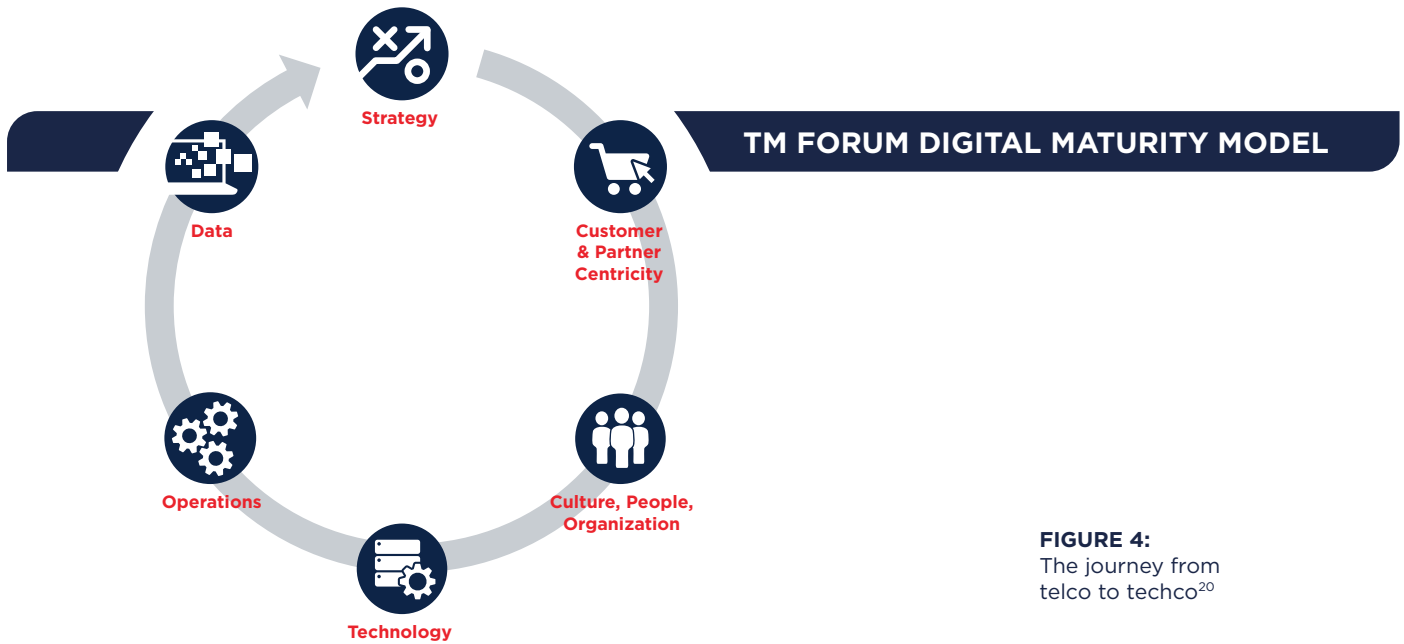
At the same time the perceived economics of some network elements are changing. Passive infrastructure – base station towers – are viewed as a cost when on operators' books but become valuable assets when moved outside a mobile network operator's main business. For mobile operators, the sum is less than the value of the parts, hence the recent flurry of activity in operators selling off their passive infrastructure as Telefonica has, or spinning it off into a separate entity like Vodafone, Orange and Deutsche Telekom, and the rise of towerco specialists like Cellnex and American Tower.

SUPPORT FOR CHANGE

There is considerable enthusiasm from executives within the industry about this radical change, with Colman Deegan, CEO of Vodafone Spain, commenting, "Leaning into technology can be highly disruptive but liberating also."

Competition within telecoms is becoming a battle between technology stacks, with many types of technology appearing at every layer within the stacks. Enterprises are building unique architectures to capture the market in unique ways, meaning that business and technology strategies will need to be more deeply aligned than ever before. Increasingly, enterprises will be defined by the IT choices their leaders make, and the strength of the stack they build.

Recent research by Accenture found that 83% of communications executives agree that their organization's business and technology strategies are becoming inseparable, and even indistinguishable[19]. No part of a traditional telco organization will remain untouched with wholesale transformation required across six key areas: Strategy, customer and partner connectivity, culture, people, organization, technology, operations and outcomes and data. The transformation journey from telco to techco across all six areas is detailed in the graphic and table below. The speed of delivering this transformation is key, given that global platform providers enjoy a considerable head start and advantage across the six areas and are continuing to evolve at pace.

