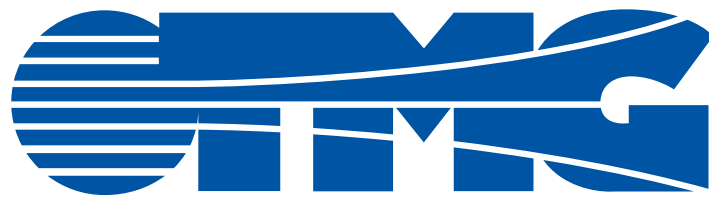


A world map with a dark blue background, overlaid with a network of white lines representing global connectivity. The map is centered on the Atlantic Ocean, with North and South America on the left and Europe and Africa on the right. The lines are dense and crisscross the globe, with some lines highlighted in orange and red, suggesting high-traffic or critical network paths.

Mobile Infrastructure Sharing: Trends in Latin America

*ITU Regional Economic and Financial Forum of
Telecommunications/ICTs for Latin America and the Caribbean
San Jose, Costa Rica – 12 March 2014*



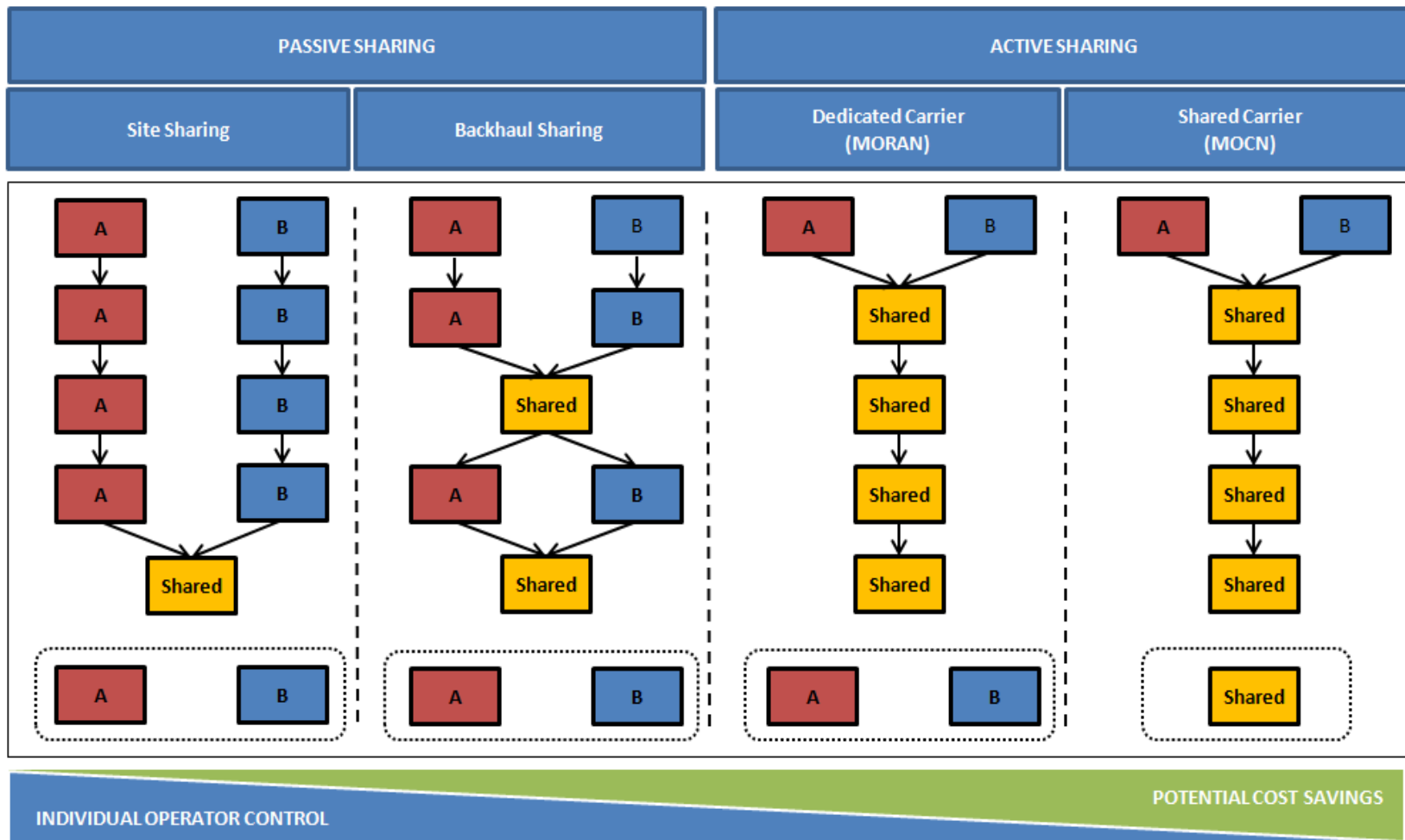
Daniel Leza
Vice President, Legal and Regulatory

