Emerging Markets for Network Providers

Extracting Additional Value from Existing Networks

Prepared by

THE SHPIGLER GROUP

STRATEGY MANAGEMENT CONSULTING SERVICES

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The Shpigler Group
(404) 600-5480
www.shpigler.com

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The Shpigler Group is a strategy management consulting firm offering our clients a full range of services. We have designed our practice to add value to our clients' organizations, identifying suitable opportunities and optimal solutions. We deliver custom consulting services to four major industry groups:

- Energy
- Water
- Telecom
- Smart Cities

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- Performing benchmarking studies to support performance enhancement
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- Supporting network design and construction management
- Performing technical research relating to projects or solutions designed
- Conducting management and operational audits
- Implementing go-to-market strategies
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- Developing complete network designs and performing economic analysis of chosen models
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Executive Summary

The economic viability for independent telecommunications companies has always been an issue. With rapidly changing industry dynamics and increasing competitive pressures from established telcos, independent providers are challenged to effectively meet consumer demands while profitably growing their businesses. Studies have documented the challenges, as operating margins on regulated services have been decreasing while revenues have been flat on a nationwide basis.[1] Finding ways to compete continues to present challenges to network operators.

Conducting extensive growth campaigns in search of underserved markets may be considered, but with the challenges associated with raising capital and servicing the debt, more economically prudent solutions may offer a better approach. For many progressive telcos, the answer has been to more deeply leverage the existing assets of the network. With existing fiber (and other) assets already in place, network operators may consider how to explore opportunities to grow business lines in emerging markets. Three categories are emerging across the telecom industry today:

- Long Haul Capacity – Utilizing existing network assets to facilitate traffic onto and off of long haul networks to support a variety of emerging solutions, including 5G wireless networks, intelligent transportation systems, and smart city deployments
- Metropolitan Area Networks – Bundling network resources to provide extensions of local area networks across a metropolitan area
- Additional Services – Providing new applications that leverage developments in IoT, artificial intelligence, virtual reality, and home/building automation in addition to managed services in the fields of data security, Internet delivery, and data management

[1] Telergee Alliance Benchmarking Report, November 2018.

Long Haul Capacity

In the past, it was traditional for telcos to be focused on either long haul or last mile services. However, over time, lines have blurred between the telecom operational arenas, in particular in rural areas that suffer from low supply of fiber relative to potential demand. Today's telecom provider would be wise to consider additional avenues for revenue enhancement and value creation.

Consider a telco that is offering service to the residential and commercial segments of a rural market. In the search for ways to leverage existing fiber assets, there are a number of customers that may have been overlooked that may be worth considering for wholesale fiber capacity:

- ILECs – Independent or cooperatively-owned telcos must acquire the interconnections they need to trunk traffic back to the PSTN. In some cases, groups of independent telcos have worked jointly to develop a common interconnection network. Some public owners of fiber in rural areas have worked with telcos to develop these networks.
- CLECs – Much like ILECs, facility-based CLECs must connect their networks to other carrier networks. CLECs frequently lease these interconnection circuits from incumbent carriers, but they will usually entertain alternatives.
- Data Transport Carriers – Companies providing data transport frequently need to fill in or augment their existing networks. This is especially true in rural and semi-rural areas, where private carriers may be interested in leasing capacity to expand or better serve customers.
- Wireless Carriers/Tower Operators – There are opportunities to support markets that underlie the operations of fiber connections directly to wireless towers.
- Data Centers – Businesses needing off-site data storage or server solutions require high-bandwidth resources. Some data center operators will interconnect physically separated facilities for disaster recovery purposes. Corporate data centers or commercial colocation facilities may be interested in using dark fiber to meet their interconnection needs.

While these segments are always a source of value, it may be said that the potential to deliver wholesale capacity has never been greater than it is today. One reason for this is the advent of 5G networks. Fifth generation mobile networks offer the potential to deliver new ecosystems of digital devices, presenting new communication-based services. However, the backhaul need supporting the deployment of 5G services is significant, as increased network speed and capacity calls for the presence of a network of deep fiber. One industry estimate suggests that between $130 and $150 billion will be needed on a nationwide basis to adequately support the growth of 5G services.[2] While much of this development will need to be conducted on a greenfield basis, there is no doubt that much of the required network infrastructure is already

[2] "Communications Infrastructure Upgrade: The Need for Deep Fiber". (July 2017). Deloitte.

in place. For those carriers that have fiber assets located in locations that could serve as on-ramps or off-ramps to the long haul backbone network, there is value that can be created.

Another area of increasing development is in the field of intelligent transportation. An intelligent transportation system (ITS) is a set of advanced applications that offer the ability to optimize a diverse set of modes of transportation and traffic management systems in order to provide users with enhanced information and help them to make safer and more coordinated use of transport networks. The value of ITS stems from the ability to integrate devices and systems to optimize the experience of a wide array of users with respect to safety, convenience, and information. With the growing needs of communities to address transportation issues, the vendor community has been rapidly developing newer and more advanced systems. Recent estimates of the scope of traffic management application suggest an annual market size approaching $4 billion, with annual growth close to 7.5%.[3] While much of the focus of the ITS industry has been centered on data collection devices and analytics systems, there is a strong need for telecom networks to deliver two-way communications.