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Strategy

Data

Customer & Partner Centricity

Operations

Culture, People, Organization

Technology

TM FORUM DIGITAL MATURITY MODEL

FIGURE 4:
The journey from
telco to techco[20]

Strategy	**Lack of clear organizational-wide transformation roadmap and lack of meaningful delivery metrics** • Transformation strategy is not clear and is not understood across the business • Manual and inconsistent reporting across the organization • Frequent cost and schedule overruns • Ecosystem held at arm's length from technology organization	**Clear organizational-wide transformation roadmap and business outcome focus** • Transformation strategy is clear and is understood across the business • Value-driven measurement model • Maturity model: Efficiency and output
Customer & Partner Connectivity	**Poor digital customer experience and lack of ecosystem products** • Fragmented customer experience and no 360-degree view of the customer • Traditional channels of providing customer experience with few digital touchpoints • Few vendors at scale to act as strategic partners • Rigid contracts, ridged solutions • Ecosystem held at arm's length from technology organization	**Digital, proactive omnichannel experiences based on an ecosystem platform approach** • AI-driven 360 degree proactive customer experience • Fully digital customer experiences with a "one app" approach • Vendor consolidation initiatives with strategic partnerships • Service co-creation and product innovation with selected software vendors
Culture, people, organization	**Unempowered resources with outdated skills** • Core capabilities outsourced • Limited incentives to innovate • Resources more vendor managed-based than technologies	**New workforce with tech dominance** • Build skills and talents to reduce vendor dependency • Co-sourcing with a strategic partner
Technology	**Poorly mapped system; End of life platforms** • Siloed stacks with duplicated functions • Legacy impeding innovation • No clear target date • Plans for and addresses threats, vulnerabilities and security compliance requirements	**Supporting modern software engineering** • Decoupled and microservice-based architecture • Technology simplification • Open platform for ecosystem contribution • Proactively contributes to the definition of new digital security standards, responds to all threats in real-time and prevents potential threats
Operations	**Ill-defined processes with too many handoffs** • Heavy on waterfall • Friction internally (DevOps) and externally (Digital, R4B)	**Outcome-based and business driven** • Digital hub to build own IP with new agile ways of working • Collaborative decision making • Focus on speed-to-vale and innovation (try and fail)
Data	**Poor data management and lacks data-driven insights** • Lack of a standardized data model • Organizational decisions are rarely data driven • Organization generates no measurable value from data	**Data-driven organization focused on value** • Standardized data model used throughout the organization • Organizational decisions are taken based on data from across the organization and ecosystems partners. • Organization generates significant measurable value from data optimized across the organization and ecosystem partners.

Successful transformation across the six key areas will reap big rewards, with increased revenues and return on invested capital (ROIC), dramatically improved customer experience and more engaged employees. New opportunities will be unlocked across both B2B and B2C with cloud and edge radically transforming the technology, ecosystem and operating model landscape for CSPs. Networks are becoming horizontally decoupled, virtualized, cloud native and software defined. Cloud is changing business models and barriers to entry: The worldwide cloud market is expected to grow by 16% CAGR between 2019 and 2024[21].

For CSPs, migrating to the cloud can modernize legacy technology, accelerate innovation, rotate talent, enable new business models and lower barriers to entry. Significant cost efficiencies can also be achieved, such as 40% savings in CapEx by moving to virtualized, cloud-based architectures and 25% savings in OpEx[22] from network automation and AI-driven network maintenance.

CSPs can also use the cloud to develop and deploy new business, network and data monetization models while partnering with cloud providers is an important go-to-market shift that will become central to success: As Peter Leukert, CIO of Deutsche Telekom, stated, "If we are to be successful, we need to have APIs in AWS, Azure and GCP [Google Cloud Platform]." Through such partnerships, CSPs can more effectively respond to market disruption and roll out new digital services and commercial models more quickly.

PREPARING FOR CHANGE

TM Forum has been helping the industry take a practical approach to transformation with the Digital Maturity Model (DMM) which has been developed by industry thought-leaders. The guided assessment helps CSPs navigate the complex digital transformation journey by allowing them to understand where they are today, what they want to become tomorrow, and bridges the gap with practical help, tools and assets, along with a set of key strategic KPIs so C-level executives can easily measure their company's transformation progress[23].

In the consumer space, this entails creating value through a "platform mindset" leveraging data and control points like customer premises equipment, mobile apps and smart devices to increase their relevance and engagement by converting data into insights to improve services. Intelligence from data enables CSPs to offer consumers personalized services and experiences as well as new digital services through partnerships within the ecosystem.

Examples could include new smart home services, enabling them to more easily manage the disparate array of connected devices in the home or offering new services and upgrades over the air (OTA) in areas such as parental controls and security. Other verticals witnessing double-digit growth include connected health, gaming, and online education. CSPs like Rakuten Mobile have achieved web-scale-like growth from pursuing this model and continuously building new partnerships and offering consumers new services while Etisalat's hugely successful Smiles membership and loyalty platform has seen Etisalat recognized by Brand Finance as Middle east and Africa's most valuable consumer brand.[24]

In the B2B sphere, while traditional connectivity revenues stagnate, edge technology offers CSPs the opportunity to play a new role in delivering industry solutions and is another critical enabler of CSPs' journey from telco to techco. 5G and edge computing are based on web-scale technologies and open-source principles The worldwide edge computing market is predicted to reach $50 billion in 2024 with a CAGR of 12.5% over the 2019–2024 forecast period[25]. As CSPs migrate to cloud-native network architecture, the telco network becomes an extension of the cloud and edge emerges as the critical new control point, offering CSPs the opportunity to create new moments of engagement with customers.

