FRAMEWORK FOR A SUCCESSFUL SERVICE PROVIDER DIGITAL TRANSFORMATION

EXECUTIVE SUMMARY

Market forces are driving service providers to transform their networks and infrastructures to enable them to increase the velocity and breadth of service offerings and to reduce capital expenditures and operating costs. Several key technologies are now mature enough for network introductions that will underpin service providers' digital transformation.

This transformation is complex and far reaching in scope and affects every aspect of operators' networks and businesses. It is essential that providers retain the right partner that will guide the company through this intricate process.

Key selection criteria for this partner include: global scale combined with local focus and flexibility, a rich and market-proven products portfolio backed by a strong services organization, fully integrated solutions, a track record of innovation, staff support capabilities to alleviate skills shortages, and business support to assist with business planning and organizational transformation.

Once the right partner has been selected, service providers need to work closely with that partner to create a well thought-out, detailed plan that considers all aspects of the transformation for the duration of the process, which is likely to take years.

In this paper, ACG Research discusses these requirements for transformation and highlights use cases to guide the operators toward successful outcomes.

Key Findings

- Service providers must embrace digital transformation to meet market needs and to remain competitive.
- The digital transformation is complex and requires that the operator create the right ecosystem as they undertake it.
- At the heart of that ecosystem is the right partner, which brings the right scale, technology, solutions, and services to successfully shepherd the operator through this multifaceted, typically multi-year process.
- A tight relationship with the right partner is essential for success.

INTRODUCTION

Service providers are undergoing a profound transformation of their entire business to continue meeting the needs of a changing and highly competitive market and to grow their top-line revenue. New services, discriminating expectations from customers, maturing businesses, and fierce competition are forcing them to redesign their networks, to rethink their product strategies, and to fundamentally change their operating environment, business models and their go-to-market strategies. This transformation is not optional; it is essential for their continued survival.

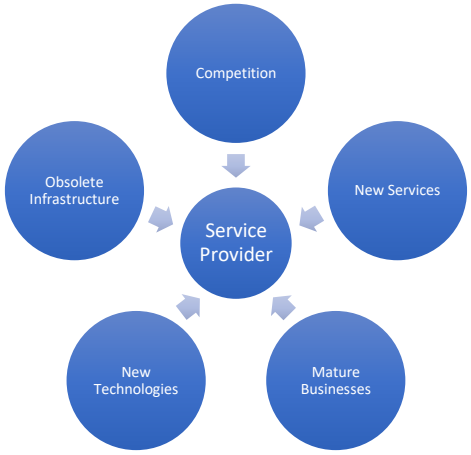

Figure 1. Drivers of Digital Transformation

This transformation is far more than a technological upgrade; it is essentially a fundamental change to how they operate their businesses. Such a far-reaching transformation is extremely complex as it impacts all aspects of the firm. The probability of failure is high; therefore, it is imperative that operators work with a trusted partner that brings an end-to-end continuum of capabilities to guide them through the entire process and that has demonstrated a successful track record in enabling such transformation.

This paper focuses on the market forces that are driving service providers to undergo this complicated transformation. It highlights the main challenges they are likely to encounter and proposes a framework for selecting the right partner to enable a successful transformation. It proposes strategies for successfully engaging with a partner and discusses use cases that demonstrate how the right partner greatly contributes to the success of the evolution.

DRIVERS OF DIGITAL TRANSFORMATION

Market forces are causing service providers to rethink their networks, organizations, and business models. The ecosystems that have underpinned their success are fraying as they find themselves competing against new entrants with more agile networks and systems, as their existing service revenues mature, and as new services emerge that their infrastructures are not able to support.

COMPETITION

Service providers are increasingly competing with digital natives such as Amazon, Google and Netflix as well as with each other. Telcos entered the video business in the early 2000s; cable companies have made multiple attempts at entering the wireless business. Nowhere is this competition fiercer than in consumer

video. The multichannel video programming distributors (MVPDs) that traditionally supplied the majority of consumer video have been steadily losing market share to Netflix, YouTube, Hulu, and other over-the-top video providers, leading some analysts to predict that the industry is in secular decline.

