Regulating shared access in the wireless service environment

NTC ITU Training Workshop on Infrastructure Sharing

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Craig Skinner
craig.skinner@ovum.com

Agenda

- Market developments
- Network sharing options
- Policy and regulatory options
- Case studies
- Best practices

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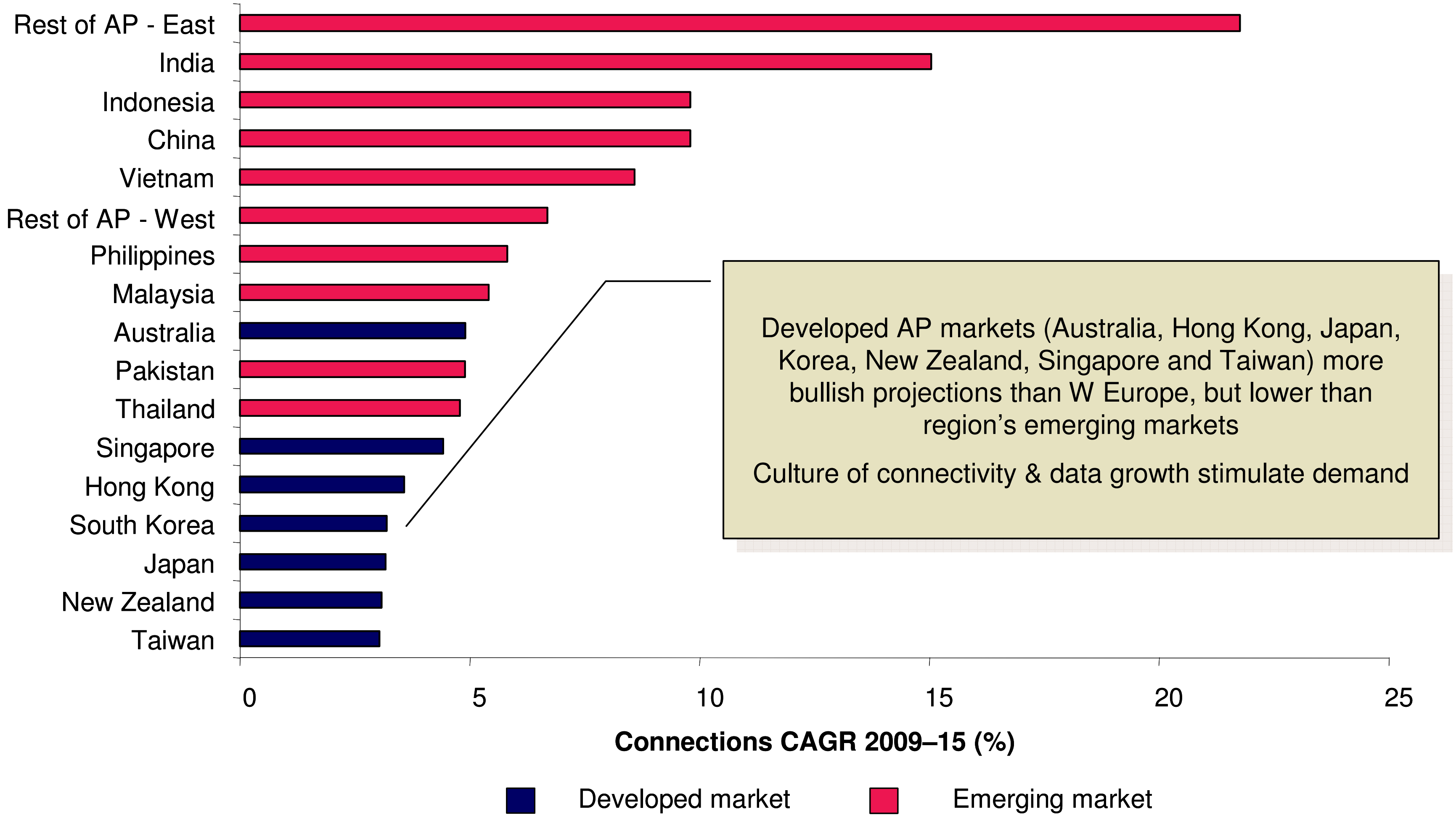
Asia-Pacific: A tale of two extremes



Developed AP markets (Australia, Hong Kong, Japan, Korea, New Zealand, Singapore and Taiwan) more bullish projections than W Europe, but lower than region's emerging markets