21 IDC, Worldwide Whole Cloud Forecast, 2020–2024 (Oct 2020)
22 Arthur D Little: Who dares wins! How access transformation can fast-track evolution of operator production platforms, 2019
23 https://www.tmforum.org/digital-transformation-maturity/
24 Brand Finance Global 500 2021
25 IDC Worldwide Edge Spending Guide, 2020

ECOSYSTEM PARTNERSHIPS

Service monetization too will adopt a service-based architecture, distributed across end-to-end network architecture as ecosystem partnerships will be key to CSPs developing vertically integrated services to solve industry-specific needs, whether they are in intelligent manufacturing, autonomous driving, precision agriculture or remote surgery. CSPs have an opportunity to play a central role in delivering new services and a clear desire to position services beyond physical infrastructure and connectivity. Rainer Deutschmann, Group COO, Telia Company, comments that CSPs "now have the opportunity to play an orchestrator role delivering a one-stop shop service to customers".

In the network domain, the shift to a virtualized, open-source paradigm is an opportunity to become more Agile: Competitive advantage is not only based on price or commercial offerings, but on experience and speed. Partnerships are more important than ever here today, with CSPs collaborating more on interoperable architecture and technologies such as Open RAN and sharing the burden of maintenance, leaving more room for innovation by participating entities.

TALENT AND SKILLS TRANSFORMATION

Talent and skills transformation are essential for CSPs looking to shift to a platform business model, including developing software and product development skills in-house and reducing vendor dependency and lock-in. A key to success will be moving resources from maintaining the current core business to transforming and creating incremental growth, while at the same time building the foundational capabilities that will allow CSPs to scale new business models and opportunities. Each legacy capability must be modularized and transformed into a standardized, cloud native, scalable microservice which can be evolved independently of the rest of the stack, creating resilience, future compatibility and cost competitiveness.

With a limited supply of high-tech talent, CSPs are competing against platform companies to attract and retain star employees. Platform companies had a big head-start and far larger budgets. One of the executives interviewed for this paper discussed the challenge of attracting the best technical talent into telecoms stating, "As an industry we need to rebrand ourselves as innovative and impactful, as we have found it challenging to bring people into the organization as when candidates think of CSPs they think about program management and vendor management versus new product development."

A talent shift is also needed from a sales- and service-dominated workforce to one that is focused on engineering and analytics. Only 14% of today's telco workforce holds engineering and/or analytics skills compared to 53% in technology disruptors' workforces[26]. CSPs must define a talent strategy that identifies capabilities and skills to grow in-house versus where to make acquisitions and strategically partner for transformation. Likewise, CSPs need to take bold action regarding inclusion and diversity as telecom has the lowest inclusion and diversity (I & D) scores among major industries. Ambitious I&D targets must be central to any growth and transformation strategy if it is to succeed.

Open Digital Architecture (ODA) as the blueprint for transformation

The next wave of transformation for telecoms will have software at its core if it is to progress beyond delivering traditional connectivity services. High value connectivity will always be at the core of the CSPs' business but to grow revenues, telcos need to build highly agile and scalable services on top of that connectivity, adopt new business models and partner with the right companies to ensure they have a solid role and extended reach in delivering digital services. So far, technology transformation has typically been left to the IT and Network technical teams: The rest of the organization knew little about how they could leverage new capabilities, innovate using technology, deliver the services their customers want or experiment.

"It is no longer acceptable for commercial and business teams to not have a basic understanding of IT/Architecture principles, and likewise, IT teams must understand the drivers of the commercial business they serve"

Jonathan Abrahamson, *Senior Vice President, Product and Digital,* **Deutsche Telekom**

Tech transformation enables the transformation of operating and business models, which is why all senior executives need to understand the critical role it can play. Adopting a common framework and blueprint can help the business meet its macro-objectives such as improving the customer experience, operating at lower cost points, reducing time to market and seeing better return on invested capital (ROIC) – which is where the Open Digital Architecture (ODA)[27] comes in.