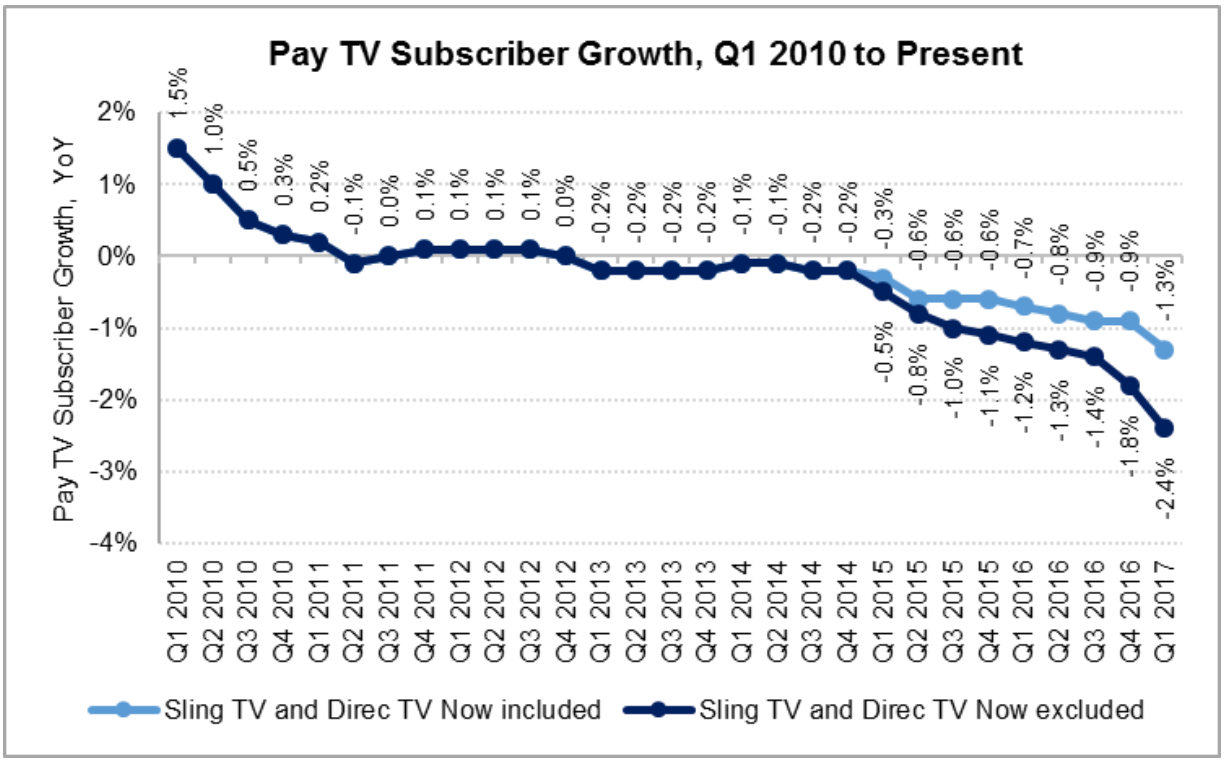

Figure 2. Pay TV Subscriber Trends

Mobile network operators have not fared much better. Hyper-competitive market conditions have forced them to offer unlimited data at prices that have challenged their margins. Verizon, which resisted getting into the unlimited game, caved in in 1Q 2017 but still experienced its first quarter of subscriber loss ever. These challenges and market dynamics, which are characterized by price wars, are driving mobile network operators to seek alternative revenue sources. Verizon, largely through its acquisitions of AOL and Yahoo, sees advertising as a new source of revenue; it also has made significant investments in Internet of things (IoT) through its acquisitions of Fleematics and Sensity. AT&T has bet on video with the purchase of DirecTV and wants to get into content with its pending acquisition of Time Warner; AT&T also views IoT as a major source of future revenue.

MATURING BUSINESSES

The mobile industry had posted significant growth in past years but has recently seen its market saturating; consequently, operators started an attrition war. Average revenue per person (ARPU) declined, and churn inched up. The only notable exception is T-Mobile with its un-carrier strategy, which has enabled it to gain market share.