Culture of connectivity & data growth stimulate demand

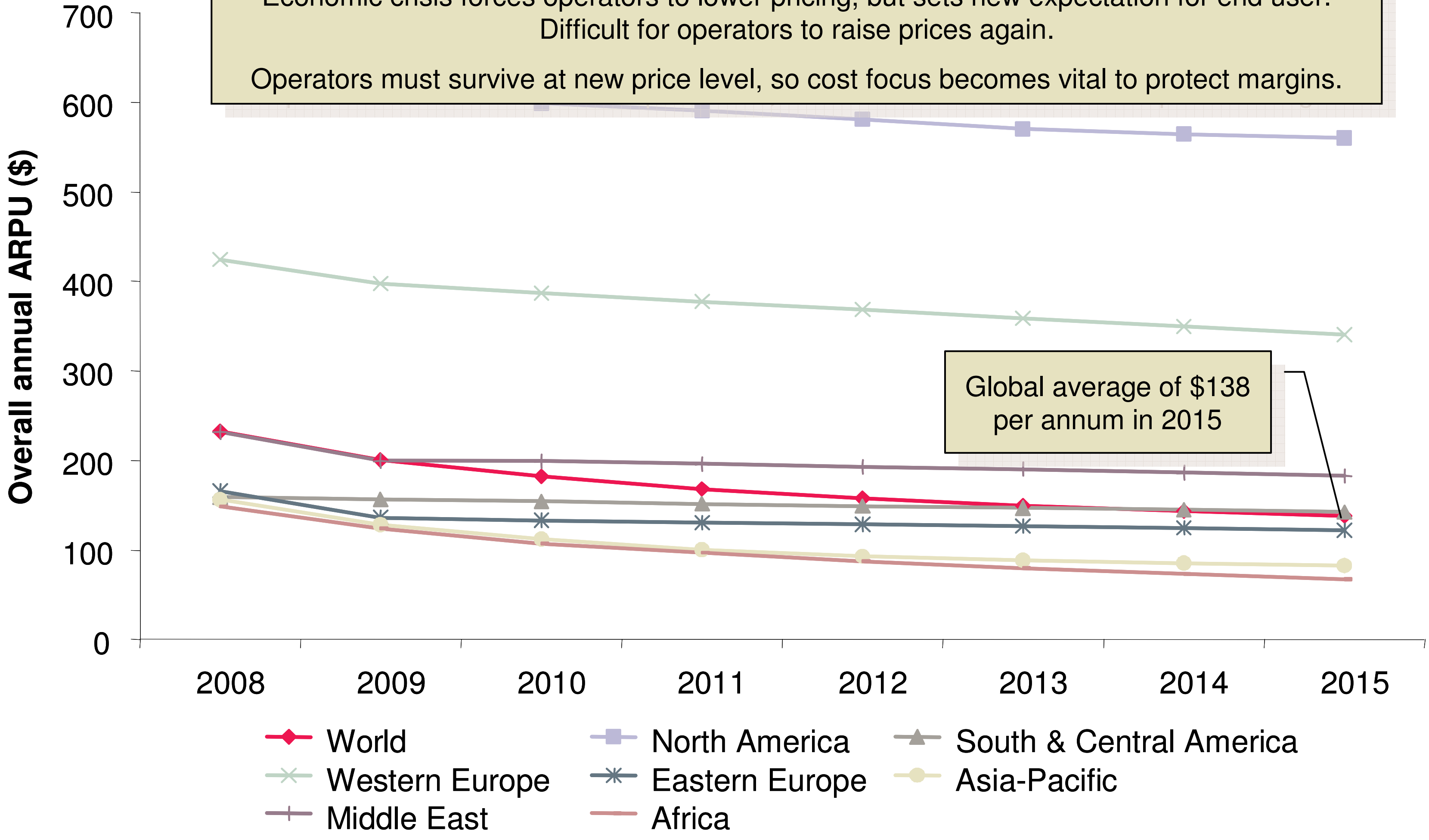
Source: Ovum

Connections growth hides ARPU decline

Driven by saturation & competition globally & penetration of rural areas in emerging markets.

Economic crisis forces operators to lower pricing, but sets new expectation for end user. Difficult for operators to raise prices again.

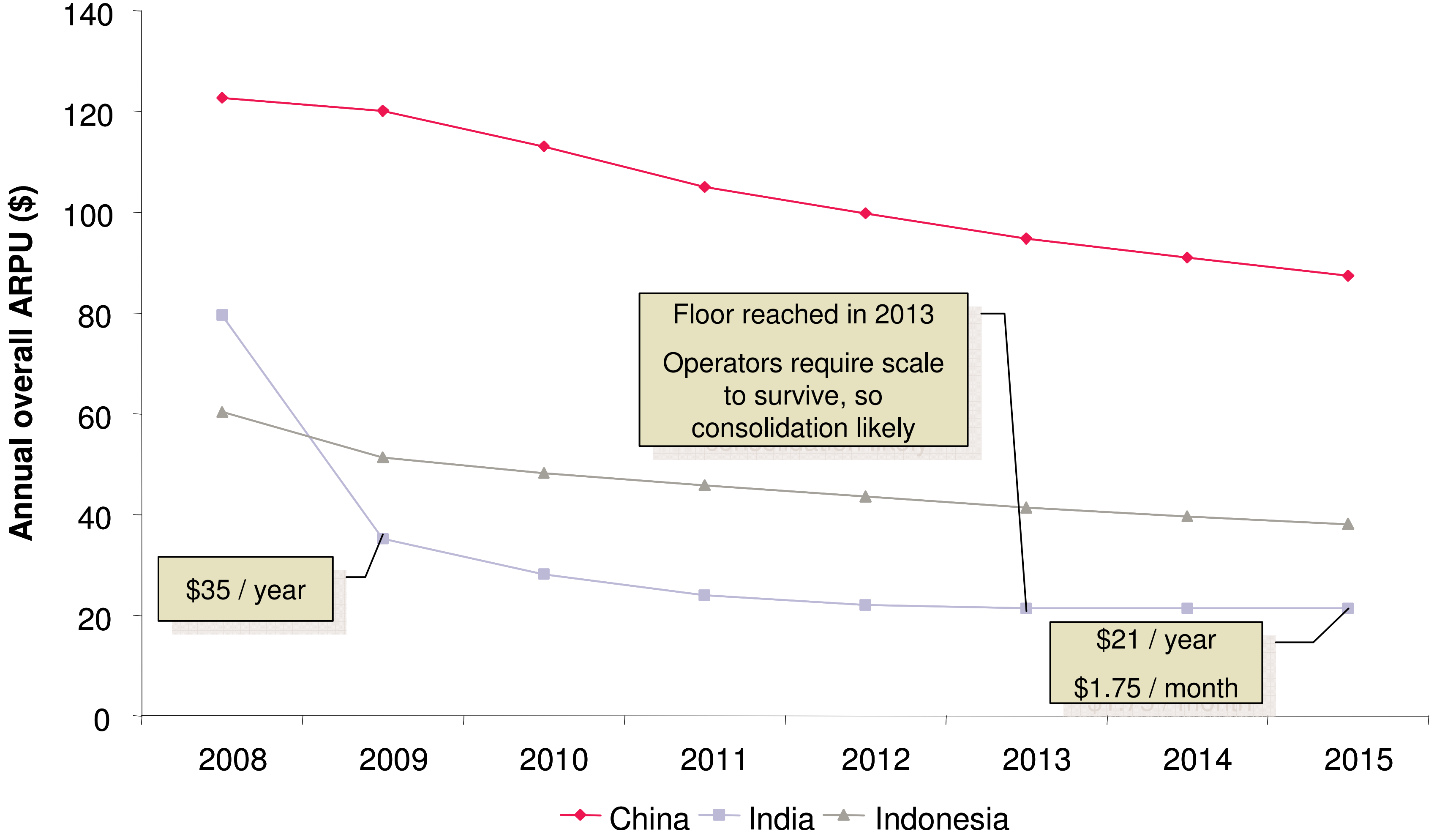
Operators must survive at new price level, so cost focus becomes vital to protect margins.



Global average of $138 per annum in 2015

Source: Ovum

Revenues in the "big three" are still growing, but how low can ARPU go?



