TowerXchange Meetup Asia 2017 Post Event Report

Exclusive highlights and insights from the region’s only event focused on telecom infrastructure
With special thanks to the TowerXchange “Inner Circle”

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About TowerXchange

Founded in 2012, TowerXchange is your independent community for operators, towercos, investors and suppliers interested in EMEA, CALA and Asian towers. We’re a community of practitioners formed to promote and accelerate infrastructure sharing. TowerXchange don’t build, operate or invest in towers: we’re a neutral community host and commentator on telecoms infrastructure.

TowerXchange produces a bi-weekly newsletter and quarterly journal, both available to subscribers, which cover industry news and provide deep insights into telecoms infrastructure worldwide. We also host annual Meetups on each of six continents to bring together the leading tower industry stakeholders.

TowerXchange was founded by Kieron Osmotherly, a TMT community host and events organiser with 21 years’ experience, and is governed with the support and advice of the TowerXchange “Inner Circle” – an informal network of advisors.

TowerXchange was acquired by Euromoney Institutional Investor PLC in December 2017.

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TowerXchange Meetup calendar

- TowerXchange Meetup Europe, April 17-18, 2018
- TowerXchange Meetup Americas, June 20-21, 2018
- TowerXchange Meetup China, September, 2018
- TowerXchange Meetup Africa, October 9-10, 2018
- TowerXchange Meetup Asia, December 4-5, 2018
- TowerXchange Meetup MENA, February, 2019

Interactive roundtables
Networking dinner
Business opportunities
Foreword by TowerXchange

Dear industry colleagues,

As we reflect back on 2017, the Asian tower sector was dominated by speculations on the MNOs consolidations and asset monetisation strategies in India; by various refinancing, sale and IPOs announcements in India, Indonesia, China and Myanmar; by edotco’s landmark deals in Pakistan, and by possible new tower markets opening up in Nepal and Bangladesh.

In the midst of it all, towercos continued to march on with their organic and inorganic growth in what has been a very busy year across the region. Top players from across the regional ecosystem also regrouped for the fourth annual TowerXchange Meetup Asia, held once again at the iconic Marina Bay Sands in Singapore.

TowerXchange welcomed over 290 executives for the largest gathering of Asian top telecom infrastructure leaders to date. And their inputs, knowledge and insights contributed to making the TowerXchange Meetup Asia a truly unmissable experience.

Eighty representatives from 30 leading towercos as well as top investors, advisors, MNOs, small cells providers and an array of proven equipment and service providers joined forces to discuss the dynamics of the Asian telecom infrastructure market.

TowerXchange has gathered the most useful findings and insights in this report, capturing the highlights of the TowerXchange Meetup Asia 2017. And don’t forget to mark your calendars for the 5th annual TowerXchange Meetup Asia, to be held in Singapore, 4-5 December!

Warmest regards,

Christie Liu
Head of Asia
TowerXchange

Arianna Neri
MD - Americas & Asia
TowerXchange
Amongst the delegation were:

- **79** tower executives from **33** top towercos
- **23** representatives of **14** leading MNOs
- **28** investors and financiers from **21** firms

2 days of intensive discussion and networking included:

- **36** peer-led roundtables
- **9** country focus
- **15** strategic and financial
- **12** operational best practices
- **10** dynamic expert panels
- **5** MNO and towerco keynotes
- **4** technology working groups
- **1** pre-event vendor briefing

41 sponsors and exhibitors benefitted from:

- Executive industry interviews on TowerXchange's website and Journal
- Exposure to database of 35,000 telecom infrastructure industry leaders
- Extensive pre-event and on-site branding
- Unique networking with Asian tower industry leaders

Join us on 4-5 December 2018 for this year’s Meetup! Find out more at: www.towerxchange.com/meetup-asia/
Feedback from TowerXchange Meetup Asia 2017 attendees

“TowerXchange Meetup Asia 2017 was a very effective networking programme with opportunity to share and assimilate experiences and knowledge among several companies in the APAC region. The event has helped members of the tower industry ecosystem to partner with the goal to grow in a sustainable manner. The focus on small cells, IoT and 5G was a good precursor.”  
*Tushar Kapadia, Vice President - Strategic Initiatives, GTL Infrastructure Limited*

“An innovative format of conference where you come across with real stakeholders of the industry value chain.”  
*KS Mishra, CEO, KPR*