1. Mobile sharing scenarios
2. Trends in mobile infrastructure sharing
3. Case studies: sharing in Latin America
4. Conclusions

1. Mobile sharing scenarios

Deeper sharing increases potential savings, but reduces individual control over the network

Multiple alternatives exist for mobile sharing



INDIVIDUAL OPERATOR CONTROL

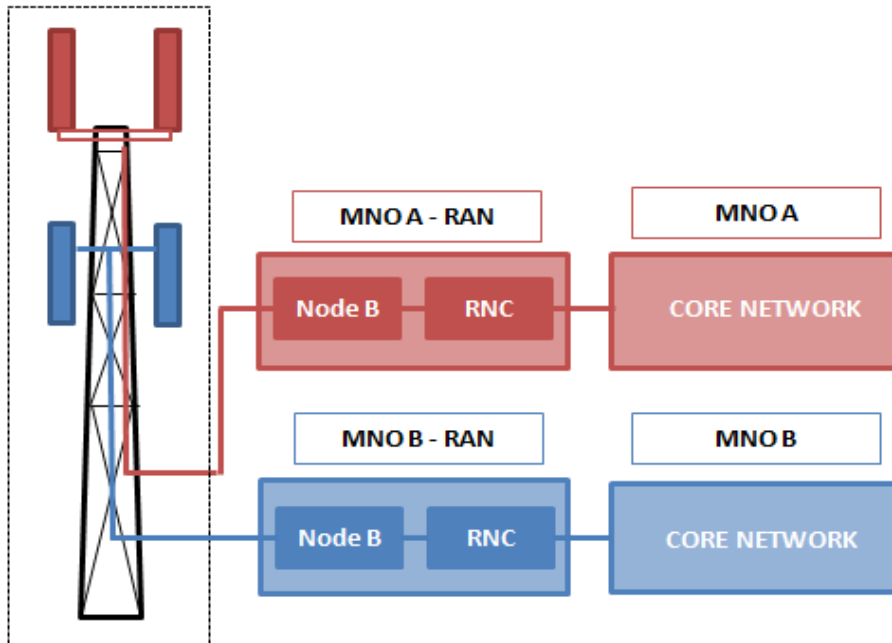
POTENTIAL COST SAVINGS

Source: adapted from Nokia Siemens Networks (NSN)