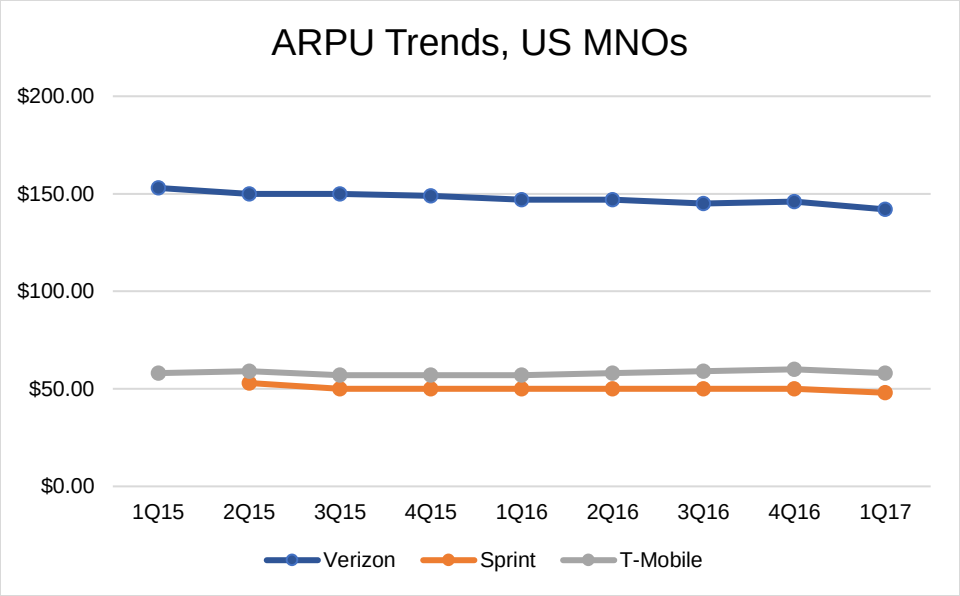

Figure 3. ARPU Trends

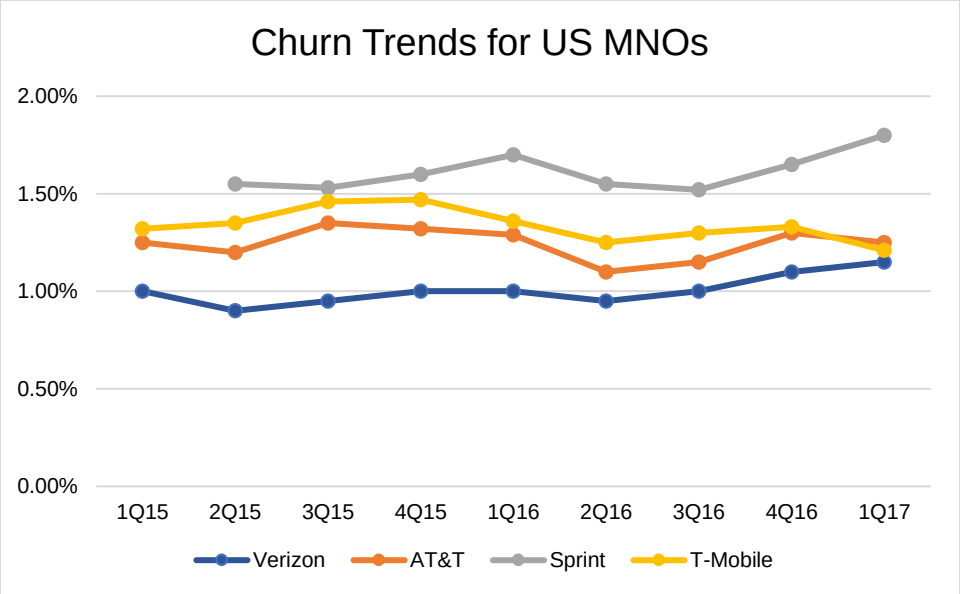

FIGURE 4. CHURN TRENDS

OBSOLETE INFRASTRUCTURE

In some cases, service providers' infrastructure, which has served them well in past decades, is no longer suitable for today's market needs and has become expensive and difficult to maintain due to lack of spare parts and skillset.

NEW SERVICES, REVENUE OPPORTUNITIES & NEW KEY OPPORTUNITIES

Service providers have significant opportunities for new revenue, new customers and differentiation with emerging technologies. Each, however, poses risks and rewards for the provider willing to invest in their adoption.

Internet of Things

Service providers, given their scale, the size, security and reliability of their networks and infrastructure, and their existing customer relationships, are uniquely positioned to offer IoT services, which promises significant new revenue sources for service providers. The number of IoT devices is expected to exceed 3 billion (Figure 5) by 2021[1].