Open Digital Architecture is an open, modular, software-based, cloud-native and loosely coupled IT reference model, that allows CSPs operations to be driven by AI and data. It is made up of standard components that can be easily produced and deployed without customization. The standardization of components and the exposure of capabilities will limit vendor lock-in and boost scalability and innovation in the future
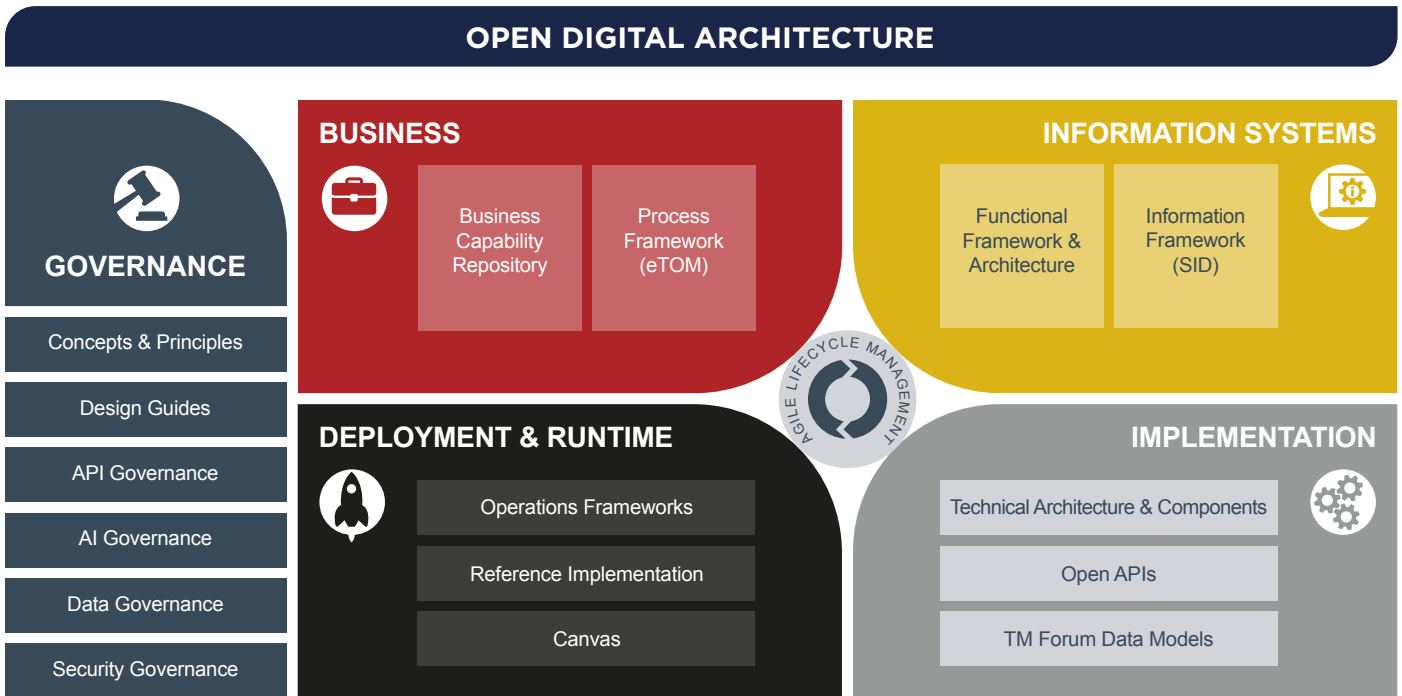
Deutsche Telekom used the ODA and TM Forum Open APIs to transform its complex back-end systems and introduce a single mobile application (OneApp) across Europe. Previously each country had its own, each with different architectural approaches and maintenance costs.[28] OneApp is now used by over 60% of Telecom customers each month. Similarly, M1 leveraged TM Forum's ODA and Open APIs for their transformation to become a cloud native digital service provider with an elastic cost structure to enable partnerships and instant, hyper-personalized, made-to-measure service for its customers. They moved almost everything in their backend system (apart from the physical networks assets) into the cloud – the first such shift of its kind in the telco world. 90% of M1's business processes are now cloud native and they expect self-service transactions to raise from 15-20% to close to 90%[29].

The adoption of ODA enables a true 360-degree transformation of the core tech, go-to-market strategies and different business models. It also allows CSPs to become industry orchestrators, powering the next wave of innovation across industries and enable the creation of marketplaces for software.

27 https://www.tmforum.org/oda/
28 https://inform.tmforum.org/casestudy/deutsche-telekom-uses-open-apis-european-unification/
29 https://inform.tmforum.org/casestudy/oda-and-apis-help-m1-transform-into-cloud-native-dsp/

FIGURE 5: Core elements of the Open Digital Architecture

ODA comprises an architecture framework, common language, and design principles. It defines standardized interoperable software components organized into loosely coupled domains. These components expose business services through **Open APIs** built on a common data model. ODA provides machine-readable assets and software code, including a reference implementation and test environment.

CREATING MARKETPLACES

CSPs could create marketplaces, whereby they procure and assemble interoperable ODA components to make products and services available to their customers which are cheaper, faster and easier to deploy, encouraging a "try and buy, fail fast and cheap" approach.

Anthony Rodrigo, Group CIO, Axiata, sees this approach as critical for evolving the CSP business model. He sees this as an important way to "scale services, launch new business models, adapt to the speed of the market, attract new partners and launch new products quickly and at a lower cost point. Apart from the API/technology enablement we must be able to support flexible business and charging models, out of the box to minimize time and cost to move a partner led service from concept to production.