Passive sharing: Site + tower sharing

Site and tower sharing



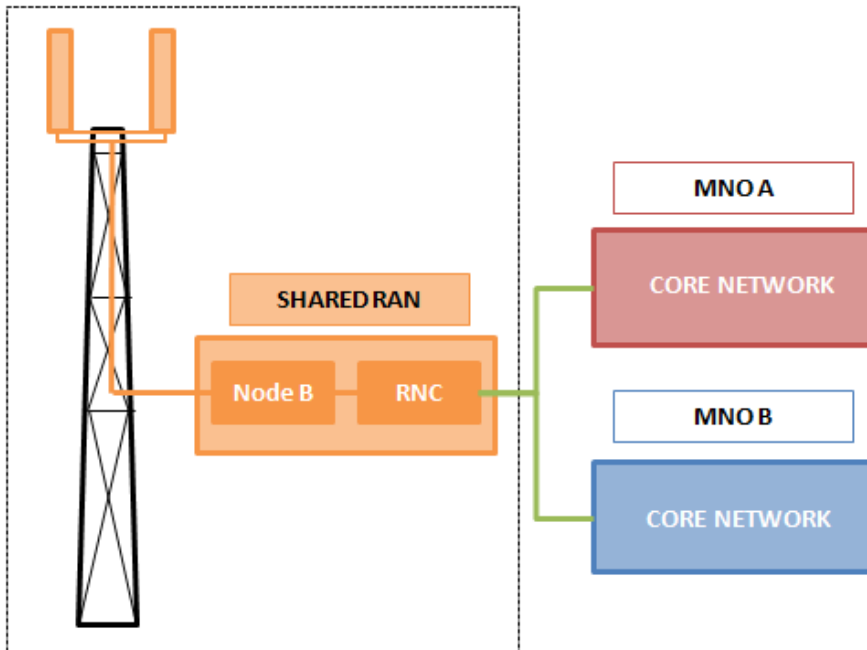
- What is shared?
 - Cell site
 - Shelters, towers
 - Power, A/C
 - Security for buildings and systems
- Potential advantages
 - Cost sharing for site acquisition, infrastructure, lease, maintenance, power
 - Reduced network footprint
- Potential drawbacks
 - Entrants may not benefit if they lacks own sites to offer
 - Costly to negotiate and implement when established networks are being consolidated

Passive sharing: Backhaul

- What is shared?
 - All elements of site sharing
 - Backhaul links: cables/fiber, leased lines, microwave
- Advantages
 - Cost savings in equipment cost
 - Cost saving in deployment
 - Joint-digging of trenches (70-80% of costs)
 - Microwave links – reduced license fees
 - Faster deployment timeframe

Active sharing: Dedicated carrier

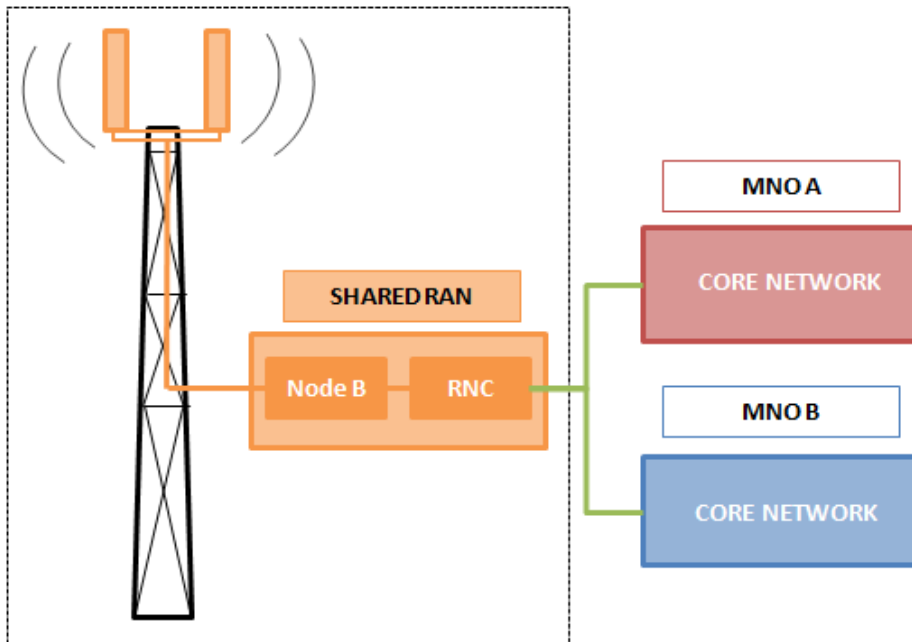
Multiple Operator RAN (MORAN)



- What is shared?
 - All elements of site sharing
 - Radio network controllers, base station equipment and antennas
 - No spectrum sharing
- Potential advantages
 - Cost sharing on radio equipment
 - Reduced antenna footprint
- Potential drawbacks
 - May have a negative impact on QoS due to reduction of signal strength when antennas are combined

Active sharing: Shared carrier

Multiple Operator Core Network (MOCN)



- What is shared?
 - All elements shared in MORAN
 - Radio spectrum
- Potential advantages
 - Shared operation and planning cost
 - Efficiency by pooling of spectrum
- Potential drawbacks
 - Affects service differentiation in terms of availability and network quality
 - May not be viable under existing spectrum usage regulations

Regulators increasingly favor sharing...