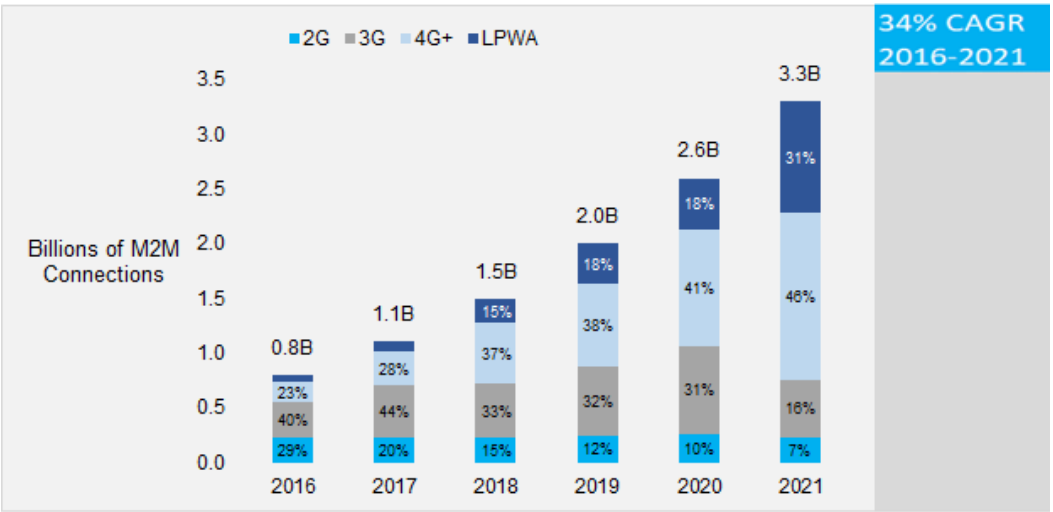

Figure 5. Connected Devices[1]

However, IoT places significant demands on service providers:

- A fundamental premise of IoT is the data and how it is collected, managed, secured and analyzed. The massive amounts of data combined with the significant computing resources that are needed require new network architectures that are not only cloud based, but that also have significant edge computing capabilities. The need to analyze data in real time for some applications imposes significant latency requirements on service providers' networks.

- IoT is not a technology but an enabler to solve business problems that cut across parts of an organization and sometimes go across organizations, cities and other entities. To be successful in IoT, service providers need to work within complex ecosystems that include vendors, various customer representatives, other service providers, and regulators. For companies that are largely organized around selling connectivity, this is a significant change in mindset and business practices. They need to create a partnership ecosystem with clear accountability for products, services, security, marketing, customer service, and other capabilities. They also need to embrace new business models, such as data as a service.

- IoT services will necessitate deep awareness and expertise of customers' businesses and often will require specialization in the vertical to which the customers belong. In this nascent industry, customers' needs are still in flux; therefore, service providers must bring agility into their

[1]http://www.cisco.com/c/en/us/solutions/collateral/service-provider/visual-networking-index-vni/mobile-white-paper-c11-520862.html.

development/deployment processes to move at the customers' speed and to meet fast evolving requirements and business imperatives.

Pervasive Video

Until recently, the video delivery ecosystem had distributors (largely cable, telcos and satellite) buying content and distributing it in bundles delivered to a set-top box connected to a TV, marketed as subscribed bundles with a relatively captive audience.

Today, consumers want video anytime, anywhere, and on any device. They also source their own videos from a variety of sources (Facebook, YouTune, etc.). Consumers are increasingly refusing to pay the high prices MVPDs typically charge (about $80/month on average for video).

New entrants are meeting these demands and expectations and are disrupting this ecosystem. Virtual MVPDs (vMVPD) offer skinnier bundles delivered over the top to multiple devices. These entrants are also reinventing the viewing experience by moving away from the Excel-like programming guide, which has been the mainstay of the industry since 2002, toward a search-based, voice-enabled, and personalized user interface. vMVPDs are nimbler, not bound by the legacy environment of most MVPDs, for example, the need to upgrade the software and sometimes hardware of deployed set-top boxes. They can introduce new services and enhance their offer at Internet speed.

However, service providers are not idle. They have embraced the new reality of the market and have introduced their own vMVPD offers. Examples include DirecTV Now by AT&T, X1 by Comcast, and the upcoming streaming service by Verizon.

Mobility

A significant amount of video consumption is moving to mobile networks. It is estimated that video traffic will make up 50% of Internet traffic by 2022 (Figure 6). Video is not the only application that is moving to mobile networks. The number of mobile-connected devices continues to increase exponentially and is expected to reach 12 billion in 2021, according to the Cisco VNI Report 2017. Enterprise and consumer applications are running on mobile networks, demanding more capacity and less latency.