New services can also be launched with partners in days rather than months, which is far too long. To take full advantage of this software marketplace approach Rodrigo acknowledges, "we need to shift our business and operating model from selling connectivity to creating and selling solutions. For example, this is a fundamental change to the sales teams driven by KPIs and skills and way of working centred around just connectivity.

TRANSFORMING CUSTOMER EXPERIENCE

Beyond the development of marketplaces, we are beginning to see real business results with CSPs deploying the Open Digital Architecture. Vodafone UK recently used the ODA to transform its customer experience to launch new offers faster, increase digital sales and end-to-end automation, reduce costs and implement a culture of innovation and to complete a turnaround of Net Promote Scores (NPS).

RESULTS OF VODAFONE'S NEW DIGITAL CUSTOMER EXPERIENCE

Digital sales increased by **more than 50%**

30% increase in sales conversions

Launch of VOXI youth brand to counter competitors **within weeks**

Able to roll out **more than 40%** on-demand production releases within a day

End-to-end automation for more than **1/2** of all customer interactions

Digital customer contacts with no manual intervention increased to **greater than 50%**

Zero downtime while deploying microservices into production

3x improvement in NPS (from +11 to +33)

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It did this by replacing aging and redundant IT stacks; retiring an outdated content management system; adopting CI/CD/CT and DevOps methodology; leveraging TM Forum Open APIs; implementing a new microservices-based digital experience layer; and intelligent, omnichannel customer experiences including a new app, web store and chatbot.

Digital sales have increased by more than 50%, with more than half of all customer interactions handled by end-to-end automation. There has been a 30% increase in sales conversions, the launch of VOXI, a youth sub-brand to counter competitors and a three-fold improvement in NPS.

Vodafone UK's IT group can roll out more than 40 on-demand production releases a day and achieved zero downtime while deploying microservices into production. Total cost of ownership has been reduced as a result of reuse, the adoption of cloud applications and an automated CI/CD pipeline. Optimization of non-production environments has delivered an additional cost savings of £500,000 ($694,600) per year. The solution deployed by Vodafone UK customer experience has become the model for the Vodafone group.

ODA also played an important role of bringing about cultural change in the organization as people could clearly understand the benefits that modularity and a cloud native approach would bring. Ben Connolly, Head of Digital Engineering at Vodafone UK, said, "Culture change was crucial to the success of this effort and it was driven from the top; our leadership's commitment to digital transformation and adoption of new methods was critical.[30]" Read more about this case study here.

FIGURE 6: Results of Vodafone's new digital customer experience

DEVELOPING NEW B2B2X CAPABILITIES

stc is another example of where growth was enabled through using the ODA. The operator completely digitally transformed its wholesale business to expand its offerings, accelerate launches, increase sales, integrate channels, automate key processes and deliver a more responsive customer experience. By implementing a new microservices-based digital layer, leveraging the ODA and Open APIs as well as Agile, taking a design thinking approach and using continuous integration, continuous deployment, continuous testing (CI/CD/CT), it digitally transformed the wholesale business unit, improved speed, efficient and revenue growth while adding new B2B2x capabilities such as:

- Delivered single, open, automated platform for all lines of business with unified wholesale product catalog
- 10x faster product launches with product configuration in hours
- 200% increase in fiber-to-the-home order flow
- 30% less time to close quotes
- Leapt from 30 to more than 150 enhancements rolled out to production per year
- First in the region to deliver a multi-party B2B2X solution.

KEY BUSINESS REALIZATIONS - WBU TRANSFORMATION PROGRAM

1

10x
Faster product launch time

2

30x
Increase in quote closure time.
- Inventory checks for complex bundles are automated
- Correction of sales error, is systematic process

3

50x
Shorter sales cycles by digitization of sales process from agreement to proposal sign-off

4

70x
More and larger deals by supporting complex, bundled products

5

80x
Optimization of agreement, pricing & discounts capability. Sales has numerous options to offer best, dynamic prices to customers

6

90x
Of data meets organization & industry standard healthindex, ready to use in big data, in business Analytics and intelligent report

7

100x
Auto Multiparty B2 B2x solution

The importance of going beyond technology transformation was highlighted by Mohammed A. Alabbadi, Vice President for Wholesale, stc. He spoke about how success lay with a change in the operating model and how people worked and communicated with each other across the business. He said, "Cross-functional roles, tools and processes along with Agile strategy, a design-thinking mindset and by implementing a DevOps organizational approach," were critical success factors[31].
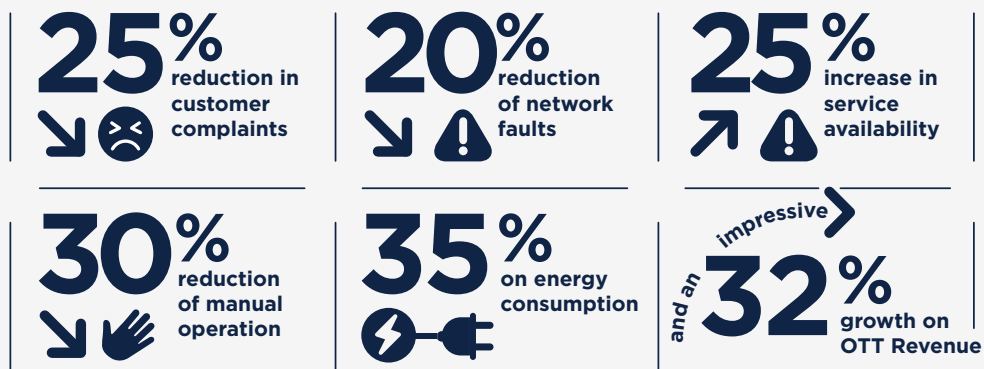
FIGURE 7: stc's results from its transformation program