Mobile infrastructure sharing may result in significant benefits for consumers and MNOs

Consumers

- Increased service footprint and network coverage
- Cost savings may be passed on to consumers in the form of lower prices or enhanced services
- Promotes competition by facilitating deployment in un-served/underserved areas and fostering service differentiation between existing MNOs
- Reduces the environmental impact of mobile infrastructure and energy consumption

MNOs

- Cost savings (RAN sharing can save 30-40% cost)
 - Joint build –deployment of LTE
 - Consolidation of existing networks
- Rapid deployment, increased time-to-market
- Risk-sharing in low population density areas
- Pooling of spectrum to increase efficiency and reduce spectrum costs
- Can control for difficulties in obtaining permits to build new sites

...but potential competitive concerns need to be addressed

Regulators should review sharing agreements on a case-by-case basis and balance the potential benefits with the potential competitive concerns

- This is especially relevant as MNOs enter into deeper sharing agreements and become more integrated; sharing can be seen as a viable alternative to consolidation (M&A)

Active Sharing

- Commercial independence: retail competition and service differentiation should be ensured
- Collusion: no exchange of commercially strategic information should occur, information sharing should be limited to the execution of the network sharing agreement
- Wholesale markets: competition and provision of wholesale inputs, where applicable, should be maintained
- Discrimination: prices, terms and conditions for wholesale capacity should not unduly favor the parties to the agreement vis-à-vis third parties
- Passive infrastructure: potential reductions in availability of passive infrastructure (e.g., supply of access to sites/towers) should not affect competition

Spectrum Sharing

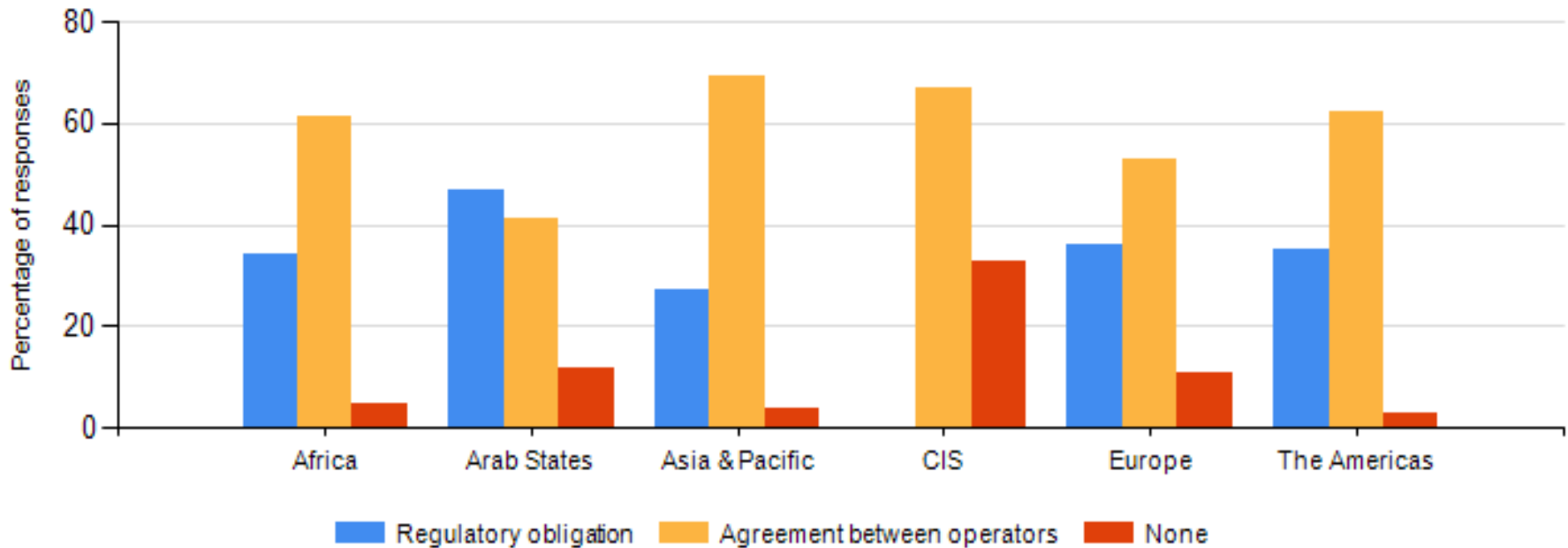
- Spectrum concentration: regulators should review the long-term competitive impact of spectrum aggregation
- Conflicting demand: parties need to establish ways to arbitrate between conflicting demands on shared spectrum, for example which customers receive priority in case of congestion