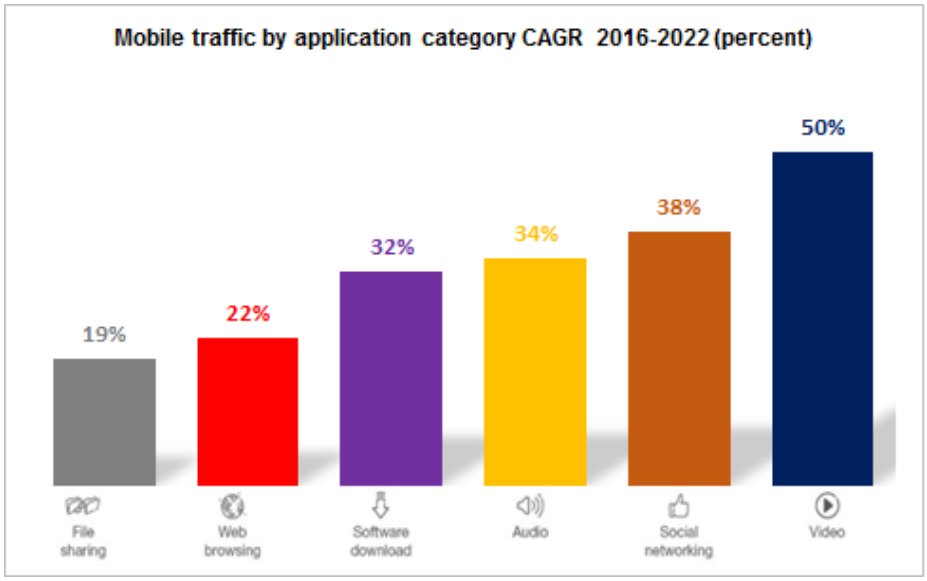

Figure 6. Mobile Traffic CAGR (Source: Ericsson Mobility Report 2017)

Virtual Reality and Augmented Reality

Although virtual reality (VR) is still years away, augmented reality (AR) is making significant inroads in consumer and business applications because they chiefly run on existing devices[2]. Mobile AR devices (mostly smartphones) are expected to grow substantially by 2021, Figure 7.

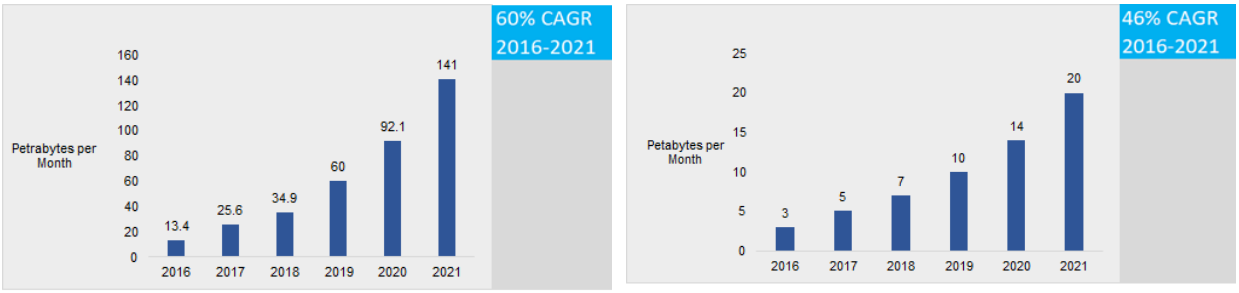

Figure 7. VR Mobile Data Traffic and AR Mobile Data Traffic[3]

KEY ENABLING TECHNOLOGIES

Just as market forces are driving service providers to transform their operating ecosystems, technology innovations are providing them with the tools and methodologies to do so.

Virtualization

To meet the market demands for new services, to compete with webscalers that can introduce services quickly, and to reduce capital expenses and operation expenses, service providers need to virtualize their networks.

Virtualization enables services providers to run their networks on commercial off the shelf (COTS) servers instead of dedicated hardware and to move the control from network elements to central policy controllers. This configuration allows service providers to shift traditional computing to a cloud-based model. The benefits of virtualization are many:

- Operators can optimize resources by allocating compute resources where needed. They also have more flexibility to scale up or down by adding or removing resources. Because the servers running the software are standard, they can be reallocated to other functions.
- This flexible infrastructure enables them to significantly increase the velocity of new services and features.
- A software-powered environment enables service providers to meaningfully improve customer service. They can offer self-service capabilities, including troubleshooting problems. They can also introduce new business models, such as “as a service,” which is a key requirement in new applications such as IoT.
- By linearly aligning their assets with revenue-generating opportunities, service providers can significantly reduce capital and operation expenses.

[2] https://techcrunch.com/2017/01/11/the-reality-of-vrar-growth/.

[3] ww.cisco.com/c/en/us/solutions/collateral/service-provider/visual-networking-index-vni/mobile-white-paper-c11-520862.html.

Automation and Orchestration

Once operators have virtualized their network elements, they need to reduce the expensive and rigid manual processes that are typically required to operate and maintain their networks. Automation effectively enables virtualization to achieve the flexibility inherent in virtualization and to programmatically configure and provision network connections. Orchestration enables operators to effectively allocate the network resources to meet the fluid needs of the business.