31 https://inform.tmforum.org/casestudy/stc-transformation-delivers-first-in-region-b2b2x-solutions/

POWERING AUTOMATION AND SERVICE ASSURANCE

The value of autonomous operations also cannot be underestimated in the terms of business value and benefits that it brings. Without AI and automation, CSPs simply will not be able to deliver the connectivity required for the next generation of services, never mind additional services running on top. The AIOps Autonomous Service Assurance Catalysts[32] demonstrated the value of the ODA's AIOps Service Management Framework, showing how autonomous and intelligent operations are required to meet growing network speed, quality and capacity requirement, as well as to manage increasingly complex infrastructure and optimize operational costs.

The benefits of deploying the AIOps Framework saw a: [33]

25% reduction in customer complaints

20% reduction of network faults

25% increase in service availability

30% reduction of manual operation

35% on energy consumption

and an *impressive* **32%** growth on OTT Revenue

Realizing the power and value of the ODA depends on its wide adoption and implementation, plus also telcos and partners working together to ensure it is deployed in a standardized and harmonized way. If telcos want to create an attractive ecosystem with scale, they need to work as one to move beyond connectivity, standardized interfaces, such as TM Forum Open APIs, and reference architectures and data models to ensure they take a common approach to selling solutions. Fundamentally, there must be interoperability between the telco ecosystem and the hyperscalers' ecosystems, as well as those of verticals and so on. As Ruza Sabanovic, Executive Vice President and Chief Technology Officer at Telenor stated, "We need to understand what partnerships really mean and deliver the interoperability and standardization to realize their value at scale."

The ODA provides the necessary architectural blueprint to realize value from transformation as well as to migrate from a telco to a techco. Its success must be part of the broader business transformation which requires a fundamental shift in the CSPs' operating model. This means changes to KPIs, organizational structure, the effectiveness and leadership by senior executives, and a shifting mindset. It requires an organization that can learn to experiment and fail fast as well as ensuring everybody understands the role technology has to play in unlocking true business value.

FIGURE 8: The benefits of deploying the AIOps Framework

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32 https://www.tmforum.org/catalysts/aiops-autonomous-service-assurance/
33 These statistics are the combined business benefits of the 6 use cases included in the catalyst from HKT, Smart, PLDT, TIM, China Telecom, LGU+ and Cosmote supported by PCCW Global, Huawei, BOCO Inter-Telecom, Comarch and Intracom Telecom

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The next wave of change

CSPs' transformation journey will never end: They need to keep evolving and adapting to market dynamics. No one size will ever fit all, and there will be various localized market conditions that operators need to take into account. As they prepare for this next wave of change there is, however, a blueprint they can follow so they emerge stronger, more agile and innovative; making them more attractive to partners and enabling new business models that scale. This will drive revenue growth for CSPs and put them at the heart of digital lifestyles and societies: CSPs fundamentally changing their operating model is central to their success.

It is understood that operators need to continually **evolve their network and IT architecture** to one that is open, modular, agile, cloud native, AI and data driven. It must be loosely coupled and made up of standard components which can be easily procured without customization. This will enable CSPs to achieve the required concept-to-cash cycles, open up new business models with partners and operate at the cost point and with the flexibility the market requires.

We are already seeing huge success with operators that are taking this approach: They can partner with a wider range of companies more rapidly, differentiating themselves in the marketplace and unlock new revenue.

In addition to this, as outlined in the previous chapter, AI and autonomous networks are also having a huge impact on CSPs' business, from helping to reduce OpEx and enabling an increase in OTT revenue by assuring new services. **AI-driven autonomous operations** are critical to deliver the next generation of services and take advantage of ultra-low latency and massive connectivity. Networks must be zero wait, zero touch and zero trouble.

Change your mindset

Deploy AI-driven autonomous operations

Prioritise Partnering

Change your operating model

Reskill your workforce

Evolve Network and IT

Work Collaboratively as an industry

FIGURE 9: Key steps telcos need to take to ride the next wave of change

ARCHITECTURE DEFENDS AGAINST COMMODITIZATION

Philippe Rozes, Senior Vice President, Innovation Strategy at Orange, sees this architectural change as critical to fight commoditization of connectivity and the reduction in revenue from data services. Moving towards a modular architecture which exposes enterprise-grade business capabilities connected through Open APIs is key not only for partnering but to offer existing capabilities as new services on top of connectivity, such as a billing, analytics, and location-based services. Business model innovation can happen with or without partnerships but in either case, modularity, flexibility and agility of an open digital architecture are necessary.

