



Is Infrastructure Sharing the Answer for the Wireless Operators?

Spectrum Management Consulting

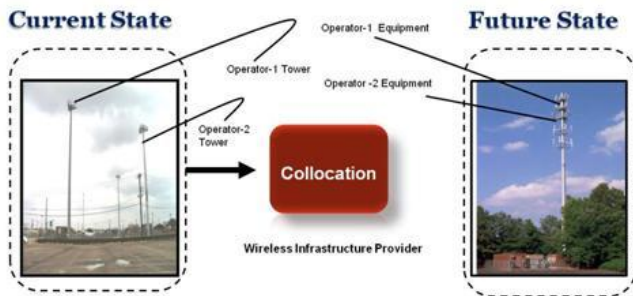
Align Technology to Business Needs

Is Infrastructure Sharing the Answer for the Wireless Operators?

By Gerard Vincent

Infrastructure Sharing Concept

Competition drives cost pressures as telecom operators compete for customers based on lower prices and better service. Telecom operators' spending has traditionally been dominated by considerable investments in technology and network deployment. Given that such investments are fixed, sunk, and irreversible; they represent a high risk factor. The risk is compounded by the need, for both fixed and mobile operators, to continuously adopt new technologies and upgrade infrastructure. Therefore, infrastructure sharing can reduce this risk for operators by spreading it among several players.



Two Different Types of Infrastructure Sharing

The infrastructure at a cell site typically consists of **active** (electronic) components such as BTS, microwave radio equipment, switches, antennas, trans-receivers used for telecom signal processing and transmission as well as **passive** (non-electronic) components including land, tower, shelter, HVAC, electric generator, battery, electrical supply, technical premises and easements.

Typically, the passive components constitute around 60 percent and the active components constitute the remaining 40 percent of the total capital cost expenditures (CAPEX) of a Radio Access Network, while the operations & maintenance costs (OPEX) for the active components, excluding the land lease, is 4 to 5 times larger than the passive components.

Passive Infrastructure	Active Infrastructure
Land & Easements	Radio Base Station
Tower and Mast	Transmission (PDH, SDH, FO)
Shelter	Switches & Controllers
Electro-mechanic & Electric Supply (PowerCo, HVAC, Genset)	Other Electronics (PMA, Transceivers)
Conduits & Ducts	Antennas & Feeders

Telecom infrastructure requires huge investment outlays. Often, such investments turn out to be risky propositions given the rapid introduction of successive generations of new technology. Operators are occasionally faced with a situation where even before recovering their investments in existing infrastructure they embark on further investments in new generation networks.

In response to this phenomenon, operators are increasingly placing greater emphasis on alternatives to the traditional high-cost infrastructure development model. By considering such measures as infrastructure sharing the operators can avoid investing a large percentage of their CAPEX into non revenue generating infrastructure. These measures can help reduce the financial burden on operators, accelerate the introduction of new services and facilitate the deployment of new networks while lowering barriers to market entry.

Passive Infrastructure Sharing

The basic concept calls for sharing passive infrastructure among telecom operators. An independent tower operator (TowerCo) acquires and builds towers with an intention of collocating multiple carriers on the same tower. In this basic form of site sharing, operators agree to share available infrastructure, including site space, towers and masts, and power supply.

The following table provides the main drivers an operator will benefit from a passive infrastructure sharing:



Drivers for sharing Passive Infrastructure

Capital Investment Reduction	The exponential growth of the subscriber base leading to increasing wireless traffic as well as the need for denser coverage due to spectrum constraints oblige operators to deploy a much denser network including tower locations to ensure minimum quality standards.
Sharply rising site rentals	Along with real-estate prices, site rentals have also seen a sharp increase. Site owners are aware of relatively large number of players desiring to rollout in urban or semi urban areas. Hence the demand for tower sites and rentals are expected to increase sharply.
Regulatory and planning authorities	Installation of cell sites has become a cumbersome process as there are a number of clearances required and involves labor-intensive micro management. Passive infrastructure allows speeding up the process and trimming time to market.
New Tower Restrictions	Both the urban planning Ministries and Municipal Offices are now starting to place restrictions on new tower construction under the premise that they pose environmental issues and health hazard.
Sites Management and operational cost saving	Sites management requires an operational effort that diverts operators from their core business. Also a substantial savings is realized by sharing the cost of operating the site, in particular the underlying ground lease and main power supply.

Simultaneously, telecommunications equipment has been commoditized and no longer offers a competitive advantage to the operators. These trends are paving the way for the sharing of network infrastructure in the core and radio access networks among multiple operators.

Recently, more and more operators have begun paying closer attention to the RAN-sharing concept and are beginning to realize that through Active Infrastructure Sharing and RAN-sharing, operators are able to save in the following ways: investments in initial network construction, faster network deployment, being able to widen the initial coverage and saving in the operating cost. This is making it possible, for operators to deploy different services and applications while sharing a part of the network infrastructure with another operator, which ensures a healthy competition and even healthier savings.



We believe that Active Infrastructure Sharing solutions will gain popularity with an increasing number of operators worldwide in the near future. Depending on the regulation and the business arrangement between the operators, different active components can be shared. The following diagram provides a synopsis for a RAN sharing concept.