2. Trends in mobile sharing

Voluntary sharing is the most prevalent form of mobile sharing worldwide

- Mobile site sharing can be voluntary or mandated by the regulator
- Voluntary sharing continues to be the preferred approach, with regulators in many cases encouraging sharing (passive) but not mandating it

Is there a regulatory obligation to share sites?, 2013



Source: ITU Tariff Policies Database

There is a move towards deeper sharing, including spectrum sharing, around the world

Country	Configuration	Description
Australia	MOCN	H3GA and Telstra created 3GIS, a 50:50 joint venture in 2004 to jointly deploy 3G services.
Denmark	MOCN	In 2012, Telia Denmark and Telenor entered onto a network sharing agreement via a joint venture, Newco, which involves RAN and spectrum pooling
Spain	MORAN	In 2006, France Telecom and Vodafone entered into a RAN sharing agreement to cover towns with populations below 25,000
United Kingdom	MORAN	Mobile Broadband Network Limited is a 50:50 joint venture formed in 2007 between H3G and T-Mobile – currently EverythingEverywhere (EE).
	MORAN	Vodafone and O2 were cleared to create Towerco in 2012, a 50:50 joint venture that will consolidate their networks in the UK. This initiative, which expands on their 2009 “Cornerstone project”, is aimed at sharing of 2G and 3G sites.
Sweden	MOCN	Telenor and 3 Sweden entered into a 50:50 joint venture to form 3G Infrastructure and Services (3GIS) in April 2001. Goal was to meet build-out requirements on 3G licensees and includes spectrum sharing.
	MOCN	Net4Mobility is a 50:50 joint venture between Telenor and Tele2 created in April 2009 to build, own, and operate an LTE/GSM network

In Latin America passive sharing has been the preferred approach, with Tower Cos. playing a key role...

Argentina	Long standing tower sharing agreements between three major MNOs, mainly driven by municipal restrictions on site deployment
Brazil	Tower sharing agreements between major MNOs; independent third parties also lease space on towers
Chile	Tower sharing agreements recently adopted to comply with 2012 Antenna Law; independent third party entered the market in 2010
Colombia	Tower sharing agreements between major MNOs; independent third party leases space to MNOs
Costa Rica	Independent third party leases space to MNOs
Ecuador	No voluntary sharing; limited passive sharing based on regulator mandates
Jamaica	Tower sharing agreement between Digicel and Claro, later terminated by merger and decommissioning of Claro's network
Panama	Independent third party entered the market in 2013
Peru	Passive site and tower sharing between major MNOs; independent third party entered the market in 2010
Mexico	MNOs share towers under a barter 1:1 scheme; independent third parties also lease tower space to MNOs

...but active sharing is starting to take hold for deployment of LTE on newly assigned spectrum

Brazil	Oi and TIM entered into a RAN sharing agreement in 2013 to deploy LTE using the 2.5 GHz band; Claro and Vivo also entered into a RAN sharing agreement in 2013
Colombia	Movistar and Tigo entered into a RAN sharing agreement to jointly deploy LTE using the AWS band in 2013
Mexico	Government plans to deploy national wholesale network using the 700 MHz band (possibly through PPP) – this will likely involve MOCN

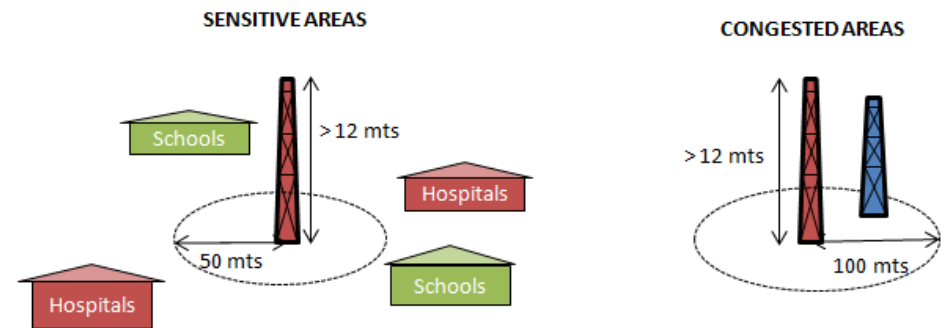
3. Case studies: mobile sharing in Latin America