A third area of emerging activity lies in the field of smart city development. According to one definition,

> *"A smart city is an urban area that uses different types of electronic Internet of Things (IoT) sensors to collect data and then use insights gained from that data to manage assets, resources and services efficiently. This includes data collected from citizens, devices, and assets that is processed and analyzed to monitor and manage traffic and transportation systems, power plants, utilities, water supply networks, waste management, crime detection, information systems, schools, libraries, hospitals, and other community services."*[4]

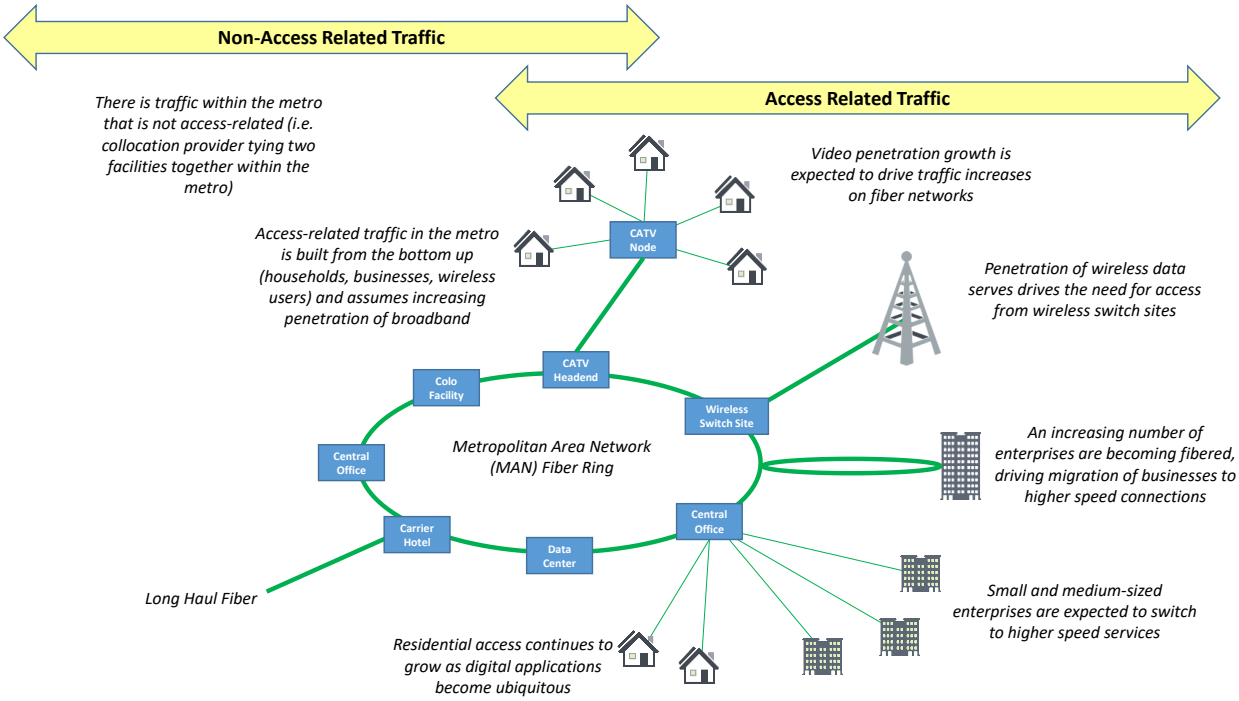
The rapid growth in smart cities suggests a need to implement backhaul networks that interconnect devices and systems within and between cities for a wide variety of services, including autonomous buildings, utility operations, environmental sensors, public safety systems, and a wide variety of other infrastructure programs.

[3] "Intelligent Transportation Systems (ITS) Market: Market Estimates & Trend Analysis" (2019). Grand View Research.

[4] McLaren, Duncan; Agyeman, Julian (2015). Sharing Cities: A Case for Truly Smart and Sustainable Cities. MIT Press.

Metropolitan Area Networks

One of the key hallmarks of network deployment has involved the MAN – Metropolitan Area Network. Traffic along a MAN is typically comprised of access related traffic generated by end users and non-access related traffic generated between major aggregation points within the community:



Typically, the development of fiber networks involve three elements of customer focus and depth of network:

- Non-Profit Customers – Of particular interest to MAN operators, many fiber networks have focused on the so-called "MUSH sector", with a focus on municipal offices, utility facilities, schools, and hospitals due to the regional nature of bandwidth demand and the prevailing need for services at those facilities.
- Data Aggregation Points – Next, many fiber-based networks focus on building the networks out into the full MAN, with a particular emphasis on connecting key points within the metro that can offer high bandwidth potential with minimal build requirement.
- Enterprise Customers – For those network providers that develop their "edge" capabilities and have fully functional retail telecom businesses, the first focus often involves building fiber connectivity to large enterprises, and then building out to other smaller and medium sized businesses. For some carriers, there are opportunities to enter this market in reverse – connecting businesses directly to metro networks after the deployment of retail telecom business lines.