Dr. Li Huidi, Vice President, China Mobile Group, says the network must become more "flexible, agile and open to enable new business capabilities and reduce costs". This is critical for China Mobile to achieve its aim of building a new information highway "to create new scenarios, new business forms and new models relating to information services, and to meet customers' needs for a diversified and differentiated digital life." An open digital architecture means operators can act like hyperscalers, quickly testing and launching new services then being able to scale them up or down, depending on their success.

As mentioned in the previous chapter, the power of this modular architecture can be seen at Axiata where its CIO, Anthony Rodrigo, has created a marketplace platform, so it can **rapidly partner** to launch new services by exposing its business capabilities and connecting with external partners through Open APIs. This not only enables Axiata to speed up innovation but also that of its partners.

This approach, as Rodrigo says, "enables Axiata to evolve its business model and co-create products with partners. Migrating to an open digital architecture enables us to launch thousands of services atop our APIs per year as opposed to typical 10s of VAS services in the pre-API era."

Axiata's is innovative in terms of technology and the way it has adapted its business model, with a differentiated pricing and revenue sharing models depending on how much of the service or workload comes from which partner. They also have flexible charging models from per transaction, periodic fee, or other combos. Innovating with technology and using it to create new, modern, flexible pricing models is critical if CSPs are going drive revenues from new digital services and partners.

TECHNOLOGY IS ONLY PART OF THE STORY

A new open digital architecture is only a part of the transformation in the next wave of change. CSPs also must fundamentally **change their operating model** to realize the value that technology brings by understanding what capabilities are needed. Without this approach, there is danger of ending up "with a Ferrari engine inside a Lada" as Nik Willetts, CEO, TM Forum puts it. A change in the operating model covers everything from business models to roles and skills, culture, governance, mindset and even the way measures (such as KPIs, objectives and key results – OKRs – etc.) are put in place. Legacy operating models hamper CSPs' ability to innovate and take a "try it and fail fast" approach.

Yet these operating models are embedded deep within CSPs, centered around legacy thinking for legacy technology, which as Willetts says "has been traditionally so customized, hard-wired and costly that the business has put a lot of checks and balances in place to prevent somebody making a costly mistake. This has had a net effect of making it very difficult for teams to experiment, learn or invent a new service to meet the needs of different or new customer segments, because there is too much red tape designed to protect the core."

As described throughout this paper, if architected in the right way, ODA-based, cloud-native software gives CSPs the capability to experiment and trial changes without rolling them out to the entire customer base, and the modularity limits impact. If CSPs do not transform their processes, governance and operations to harness this huge technological capability, all the flexibility and modularity will remain locked in bureaucracy and rigid governance processes. This is why it is critical to upgrade both the technology and operating model with business and IT working in lockstep with one another, tracking progress against combined priorities. An intelligent partnership strategy is also essential in order to transform at pace with clarity around how and where to work with vendors and partners.
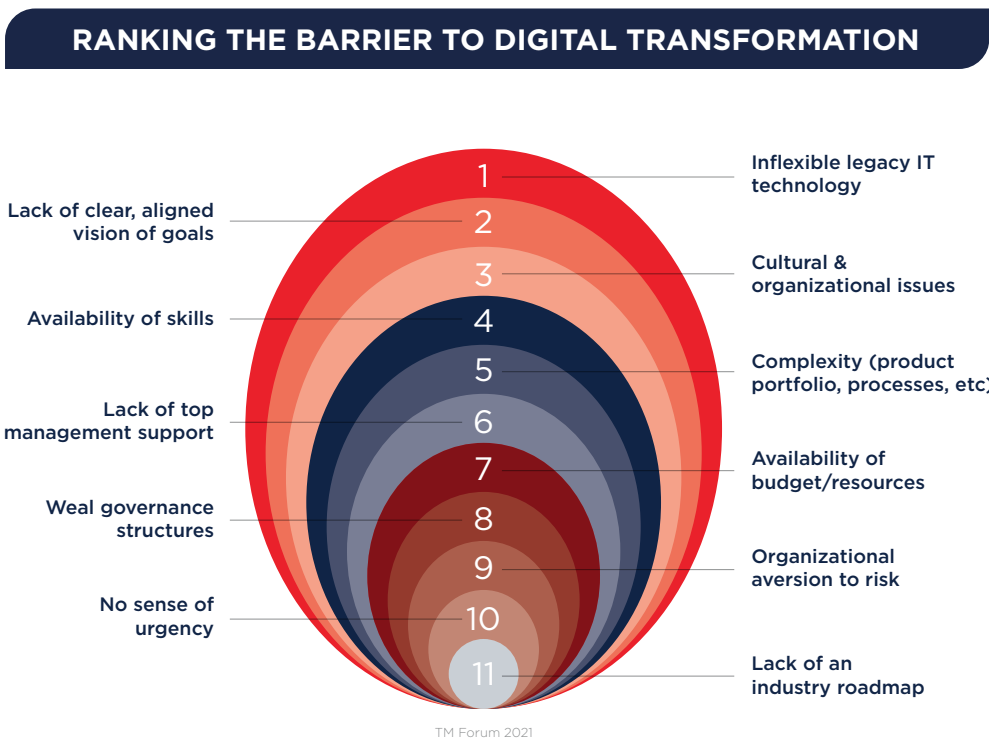
Boris Maurer, Accenture's Comms & Media Industry Lead in Europe sees successful CSPs identifying a role for both. Maurer says "vendors are within a capability – you chose them because they help you solve the problem, but you can also switch them over time, as the ODA framework is built for that, while you will have a selective set of partners that will help you strategically to master the journey."