“Coming to TowerXchange has always been a wonderful experience as it provides the right platform to understand the infrastructure market. This platform is an opportunity to learn from the other market’s experiences and also to share your best practices with others. An excellent forum to bring all the stakeholders across one table to communicate, understand and align.”  
*Shah Faisal Safdar Khattak, Head of Infrastructure Development, Telenor Pakistan*

“Great to catch up with old friends again!”  
*John Welsh, CTO, IPT Powertech*

“TowerXchange is a great forum to meet and network with a broad spectrum of tower industry participants and understand issues of relevance to the sector.”  
*Krishna Suryanarayanan, Managing Director, Telecom, Media & Technology Asia, ING Bank N.V.*

“Summarized market trends in each country in APAC very well.”  
*Toru Sekiguchi, Senior Director, Airspan Networks Inc.*

“The TowerXchange Asia Meetup was incredibly well represented at all levels from our perspective and we’ve certainly generated quite a lot of interest and opportunity from that single event”.  
*Ian Welham, SVP Global Sales, ip.access*
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# TowerXchange Meetup Asia 2017, featuring The Future Network attendee list

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<th>Mobile Network Operators</th>
<th>Investors, analysts &amp; financiers</th>
<th>Solutions providers</th>
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**Solutions providers**

- Abloy
- Acsys Technologies Ltd
- Aerial Applications
- Airspan Networks Inc
- Almana Energy
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**Advisors, consultants, law firms & others**

- AC Infrastructure Holdings, Corporation
- AC Infrastructure Holdings, Corporation
- Advisor and Independent Consultant
- American Tower Opcs (Nigeria, Uganda and Ghana)
- Analysys Mason
- China Independent Tower Alliance
Thank you to our 2017 sponsors and exhibitors

DIAMOND SPONSOR: e.co
enabling connectivity

GOLD SPONSORS:

SILVER SPONSORS:

BRONZE SPONSORS:

EXHIBITORS:
How can I get involved?

To register your interest or to discuss sponsorship and exhibition opportunities at the TowerXchange Meetup Asia, contact:

Annabelle Mayhew, Chief Commercial Officer
E: amayhew@towerxchange.com
T: +44 (0) 7423 512588
How we promote TowerXchange Meetups

- The core of our promotional campaign is TowerXchange’s proprietary database of the top 35,000 decision makers in the global telecom tower industry
- The TowerXchange database includes the management teams of 279 towercos who manage 2.966mn (67.4%) of the world’s 4.4mn towers
- We also maintain relationships with over 3,000 CXOs and Heads of M&A, Network Planning, Procurement and Tower Strategy at MNOs worldwide
- TowerXchange is read by 2,015 individuals at over 600 investment rms, of which 116 have capital deployed in towers and is followed by 842 investment bankers and advisors
- TowerXchange also maintains the world’s most exhaustive database of telecom infrastructure suppliers, from tower manufacturers, managed service providers, to RMS, site management platforms, access control and energy equipment and service providers
- Every month TowerXchange adds an average of 700 new highly qualified members to our community through a combination of “pull” marketing via TowerXchange research, and P2P introductions and research within the tower industry
- A total of 124 personalised emails with industry specific messaging were sent to our database to promote the TowerXchange Meetup Asia
- Our email campaign is supported by a direct mail campaign to 380 selected VIPs, and by courtesy calls to over 1,000 key target attendees
- A unique feature of our marketing campaign is the TowerXchange Asia Dossier – this annual publication collates and updates critical baseline data and includes the best interviews conducted throughout the year with key Asian industry stakeholders
- We use Google Adwords to amplify the findability of the dossier, and other selected industry news and analyses, attracting new, qualified members to our community

TowerXchange thanks its Asia media and association partners for their ongoing support:
- National Association of Tower Erectors
- Analysys Mason
- BMI Research
- Inside Towers
- Telecom Watch
- Telecom Finance
- Telecom Asia
- Pyramid Research
- China Independent Tower Alliance (CITA)
- Global Listed Infrastructure Organisation
TowerXchange brings the tower industry to you!

Connect with us today and discuss available opportunities for our Meetups across Africa, Asia, Europe, Americas and China! Exhibiting or sponsoring at TowerXchange Meetups is the best investment you can make to showcase your products and expertise in front of the global telecom tower industry.