5G

Operators are implementing the next-generation wireless technologies, such as Gigabit LTE, and will deploy 5G technology when it becomes available to meet the increasing traffic demands made on their networks. 5G is expected to provide Internet speeds over 40 times faster and with wider coverage than the currently prevalent 4G LTE technology.

Analytics and Machine Learning

Big data, analytics and machine learning are used to optimize network performance, automate processes and network management functions and to develop predictive models to enhance key performance indicators. These tools are employed in the application layer to create personalized services and to deliver targeted advertisements.

Edge Computing

Edge intelligence resources, often known as mini-clouds, are essential for applications that are delay sensitive or in areas where large volumes of data, in remote locations or high latency makes local processing more optimal than sending data to a remote cloud. Mobile video streaming with its sensitivity to latency is an example of an application that benefits from edge intelligence. Bringing network computing close to the user allows for personalized content delivery. Another large user of edge resources is IoT applications, where data generated by the applications often needs real-time processing.

Migration to All-IP Infrastructure

IP has become the fundamental underpinning of networks today. However, a significant part of operators' networks still runs on older technologies, such as TDM for voice, QAM for video. Such legacy infrastructure is increasingly inefficient and costly to operate and maintain; therefore, service providers are upgrading their infrastructure to IP. One example of this upgrade is the cable companies using the converged cable access platform to carry the video traffic that typically was delivered over the QAM infrastructure. Another is the telephone companies replacing the TDM switches (for example, 5ESS) with IP technology.

DevOps

Although not exactly a technology, DevOps is a software development and market introduction that emphasizes communication and coordination between product development, product management, and operations. This goes contrary to the traditional "waterfall" model that was characterized by long and rigid product cycles.

COMPLEXITY OF THE TRANSFORMATION

Although service providers have gone through several transformations in the past, this time is truly different. Even the migration to IP, which was significant, does not compare in scale and scope to the

transformation at hand. This is because prior transformations, even large ones, were largely technological ones; the rest of the operation remained intact. This transformation is far reaching because it impacts all parts of the organization and implies major changes in operations, product development and management, and in business modeling and planning. Furthermore, these are not one-time events but a continuum of transformation that can take years and meaningfully impact the entire business.

Given the wide scope of services they offer to consumers, businesses and governments, ensuring business continuity while operating in a hybrid environment during the transformation process is no small undertaking and adds multiple layers of complexity to the transformation initiatives.

Adding further complexity to this process is the need for new talent that is conversant with the new technologies, business processes and models, and mindset. Such talent is in short supply. The operator must plan for significant retraining and hiring and in some cases retaining the required skillset on a temporary basis.

Software-centric and environments enable new business models, which are often required in the market. These business models are very different from the models that have prevailed to date. Adopting new business models, with their implications on the business planning, implementing, operating and reporting processes requires expertise that the operators will need to source. Doing this on their own without expert help is a recipe for failure.

Given the level of complexity associated with the transformation and the need for support along so many dimensions, the operator must retain a partner that brings the breadth and depth of skills, a strong services organization, and the proven expertise along the spectrum of capabilities the operator will need.

FRAMEWORK FOR SELECTING THE RIGHT PARTNER

Working with the right partner to ensure a successful digital transformation is critical, but how does an operator go about selecting this partner? The following section discusses key criteria the operator should consider for partner selection.

GLOBAL SCALE

Service providers must retain a partner that has worldwide scale and one with cross-market solutions that comply with and influence international standards to address service providers' large, complex networks, geographic variations, and needs. The partner must have rich capabilities to meet the needs of the operator across its footprint. At the same time, the partner needs modular solutions that can be tailored to the service provider's requirements. One size fits all will not work.

BEST-OF-BREED PRODUCTS AND SERVICES

In their quest for agility, network operators need to implement several state-of-the-art technologies. It is essential for them to select a partner that offers the best products, backed by an outstanding services capability, and that has demonstrated a successful track record in the market.

LIFECYCLE SUPPORT

Given the changes on which they are embarking, operators cannot rely on a vendor with point solutions. They need support at each step of the process and need a partner that truly understands the new value chain associated in the new environment and can offer support throughout the entire lifecycle.

END-TO-END INTEGRATED SOLUTIONS WITH STRONG PROGRAM MANAGEMENT CAPABILITY

One of the key premises of the transformation is the agility of service creation and introduction. To achieve the agility, the entire product development, deployment, and management must be rethought. Fixating on the service creation addresses only part of the value chain and might lead to services that are created but deployed only when the rest of the organization is ready. Therefore, the operator needs to work with a partner that understands the process and brings a full suite of skillset and fully integrated solutions that are validated and proven in the market.