SHIFTING MINDSET

Changing the operating model requires a **major mindset shift,** and this is much harder than achieving technological transformation as it impacts employees' roles, jobs and powerbase, which causes a resistance to change. Indeed, cultural and organizational issues are often listed as one of the major barriers to digital transformation. In the latest TM Forum Digital Transformation tracker[34], cultural and organizational issues was ranked as the third largest barrier.

A move to agile working principles requires CSPs to educate and trust their employees to follow clearly set rule and principles around agile working and methodologies. Agile working means empowering teams to work in an agile way and being trusted to follow the rules and execute on the strategy, as opposed to having a committee do it on their behalf.

Failure to take this approach has led Willetts to comment that, "What's interesting is for all the ways of working and cultural transformation that has occurred in the last few years, I have found very few operators who have seen much new innovation at a product level. I believe this is because, while the ways of working and cultural changes have been successful in improving employee engagement, they are paired with outdated tech and operating/governance models which still make it hard for teams to experiment and innovate."

RANKING THE BARRIER TO DIGITAL TRANSFORMATION

Lack of clear, aligned vision of goals

Availability of skills

Lack of top management support

Weal governance structures

No sense of urgency

1 Inflexible legacy IT technology

2

3 Cultural & organizational issues

4

5 Complexity (product portfolio, processes, etc)

6

7 Availability of budget/resources

8

9 Organizational aversion to risk

10

11 Lack of an industry roadmap

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FIGURE 10: The barriers to digital transformation

MEASURING SUCCESS

To encourage a change in the way of working, Willetts suggests that new metrics are needed around the "ability to experiment" which will enable CSPs to assess whether the overall business is becoming more innovative. He concludes by saying "it is much nuanced than time-to-market and focuses on ability to innovate: If it is happening, you should see evidence of many failed experiments and lessons learned."

Colman Deegan, CEO, Vodafone Spain agrees that new metrics are needed to measure success and should include the percentage of staff with programming or digital skills, the percentage of revenue coming from non-core activity and the number of monthly active users on digital platforms.

34 TM Forum, Digital Transformation Tracker 5, https://inform.tmforum.org/research-reports/digital-transformation-tracker-5/

Shankar Arumugavelu, Global CIO at Verizon, also echoed the need for a change of emphasis on metrics and the way of working. He says that many KPIs look at existing business models and processes and ways of working, whereas we need to look at how the business is evolving and put new KPIs and measures in place around goals. He stresses that while new metrics and KPIs may be needed for innovation, from Verizon's standpoint, it is important that people are not distracted by these measurements and stay focused on trying to create new services, which by definition do not have precedents against which they can be measured.

He thinks there needs to be a balance as they are focused on "building a world-class network, and then building platforms and solutions on top of that connectivity." Verizon has adopted a multi-team approach to developing core connectivity, platforms and solutions to drive innovation and new services across the business while ensuring employees "do not take their eyes off the ball and deliver world class connectivity which is the jewels in the Verizon crown." **Reskilling** and retraining the workforce to ensure they have the skills to deliver change and implement new AI- and software-based technology remains critical for any transformation, whether it is focused on delivering the networks or services of tomorrow.

BETTER TOGETHER

Finally, to ensure CSPs ride the next wave of change, it is critically important that **CSPs work collaboratively,** taking unified approach to delivering digital services so that the telecoms industry is much more appealing to partners and enterprises to do business with. A common architectural approach, which fosters interoperability driven by APIs, enables CSPs to partner to partner rapidly. It also enables CSPs and their partners to scale as needed to operate in a truly digital landscape.

Ruza Sabanovic, Executive Vice President and Chief Technology Officer at Telenor, says that the industry, "Must get together, work together and not isolate. There is enough value and new revenues for everybody if we collaborate. We need to create open ecosystems, not locked ones." She is right, the future value of the industry relies on CSPs working together, actively collaborating to find interoperable solutions across the digital landscape to unlock new growth. Going it alone, will not work in a hyper-competitive digital landscape where scale and partnering are table stakes.