The following table provides the main drivers an operator will benefit from an active infrastructure sharing:

Active Infrastructure Sharing

The traditional Mobile Network Operator (MNO) business model is based on the carrier's full ownership of the physical network assets. However, rapid and complex technology migration, regulatory requirements, and increasing capital expenditures as well as operating expenditures on one side while competitive environments, saturated markets, and pressure on ever decreasing margins on the other side advocate a new paradigm: the focus on "critical success factors" and "key assets".



Drivers for sharing Active Infrastructure

Total Cost of Ownership Reduction	The main motivation for an active infrastructure sharing is to reduce the total cost of ownership. Investment and operational costs can be dramatically reduced by sharing network and resources.
Flexibility	Along with the increasing demand for data, capacity network requires more and more flexibility to answer the demand. Large networks re-grouping several operators provide flexibility for network growth.
Technology Not a Competitive Edge	Technology is no longer a differentiator in a competitive environment. Operators are distancing themselves from competitors through their own service offerings over the shared and unshared active infrastructure.
Services Quality	Through a Managed Services approach, operators have a better control of KPIs and SLAs.

Maintenance services include: Landscape Maintenance, Lighting System Trouble-shooting, upgrade and repair, Tower Painting, Tower Hardware Replacements and Upgrades, coaxial line bundling, Grounding, Tower Demolition and Removal.

Site Operations & Maintenance team has to deliver customized service response programs that provide outage resolution in addition to preventative and corrective maintenance.

A 24/7-customer care desk simplifies the interface with the clients and allows them to track any trouble ticket within the network.

Managed Services

Particularly in case of Active Infrastructure Sharing, the TowerCo team must be comprised of experienced experts involved with all the facets of a networks evolution. The scope of Managed Services includes the following activities:

- Planning and Design Services
- Configuration Management
- Provisioning Services
- Performances Assessment using TowerCo NOC
- Preventive and Corrective Maintenance for Level 1 and 2
- Interface with Vendors for Level 3 maintenance and Help Desk Support
- Spare Parts Management and Logistic
- Network Growth and Expansion Management
- Capacity Management
- Business Operation and Regulatory Issues

The TowerCo Managed Services must be based on KPIs and SLAs commitments.

Operators Benefits

The following two diagrams show a Capex and Opex breakdown for a typical wireless network. It is important to note that, during the past years, the percentage for the Capex related to the passive infrastructure has increased as well as the Opex associated to the site lease.

Services Associated with Infrastructure Sharing

For a successful infrastructure sharing, several services have to be provided by the TowerCo.

Collocation Management

TowerCo has to perform the following collocation services for the new tenants:

- Structural Analysis
- Tower reinforcement and modifications*
- Foundation construction and reinforcement*
- Connection to the prime power supplier
- Genset back-up and fuel tank installation
- Electrical and Telco coordination and installation
- Inter-modulation studies

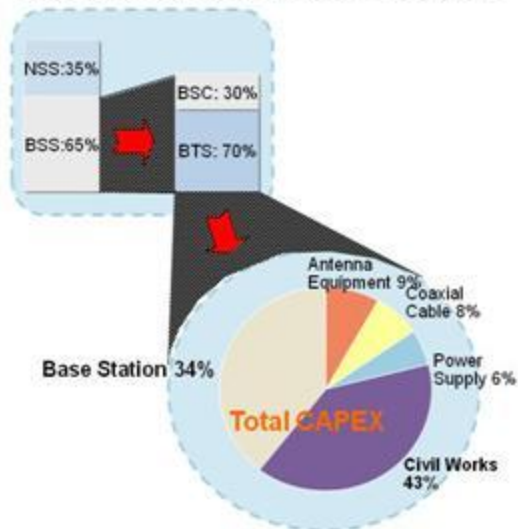
* Certain collocation projects may require tower and/or foundation modifications in order to accommodate new tenants.

Sites Operation & Maintenance

The TowerCo has to handle Tower and Site Maintenance needs and must have the availability of warehousing space to store inventory and/or equipment in a secure and accessible location.



CAPEX Breakdown for Wireless Operators



OPEX Breakdown for Wireless Operators



Wireless operators can benefit from infrastructure sharing in different ways:

a- Reduce investment requirements*: Investment is spread amongst the operators sharing the infrastructure rather than being absorbed by only one operator. Optimized investment will contribute to better sustainability of telecom operators and will justify higher investments in the long term, given the lower risk. Telecom equipment manufacturers estimate that sharing may reduce infrastructure costs for operators by as much as 40% for active infrastructure sharing and around 20% for passive infrastructure sharing.

b- Reduce operating costs*: Increasing landlord lease and power supply costs make passive infrastructure sharing very attractive. For active components, a shared managed services approach reduces dramatically the operating costs associated with an active infrastructure network.

c- Release capital for strategic investment: Sharing infrastructure enables Operators to redirect capital to improve customer facing activities and selling and leasing back existing sites allow new source of cash, which can be invested into new growth opportunities.

d- Shift the focus to service innovation instead of network deployment and maintenance: Redirect financial and manpower resources from operational efforts and focus those same energies on customer service and other activities that will garner competitive advantage.

e- Expand Investments to less dense areas and meet universal service targets: Savings generated by sharing allow carriers to expand network coverage into rural areas years ahead of typical schedule.

f- Reduce negative environmental impact: Decrease in network rollouts helps to limit negative impacts that environmental groups identify.

g- Speed of deployment: Allows a faster deployment of networks and provides more footprint access for all operators increasing the competition between operators.

* Reducing investment and operating costs allows wireless operators to offer more aggressive tariffs in markets with an increasing competitive environment and low ARPU subscribers.