BREADTH AND DEPTH OF PORTFOLIO AND EXPERTISE

The digital transformation is much more than a new technology. It is many new technologies, which often need to interoperate and be supported by a new operating environment. The operator should work with a partner that has the breadth of offering to meet most of the operator's needs, and that can source, integrate, and manage additional capabilities as needed to satisfy the end-to-end requirements of the operator. This gives the operator a single point of contact with which to work as the provider manages its resources to run the business at the same time it transforms it.

Although operators' needs vary, the following are key capabilities that the vendor should offer:

- SDN/NFV
- Cloud services
- Security
- 5G
- Edge computing
- IP enablement
- Data analytics

These capabilities should be backed by the right BSS/OSS systems that enables the agility and supports data analytics.

STRONG SERVICES CAPABILITY

The impact of the evolution on their exiting services and operating environment and importance of supporting future services requires that service providers work with partners with a globally integrated services organization. Some of the key capabilities the vendor should offer:

- Network planning and design
- Network sizing and optimization
- Network continuity planning
- Network sunset solutions
- OSS/BSS evolution
- Process redesign and optimization
- Customer service improvements
- Training

- Skillset supplementation
- Migration of existing new services to new environment
- Business modeling support

CONTINUUM OF SUPPORT THROUGH THE ENTIRE PROCESS

Digital transformation is about creating a digital roadmap that has multi-threads and is often multi-year. The partner must have the capacity to support the service provider throughout the process and along multiple dimensions. The partner that has lifecycle capabilities will alleviate the complexity of the process by providing the targeted planning, implementation, and on-going support at each step of the long and complex process.

STAFF SUPPLEMENTATION CAPABILITIES

The talent needed in the digital service provider environment is in high demand, and it is often difficult to hire personnel in a reasonable timeframe. A partner that offers staff supplementation capabilities brings unique value to the operator, enabling it to take the time to retrain its staff and to hire the expertise when it becomes available.

BUSINESS SERVICES

Digital transformation should be guided by the current and future business needs of the firm. The market is demanding new business models, such as flex capacity, and new go-to-market frameworks. In defining its business requirements, the service provider often requires expert help from an entity that has a broad perspective on the market dynamics and trends. Although service providers often retain the services of management consulting firms, it is more impactful when the technology partner can also offer such consulting services because it will make it easier to tie in the technology roadmap to the business goals.

TRACK RECORD OF INNOVATION

Technology evolution is happening at a very fast pace. It is essential for service providers to partner with partners that are constantly innovating and are at the forefront of the industry.

STRONG SECURITY FOCUS

Because of the sensitivity of data their networks carry, service providers must ensure that their networks and subscribers are protected from hackers. A Cisco security report has found that 34% of service providers have lost revenue because of security breaches. A key imperative is for operators to identify potential security threats before they affect their networks. This is done by monitoring the behavior of the network and detecting unusual patterns, which might point to security breaches, and by having an incidence response mechanism and a vulnerability management capability. As they evolve their networks, identifying and implementing a security framework is an essential part of the transformation, and it is critical that they work with a partner that has established itself as a leader in offering security solutions along all dimensions of their business.

RECOMMENDATIONS FOR A SUCCESSFUL DIGITAL TRANSFORMATION

Having selected the right partner, the operator needs to engage with the partner to create the strategy for a successful transformation.

BUSINESS NEEDS SHOULD DRIVE THE TRANSFORMATION STRATEGY

It is essential that service providers focus on their business needs as the key drivers for the transformation. Their main goal is to innovate and iterate continuously while maintaining reliability, quality of service, speed and price points that customers expect. Service providers must define their technological roadmap with a focus on meeting the customers' needs. They must identify the services they will offer and then define the best network and operational strategies that will enable them to fulfil those services.

FOCUS ON END-TO-END CAPABILITIES

Service providers must have an all-encompassing plan for the network transformation that will:

- Support the evolving business needs for the next five years or longer.
- Align the operations and environments to support the evolving network and the overall needs of the business and include detailed migration roadmaps for OSS, BSS and business processes and functions.
- Plan for business continuity support for existing and future services, recognizing that during the transition service providers need to function in a complex hybrid environment.
- Integrate all functions so that they are aligned and executed across all divisions within the company.

MAKE THE PRODUCT DEVELOPMENT PROCESS AGILE AND FLEXIBLE

A key goal of the transformation is to redefine the product development cycle from the traditional waterfall model, which is increasingly obsolete, to an agile and flexible model that enables the service provider to test new products then iterate based on the reaction in the market. This process requires tight cooperation across the various units within the company.