Chilean Antenna Law: Mandated passive sharing in selected areas

- Government adopted the Law on the Regulation of Trans-Receiver Antennae for Telecommunications Services (Antenna Law - Decree No. 20.599 of June 11, 2012)

- Antenna Law requires that **existing** towers in sensitive and congested areas be (i) decommissioned or (ii) compensation be paid to localities

- Four major MNOs have negotiated tower sharing agreements or paid compensation in about 80% of sensitive/congested areas designated by the regulator



- Implementation problems in remaining areas are mainly due to disagreements with local authorities
- Passive sharing is not significant outside sensitive/congested areas and no active sharing in the market
- Antenna Law restricts ability to deploy **new** sites and towers (in urban areas) which is expected to lead to more sharing going forward
- No specific passive sharing requirement in 700 MHz auction, but national roaming reference offer must be presented by licensees

Brazil : RAN sharing for LTE deployment

- In 2013, Oi and TIM entered into a 15 year, MORAN sharing agreement that includes:
 - Active and passive sharing to deploy LTE over the 2.5 GHz band;
 - No spectrum sharing, unless “extremely necessary” and only for a limited timeframe;
 - Deployment covering 12 cities:
 - Phase 1: Oi - Rio de Janeiro, Belo Horizonte, Brasília, Fortaleza and Salvador, TIM – Recife
 - Phase 2: TIM - São Paulo, Natal and Curitiba
Oi - Porto Alegre, Manaus and Cuiabá
- Compliance with build-out requirements (Confederations Cup and World Cup) and cost savings key drivers
- Agreement cleared by regulator (Sept. 2013) and competition authority (Nov. 2013)
- Vivo (Telefonica) and Claro also entered into an MoU for short term MORAN sharing in 2013

Colombia: RAN sharing and national roaming for LTE deployment

- In 2013, Colombia auctioned spectrum in the AWS (1.7/2.1 GHz) and 2.5 GHz bands
- Auction rules favor mobile infrastructure sharing, passive and active, and require established providers to offer national roaming to entrants
- In August 2013, Movistar and Tigo entered into a MORAN sharing agreement to deploy 4G systems using the AWS band:
 - Coordinate new site acquisitions, design, maintenance and operation of sites; and
 - Deployment of multimode antennas that will support 2G, 3G and 4G service
- Key drivers:
 - CAPEX and OPEX savings in deployment of new 4G network
 - Faster roll-out to beat dominant provider Claro to the market – Movistar and Tigo launched 4G in December 2013, within six month of obtaining their licenses
 - Achieving coverage targets set forth under the 1.7/2.1 GHz spectrum licenses
 - Major challenges for new site deployment in Colombia due to difficulties in obtaining local permits
- In January 2014, the ICT Ministry and the regulator (CRC) launched investigations against Movistar and Tigo for allegedly refusing to provide national roaming to entrant Avantel

4. Conclusions

Conclusions

- Mobile sharing can bring significant benefits for consumers and MNOs but potential competition concerns should be reviewed on a case-by-case basis:
 - Passive sharing is typically favored and even encouraged by regulatory authorities
 - Benefits of RAN sharing should be balanced with their potential limits to competition, especially in cases where spectrum sharing is involved
 - Core sharing significantly restricts service differentiation and independence between carriers
- Mobile sharing has mostly taken the form of passive site and tower sharing in the Latin American region, with independent tower companies playing a key role in many countries
- As mobile broadband traffic grows and pressure to upgrade/deploy new technologies increases, MNOs around the world and in the Latin American region are seeking deeper sharing arrangements
- Recent examples of MORAN sharing in Brazil and Colombia may illustrate the beginning of a wider trend –regulatory authorities should be prepared to properly assess their potential competitive effects

**Thank
you!**

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