$35 / year

Floor reached in 2013

Operators require scale to survive, so consolidation likely

$21 / year

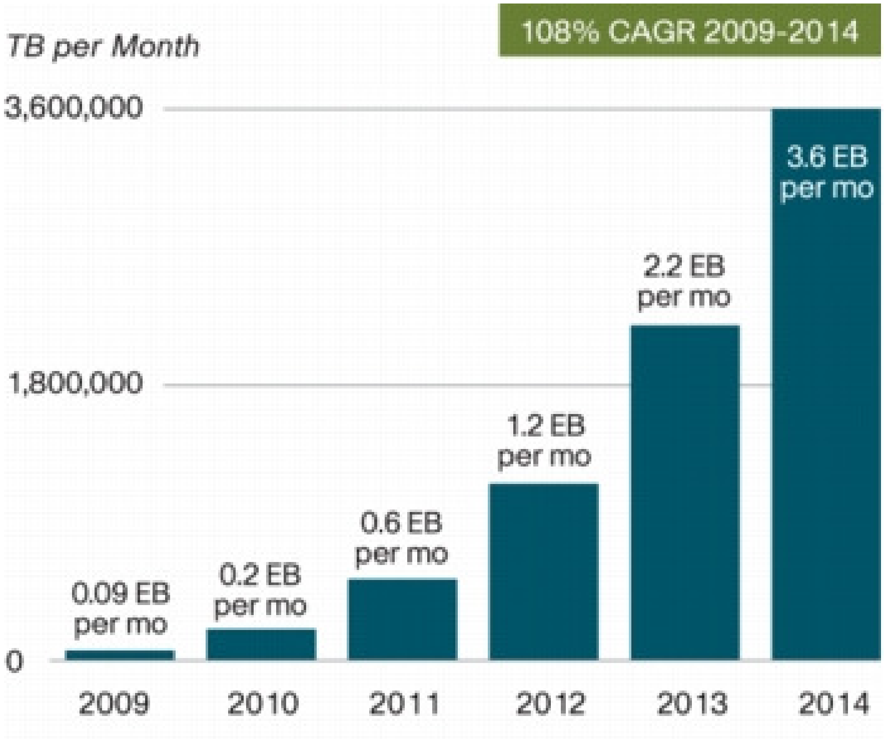
$1.75 / month

Source: Ovum

Mobile broadband growth drivers

- Network technology
  - HSPA, HSPA+, moving to LTE
- Devices
  - Netbooks, laptops, USB dongles
  - Smartphones
  - Managed device platforms (eg iPhone, Android)
- Tariffs
  - Simple, cheap, generous
- Maturing voice market
  - Operators searching for growth beyond voice

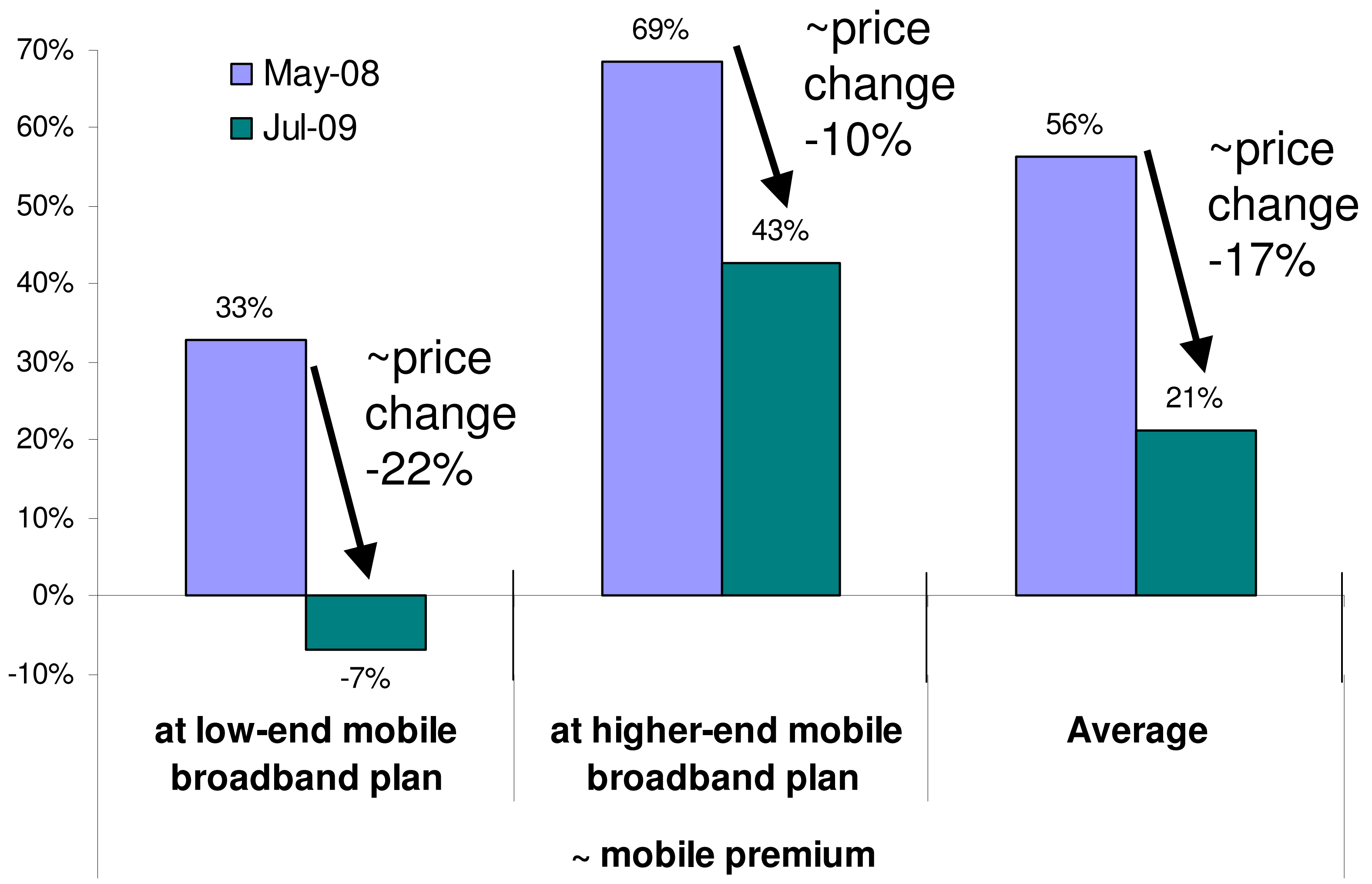
The result is extraordinary traffic growth