HIRE AND TRAIN NEW TALENT AND RETRAIN EXISTING TALENT

The new network paradigm requires skillsets and mindsets that are different from the prevalent ones in most service providers' organizations. Human resources are essential partners in the transformation due to the far-reaching implications on the talent within the company. An example of skills realignment, AT&T embarked on a bold move: retrain 100,000 of its workforce for radically new jobs, programs and facilities as part of its Workforce 2020 initiative at a cost exceeding one billion dollars[4].

FOCUS ON THE CUSTOMER'S EXPERIENCE

In a hyper-competitive industry where service providers are competing for each other's subscribers and where new entrants are grabbing a growing market share, providing a superior experience is essential. Operators' network and infrastructure upgrades must focus on delivering those services that positively impact customers' experiences. Comcast is an example of an operator that made customer centricity a major strategic goal. The cable operator was losing video subscribers on a quarterly basis. In 2014, it embarked on a long-term strategy to make Net Promoter Score a key metric across its organization. The effort has started to pay off; in 2016, Comcast bucked the trend in the industry by adding video subscribers; most other cable operators continue to lose subscribers.

[4] http://fortune.com/att-hr-retrain-employees-jobs-best-companies/.

USE CASES

TDM TO IP MIGRATION

Many operators are undergoing TDM to IP evolution because TDM technologies have become too costly to support, equipment spares and vendor support are being discontinued and the TDM technologies can no longer meet the market requirements in terms of services and features.

A successful migration requires a solution with the following criteria:

- Smaller footprint with higher capacity than the legacy DCS/ADM equipment.
- Lower operating costs, including power consumption, maintenance, and support.
- Lifecycle support for existing and future services that leverage a common IP infrastructure (convergence, social media integration, mobility, etc.).
- Flexibility and ease of migration. Service providers need to maintain existing TDM services during the transition and upgrade their networks gradually. They need to have the right support as they go through this process. They also need support to retrain the operations, field support and customer service organizations.

The operator should seek a partner with the following capabilities:

- IP/MPLS and TDM technology and migration expertise.
- Automation tools to streamline the operating environment.
- Budgeting support. These processes can unfold over years. The service provider needs to perform a return on investment analysis for each phase of the process.
- Circuit emulation capability to enable the operator to support the legacy environment during the transition.
- Proven prior expertise and accomplishments in such transformation.

The benefits of a successful IP migration are many. IP equipment uses significantly less real estate, consumes less power, is easy to maintain and is less prone to failure (thus lower operating costs), and enables the operator to offer new services and innovate faster.

VIRTUALIZATION FOR CABLE OPERATORS

Cable operator are embracing virtualization to meet the fast-growing need for bandwidth in the last mile, while at the same time reducing real estate needs, power consumption, and other operating expenses. Traditionally, high-speed data was served from an integrated, large network element, the CMTS, which resided in the headend or the hub. The cable industry is “decomposing” the CMTS, moving the physical layer to the access network closer to the subscriber, which enables the control plane to eventually run on COTS and can be moved to the cloud. This has enabled some cable MSOs, whose headends are in expensive real estate areas, to move the distributed CMTS (now called CCAP) to less expensive areas and to connect it via fiber to the access nodes, which contain the physical layer.

This change is very significant for cable operators and has serious operational implications, particularly as nodes become more “intelligent.” To mitigate those operational complexities, vendors need to offer automation tools to enable operators to cost effectively manage the access nodes.

Operators also need to plan for supporting all their existing services on the distributed platform. Cable companies have far from homogeneous networks (most of them grew because of acquisitions). Therefore, they often need different virtualizations solutions to meet the distinct needs of their various regions.

These requirements clearly highlight the importance of working with a strong partner that will help the provider build the infrastructure, support all existing services, meet the unique requirements of their service regions, create a roadmap for new services, and update operating capabilities to be commensurate with the new environment.

CONCLUSION

Network operators must modernize their networks to gain agility to effectively compete and remain relevant in a highly dynamic market. They need to implement key technologies to achieve their agility goals. In this competitive market with such high stakes for success, it is equally as important to build a sound foundation for transformation and to work with the right partner throughout the process. Failing to do so will significantly add to the complexity of the process and increase the probability of failure.

Transformation is not simple but with the correct tools and partner, becoming an agile operator and successfully making the digital transformation is not only easier but maximizes the ability of the provider to increase the velocity and breadth of service offerings and to reduce capital expenses and operating costs.