Non-Profit Customers	*Data Aggregation Points*	*Enterprise Customers*
• Municipal Buildings	• Telco Central Offices	• Industrial Facilities
• Utility Buildings	• Data Centers	• Retail and Wholesale Trade
• Schools	• Wireless PoPs	• Service Businesses
• Libraries	• Cable Headends	• Class A Office Space
• Healthcare Facilities	• Collocation Facilities	

For some established telecom providers, the pursuit of MAN revenues can be attractive for a number of reasons:

- While traditional retail sales can present marketing challenges, pursuing larger bulk sales through capacity in MAN networks offers a strong opportunity
- In many communities, there is active competition for traditional retail network services but there exists a dearth of middle mile network solutions enabled by MANs
- In addition to selling lit capacity, a network provider can deliver dark fiber IRUs to larger accounts that require little network support

Additional Services

While there are still some communication providers that view themselves as basic transport mechanisms for customers, more and more telecom service providers are recognizing the potential to increase top-line revenue and enhance customer relationships by broadening the specter of services provided. These innovative providers are realizing the potential of delivering multi-product service options to the market. While there exists a wide variety of potential market options, we may broadly think of two categories of enhanced service options:

	Added Applications	**Managed Services**
Area of Focus	Enhanced services that complement existing network applications	Providing a deeper service level through the provisioning of enhanced services
Rationale	Adding additional applications easily extends the customer relationship expand ARPU	More and more customers are seeking services that extend beyond simple applications
Examples	• IoT applications • Artificial intelligence • Virtual reality • Home automation	• Data security/management • Partner services • Wholesale services • Customer segmentation
Nature of Product Offering	Tactical	Strategic

For the field of added applications, telecom providers have the opportunity to provide new services to deepen the relationship with existing customers. Just as network providers have enhanced service options in the past, the continuing development of digital applications calls for further development within this field. Some of the leading applications of interest today include:

- Virtual Reality – As VR systems continue to attract increasing penetration into the mass market, telecom providers have an opportunity to deliver needed services. The call for dependable, low-latency network backhaul will continue to grow within this sector.
- Internet of Things – The IoT market continues to grow, with tremendous growth within the Smart Cities sector. With new applications in smart transportation, smart parking,

environmental monitoring, and mobility services, there is an expectation of significant further growth.

- Energy – Increasing development in the field of Home Energy Management Systems (HEMS) and Building Energy Management Systems (BEMS) calls for network connectivity and backhaul capabilities. The continued growth of home automation systems has exploded the market for the edge applications, driving the need for network connectivity.

The implementation of additional applications on existing networks is a natural fit for telecom providers. The provision of managed services requires a deeper level of strategic commitment on the part of telecom providers but offers long term value. By engaging with strategic partners, telecom operators offer the potential to fill in gaps in emerging markets in the increasing level of digitalization of society. Some of the areas of focus that may be considered include:

- Privacy Management – With increasing levels of online transactions, the issue of data security has become more prevalent. Telecom providers have a role to play within the field of delivering security monitoring capabilities to manage escalating threats.
- Data Management – Housing the data of blocks of customers enables network providers to support the development of enhanced services. Telcos have the ability to engage in data management to support customer needs in the acquisition of certain retail services like energy and financial services.
- Internet Delivery Services – While the function of caching and content delivery typically has fallen to a number of third party providers, there is no reason why telecom network operators could not vertically integrate into these roles. This is particularly true for video operators that have access to video content in addition to broadband content.
- Market Research – The vast amount of data available to telcos enable them to provide data aggregation services in support of market research to a number of industries. By leveraging the power of aggregated data rather than individual (protected) data, telecom providers can deliver needed information for commercial entities.

Summary

Independent telecommunications providers are critical to ensuring that communities across the nation are served with ubiquitous broadband services. The landline infrastructure provided by these telcos also enables mobile service in rural areas. Moreover, providing for a broader reach of broadband enabled services supports more communities bridging the "digital divide" that ultimately supports economic development.

Nevertheless, despite the inherent value of communications networks, it is incumbent upon telecom providers to overcome the challenges associated with economic and technological viability. Some of the developments seen across the industry include:

- The nature of a more digital service level has driven more bandwidth, requiring telcos to continuously expand capacity
- The growth of residential service has been outpaced by commercial service in some smaller markets, requiring a shift in resources
- Operational requirements of telco back offices have changed in order to respond to changing needs of the customer base

It is crucial for any network provider to continuously innovate and grow to respond to market demands. Part of this requires an ongoing commitment to expand network footprint and capabilities, requiring more investment. However, all network providers would be wise to look for opportunities to leverage the investments already made as a way to enhance revenue. For many carriers, delving into new opportunities in long haul capacity, metropolitan area networks, and additional services may offer tremendous benefits.