Source: Cisco VNI Mobile 2010

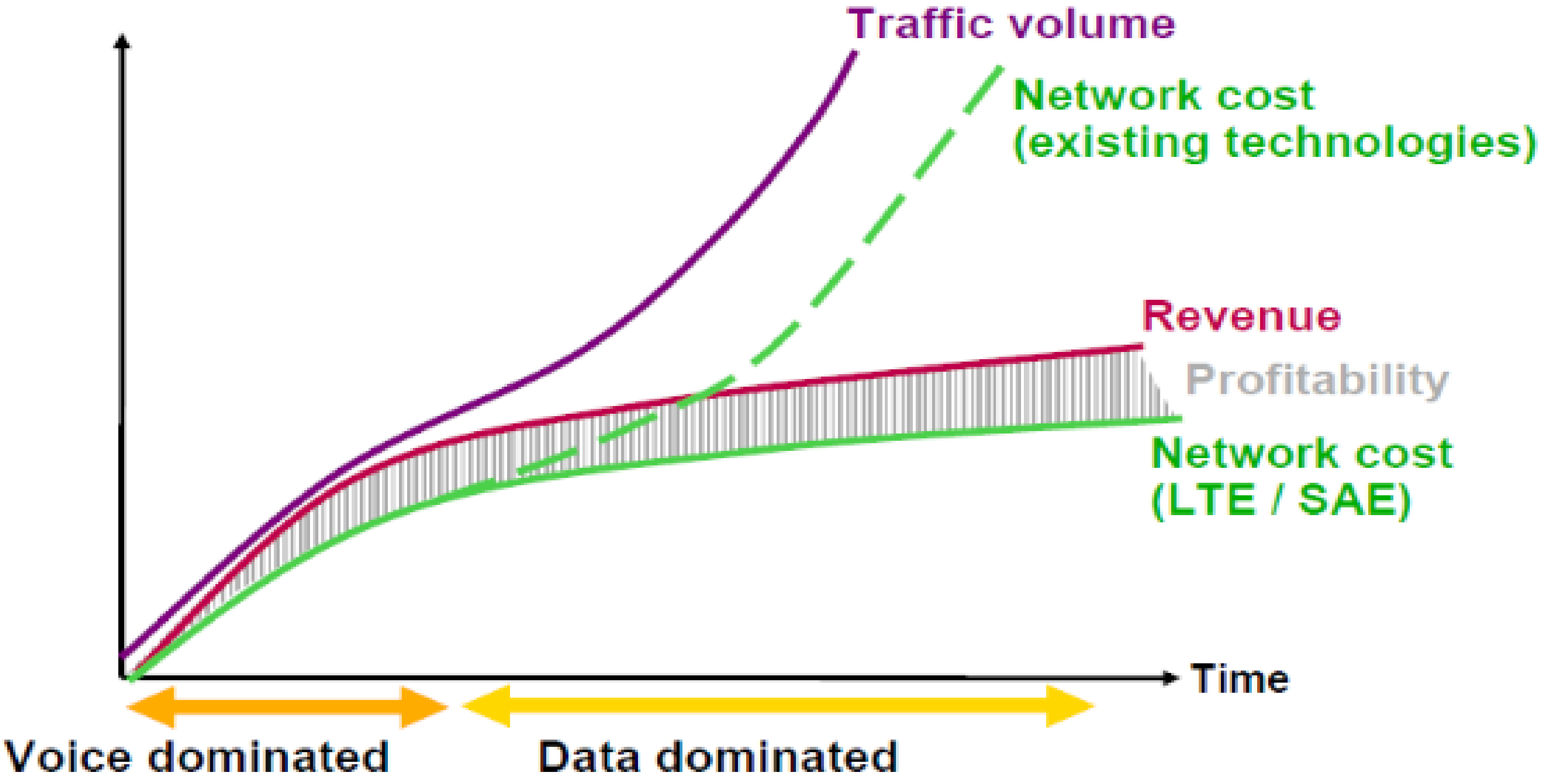
- Cisco:
  - “Globally, mobile data traffic will double every year through 2013, increasing 66x between 2008 and 2013.
  - Mobile data traffic will grow at a CAGR of 131 percent between 2008 & 2013”
- NSN:
  - “100x data traffic growth between 2007 & 2015”
  - 36MB in 2007 => 10GB in 2015 per month per data user

Premium for mobile broadband



Note: Based on mobile and fixed broadband pricing from all mobile operators in Australia, Singapore, New Zealand, Malaysia, Philippines, Indonesia, Hong Kong, Japan and Korea. Source: Ovum

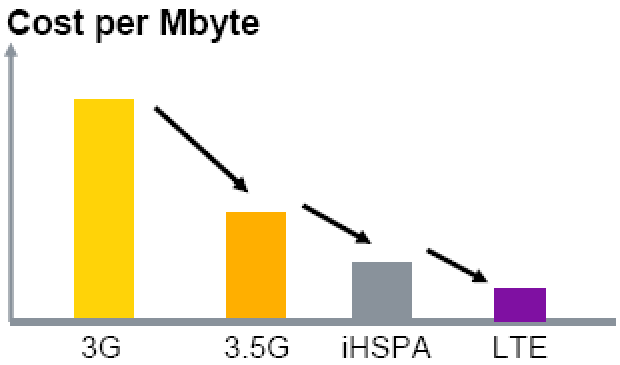
Limiting network costs



Source: Nokia Siemens Networks

LTE value proposition

- Technical characteristics ….
  - Smart antenna technology (MIMO), move to new Shannon curve
  - Utilise flexible and discontiguous channel bandwidths
  - Flat IP architecture
  - Low latency of 10ms in user plane
- … yields benefits
  - Lower cost per bit
  - Lower capex/opex
  - Better responsiveness for applications
  - Better QoS control
  - Enhanced user experience



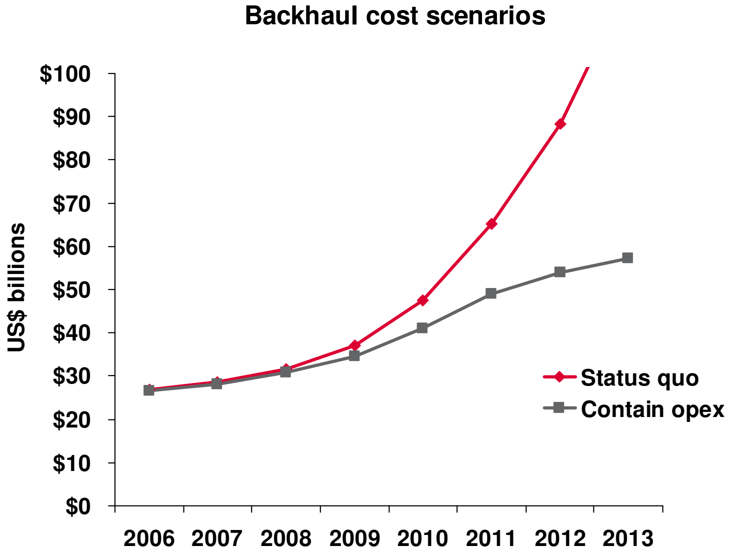
Source: NSN

LTE challenges

- No new services or revenues
  - Ovum survey, ~80% ranked new revenues and services as an important reason for upgrading to LTE
- HSPA+ provides most of the benefits of LTE
  - LTE opens more spectrum possibilities
- Deploying LTE is neither simple nor cheap
  - New spectrum acquisition
  - New RAN
  - New mobile core network + IMS
  - Increased backhaul capacity
  - Allow service continuity of existing circuit switched services (IMS)
  - New OSS/BSS
  - New devices to subsidize

Backhaul costs

- Operators and vendors are investigating alternative ways to backhaul mobile data traffic, having in mind three key parameters to match. These solutions have to be:
  - Able to deal with the data traffic growth driven by the adoption of HSPA (or LTE) services in a scalable manner given the unpredictability associated to this mobile data traffic increase.
  - Able to migrate to IP-based systems as part of the all-IP network evolution.
  - Able to achieve the two former goals while ensuring CAPEX and OPEX remains under control and, preferably allow savings.



Source: Ovum

Backhaul network must become more cost-efficient

Power savings

- Power consumption is a significant OPEX centre for mobile operators
  - RAN can represent up to 80% of the energy bill of a mobile operator
- There are several ways to try to reduce the bill
  - Network sharing
  - Optimise radio network design (reduced number of sites)
  - Optimise the site itself and its components through the use of less power-hungry radio equipment and systems
  - Use alternative power energies – wind, solar, bio-diesel
- Climate warming issue (e.g. pressure from regulation / governments)
- 3G/LTE network modernization program allows operators to proactively respond

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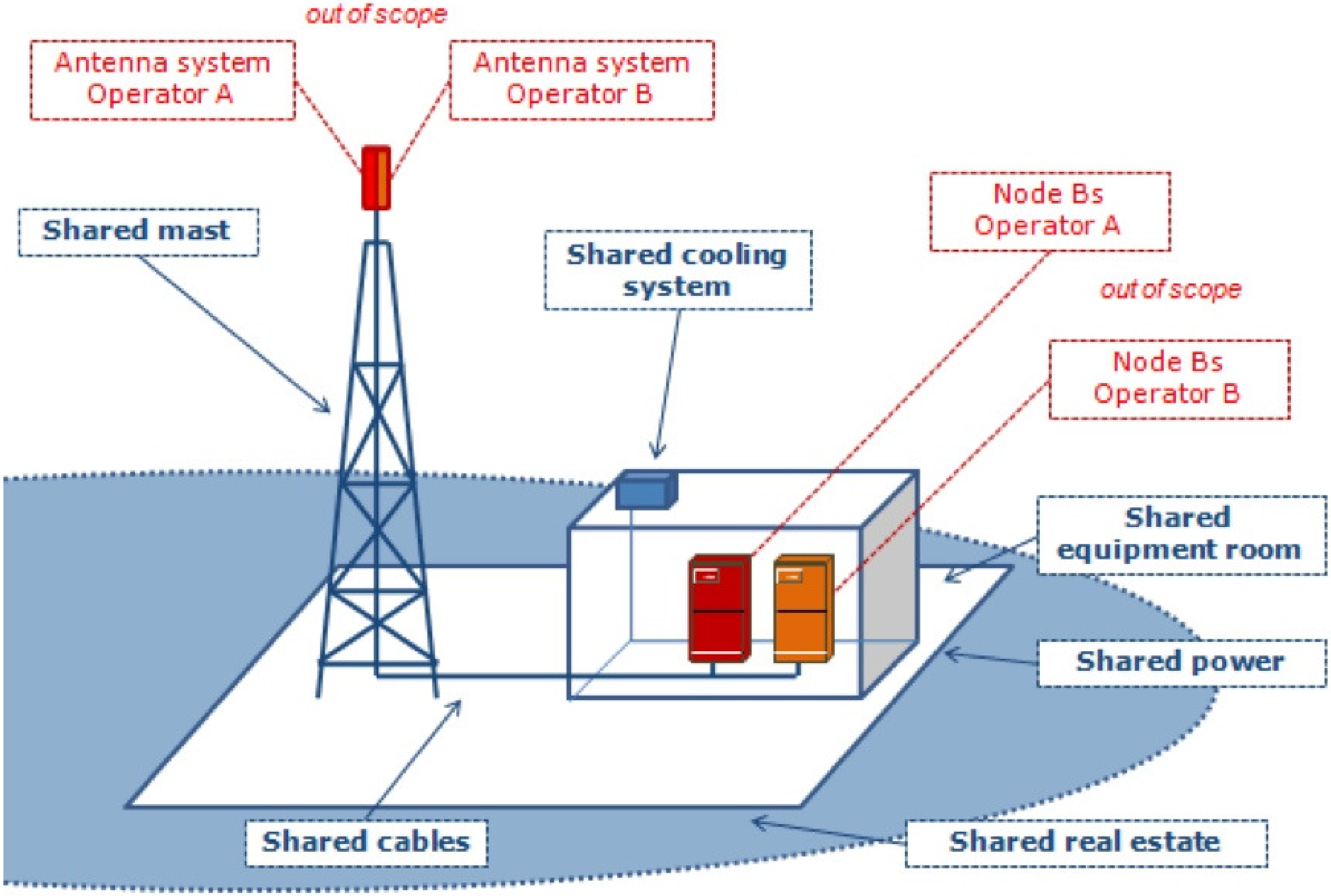
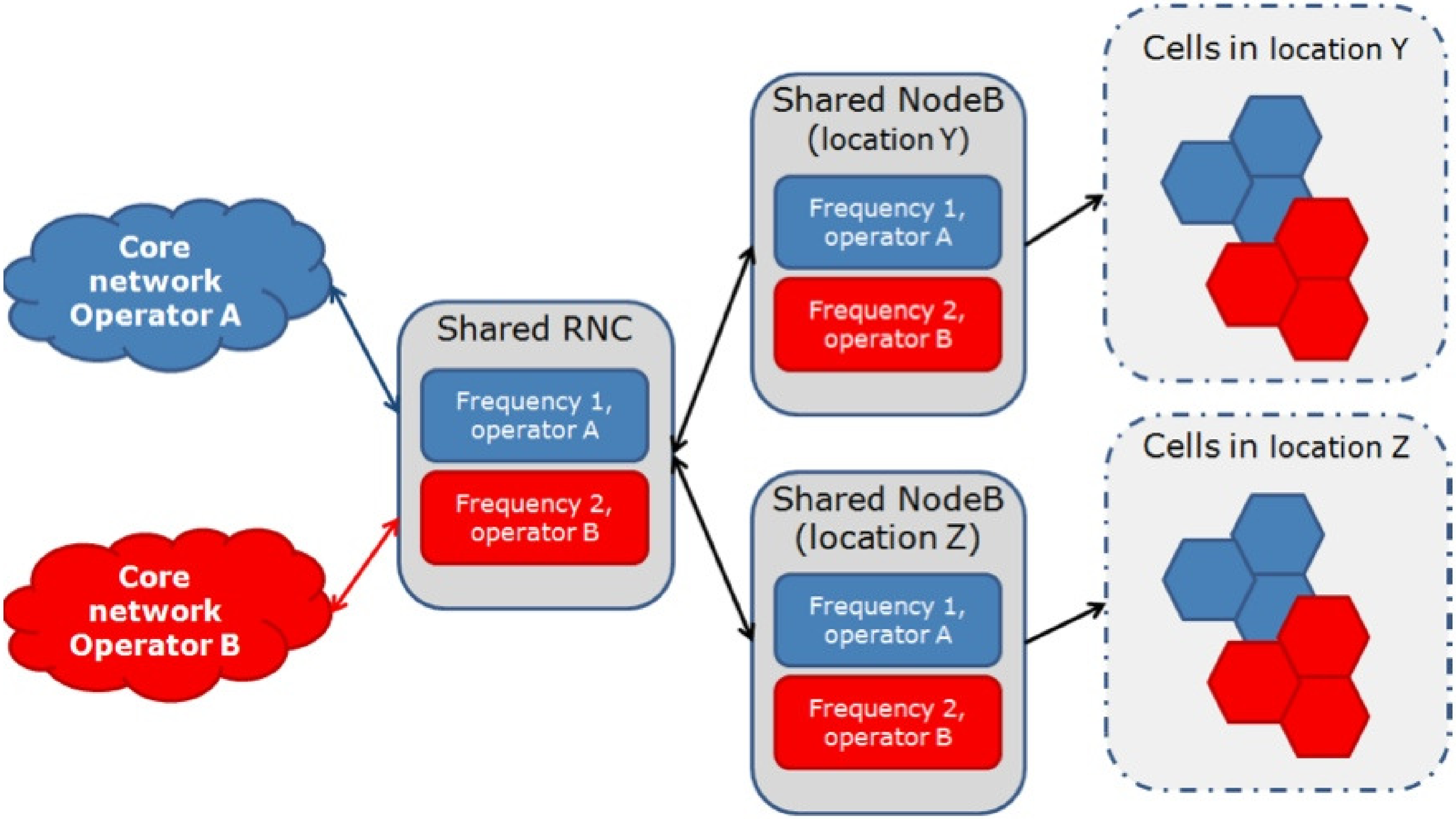
Site sharing


out of scope
Antenna system Operator A
Antenna system Operator B
Shared mast
Shared cooling system
Node Bs Operator A
out of scope
Node Bs Operator B
Shared equipment room
Shared power
Shared cables
Shared real estate

Site sharing

- Simplest and most common approach
  - Sharing a combination of the passive elements at the RAN site
- Suitable for:
  - Urban areas with limited site availability
  - Rural areas with high costs of backhaul and power (and low traffic volumes)
- Commercial options
  - Unilateral
  - Bilateral
  - Multilateral
  - 3rd party tower company
- Typical savings: up to 10% of RAN cost

RAN sharing (separate spectrum)



Core network Operator A

Core network Operator B

Shared RNC

Frequency 1, operator A

Frequency 2, operator B

Shared NodeB (location Y)

Frequency 1, operator A

Frequency 2, operator B

Shared NodeB (location Z)

Frequency 1, operator A

Frequency 2, operator B

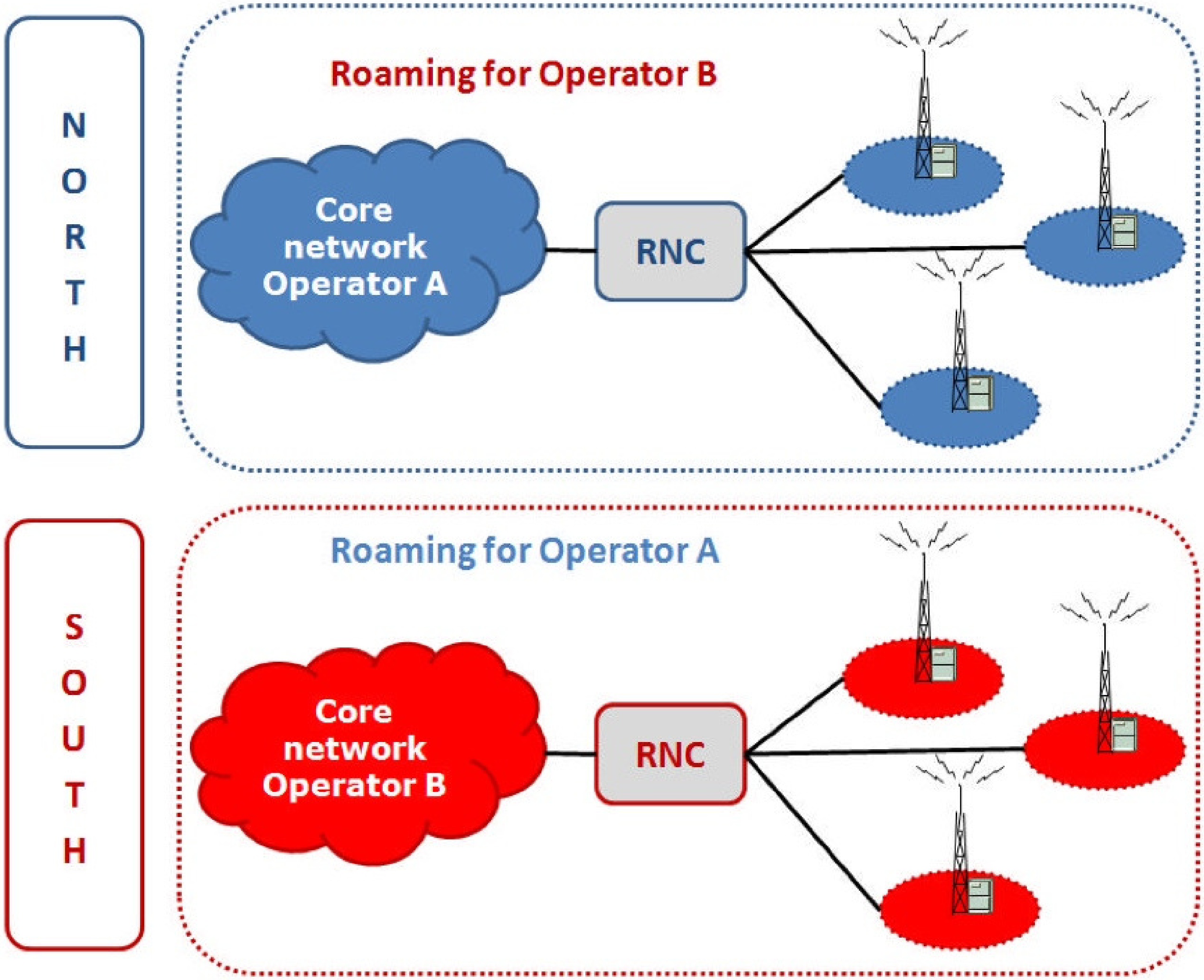
Cells in location Y

Cells in location Z

RAN sharing

- Essentially an extension of site sharing to include the active RAN elements
  - Provides additional savings to passive site sharing
  - Requires greater mutual co-ordination and planning
  - May not be so simple (allowed) from a regulatory perspective
- Can keep spectrum separate or combined
  - RAN sharing with separate spectrum standardised 3GPP R6
  - Vendors also offer full network outsourcing services
  - Combined spectrum useful where spectrum allocations of each operator are dissimilar
- Typical savings: up to 20% of RAN cost

Regional or national roaming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Roaming for Operator B
Core network Operator A
RNC
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Roaming for Operator A
Core network Operator B
RNC

Regional or national roaming

- Similar to international roaming, but within domestic country
    - Often encouraged or mandated by regulator, but sometimes disallowed
    - Pricing may be set/reviewed by regulator
    - Important for new entrants to attract customers without incurring large start-up costs in advance of revenues
    - Simpler to manage than active infrastructure sharing
    - Need to manage boundary of roaming area – overlap can produce traffic spikes on roamed network
- Government funded coverage extensions typically include national roaming requirements
- Typical savings: up to 25% of RAN cost

The many flavours of MVNOs

MVNOs vary greatly in nature, depending on the extent to which they rely on the facilities and capabilities of the host operator.

		SP	'Skinny' MVNO	'Thin' MVNO	'Thick' MVNO	MNO
Network Elements	**Spectrum**	🟥	🟥	🟥	🟥	🟥
	HLR	🟥	🟥	🟥	🟩	🟥
	MSC	🟥	🟥	🟥	🟩	🟥
	Platforms	🟥	🟥	🟩	🟩	🟥
Retail Elements	**SIM Branding**	🟥	🟩	🟩	🟩	🟥
	Billing	⬛	🟩 (usually prepaid)	🟩	🟩	🟥
	Customer Care	⬛	⬛	🟩	🟩	🟥
	Tariff & product development	🟥	🟩	🟩	🟩	🟥
	Brand visibility to end user	🟥	🟩	🟩	🟩	🟥
	Customer ownership	🟥	🟩	🟩	🟩	🟥

Note: In some cases an MVNE may operate some elements on behalf of an MVNO

🟥 **MNO** ⬛ **Either/or** 🟩 **MVNO**

Common shared network: MVNO

- Can move beyond active RAN sharing to core network elements
  - MVNO is typically a wholesale provider arrangement rather than bilateral access
- Various options for MVNOs
  - Provision of HLR, billing system, etc
  - Broadening range of services offered: voice, messaging, email & internet access, apps, games, mobile TV
- Commercial value to wholesaler of better segmenting the market
- Fixed only operator can utilise mobile component for bundling offers

Backhaul sharing

- Similar issue to fixed networks
    - It may be commercially viable to provide mobile service in a rural area, except for the backhaul cost
    - Typical (EU 3G site) costs for microwave backhaul: ~40% total capex, ~20% total opex
- Regulatory restrictions with
- Upgrading to mobile broadband will require upgrading backhaul, often to fibre
    - Rural and remote sites
- Can share the same (competitive?) backhaul as the fixed network
    - Getting the regulation for competitive backhaul right provides competitive access network pressure: fixed vs mobile

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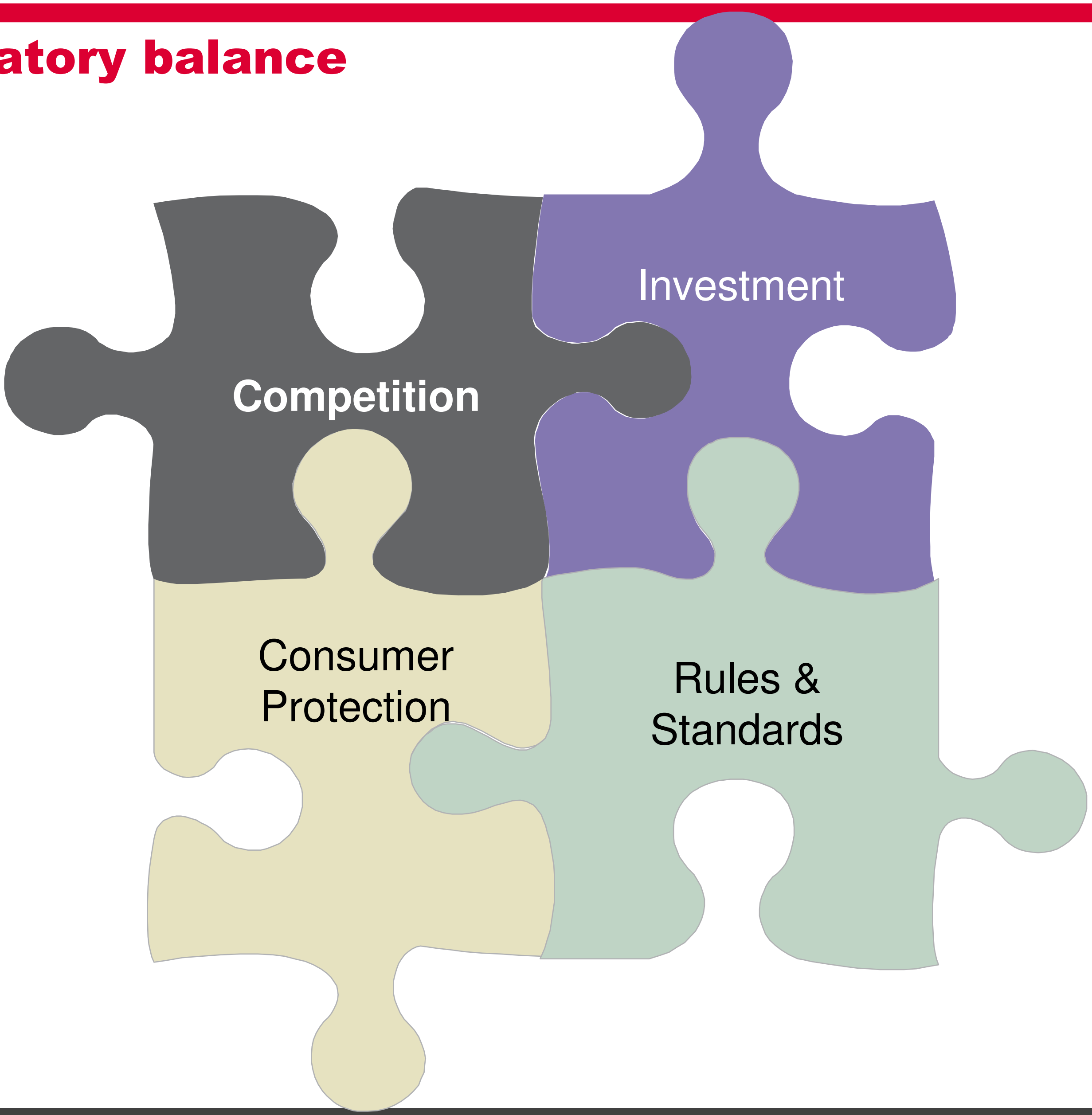
Regulatory balance



Competition

Investment

Consumer Protection

Rules & Standards

Competition and coverage

- Similar 2 key objectives to fixed: promotion of competition and extending access coverage
    - Mobile has typically had stronger infrastructure based competition and for longer than fixed
    - Balance anti-competitive concerns with deploying networks efficiently
- Promotion of competition
    - Network sharing can be seen as promoting reducing barriers to entry and promoting competition
    - But sometimes can be seen as restricting infrastructure based competition (e.g. European Commission with introduction of 3G)
- Promotion of coverage
    - Lower costs allows coverage to be extended to lower revenue locations
- Similar to fixed, can have different outcomes in different market segments
- Competitive backhaul a critical element for both fixed and wireless

Network sharing

- Passive
  - Less likely to restrict competition
  - Operators retain different networks, services and business models
  - Restrictive clauses (exclusivity, independent expansion) can still be anti-competitive
- Active
  - Potential to restrict competition: service differentiation, retail pricing
  - Licence conditions need to be considered
- National roaming
  - May be temporary and align with licence coverage conditions
- In all above cases, regulator needs to provide clarity on sharing
  - Disallowed, allowed, mandated: and guidelines and principles, incl any pricing

Government funding

- Universal service for fixed telephony long established
  - Do wireless networks meet the requirements for provision of fixed voice?
  - Should universal service be extended to (wireless) broadband?
  - Where does wireless fit into national broadband plans?
- Direct funding to improve coverage
  - Blackspots, interstate transport (road, rail) corridors, rural
  - Can include wholesale (roaming or other) requirements
  - Tender process to maximise leverage of public/private funding

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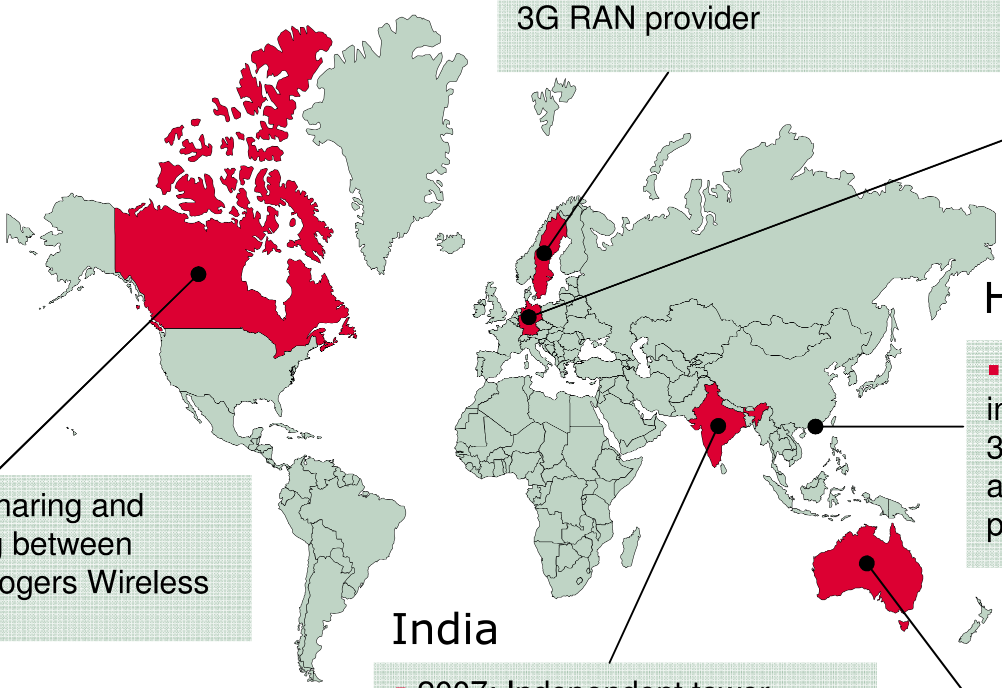
Case studies (selection)



Sweden

- 2001: Tele2 and TeliaSonera form a 50-50 joint venture with external financing as a common 3G RAN provider

Germany

- 1999: GSM national roaming of O2 onto T-Mobile
- 2003: extended to 3G national roaming

Hong Kong

- 2001: 3G network licence included requirement to open 30% of network capacity to non-affiliated MVNO, wholesale pricing to be based on LRAIC

Canada

- 2009: Tower sharing and national roaming between Videotran and Rogers Wireless

India

- 2007: Independent tower company formed between Vodafone, Bharti & Idea (70,000 sites at inception)

Australia

- 2004: Telstra and Hutchison – 3G RAN sharing with spectrum sharing; Optus and Vodafone – 3G RAN sharing with separate spectrum

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Best practices

- Provide clarity on the types of sharing that will be allowed
- Getting competitive backhaul right will benefit both fixed and wireless networks
- Allow network sharing where it has net benefits
  - Can have different levels of passive and active sharing in different geographic locations
- Consider government funding for rural and remote areas
  - Where justifiable by cost benefit study
  - Include pro-competition requirements

Thank you

Craig Skinner

craig.skinner@ovum.com