Email Annabelle Mayhew, CCO, at amayhew@towerxchange.com today to find out more

TowerXchange Meetup calendar

TowerXchange Meetup Americas 2018
June 21-22, Boca Raton Resort & Club, Florida

TowerXchange Meetup China 2018
26-29 September, Beijing

TowerXchange Meetup Africa 2018
October 9-10, Sandton Convention Centre, Johannesburg

TowerXchange Meetup Asia 2018
December 4-5, Marina Bay Sands, Singapore

TowerXchange Meetup MENA 2019
Week 2 February, Dubai

TowerXchange Meetup Europe 2019
30 April - 1 May, Business Design Centre, London

Visit our website at www.towerxchange.com
TowerXchange’s analysis of the independent tower market in Asia

Selected Asian tower market size comparisons, Q4-2017

2,396,136 of Asia’s 3,054,019 towers are owned or operated by towercos representing 78% of the total inventory of assets.

Over in Indonesia, an equally mature tower market, the towercos have carried on supplementing their organic growth with acquisitions. Specifically, Protelindo announced its acquisition of shares in KIN, adding ~1,400 towers to its portfolio, while IBS had a smaller deal involving a buy-and-leaseback of 371 towers from STI.

TowerXchange’s analysis of the independent tower market in Asia

2,396,136 of Asia’s 3,054,019 towers are owned or operated by towercos representing 78% of the total inventory of assets.

Headlines for the region have been dominated by the ongoing shakeout of the Indian market as MNOs undergo mergers and tower assets are monetised in a bid to lower debts. Through this, towercos are confronting – and bracing for – implications to tower rental contracts, as well as their future business economics.

Toweros in Myanmar continue to boost co-locations, with new builds in the country generally coming from emerging towercos contracted with MyTel, as well as OCK’s further fulfillment of Telenor’s towers once site coordinates were confirmed. The country’s first ESCO was also announced.

In China, the IPO for China Tower Corporation (CTC) has once again been delayed, with more likelihood in Q2 or Q3 this year. At the same time, the independent towercos march on with their growth plans, including acquisitions, domestic IPOs, and/or international expansions.

In the meantime, all eyes are on the Philippines, as President Rodrigo Duterte seeks to introduce a third telco player to challenge the two incumbents and propose a common tower policy. This also led to Globe Telecom’s announcement of its interest to potentially divest some or all of its tower assets.

Asia remains an exciting mix of newly developing (the Philippines, Bangladesh, Nepal) and established tower markets, as well as business models and regulatory regimes.

Afghanistan: An average of 500 towers are added to the Afghan tower network every year, which totalled 5,897 towers in mid-2015; TowerXchange

Headlines for the region have been dominated by the ongoing shakeout of the Indian market as MNOs undergo mergers and tower assets are monetised in a bid to lower debts. Through this, towercos are confronting – and bracing for – implications to tower rental contracts, as well as their future business economics.
would estimate the total count is now around 7,000. While Roshan, Etisalat and MTN all retain their towers, all have been linked with prospective tower divestitures / outsourcing in recent years, with AWCC going so far as to carve out ~1,500 towers into their subsidiary towerco, Frontier Tower Solutions.

As of the end of September 2016, there are over 27mn GSM subscribers, with 21mn of them being active. Mobile telephone base stations total 6,861 providing approximately 89% population coverage. Services in rural areas and villages are being rolled out under the Telecommunication Development Fund (TDF), which has grown to US$74mn, with more than 55 sites to be built through the TDF subsidy in the next two years and an additional 100 sites planned for the future. To date, most rural sites are off grid, and even many urban and suburban.

**Australia:** Axicom (formerly Crown Castle), Broadcast Australia and a handful of smaller independent towercos own around 2,600 towers of the total pool of 15,100 towers in the Australian market. The majority of towers are owned by Telstra, with Optus and Vodafone playing catchup, particularly in rural areas. In urban areas Vodafone and Optus share RAN. A further 1,800 towers have been recently erected by nbn, the Government-owned new broadband network, while a handful of government agencies and small local wireless operators and ISPs represent a further 2,000 between them. Ground based towers, primarily used for rural coverage, are supplemented by

### Afghanistan tower counts, 2002-15

<table>
<thead>
<tr>
<th>Afghan calendar year</th>
<th>Western calendar year</th>
<th>Tower count</th>
</tr>
</thead>
<tbody>
<tr>
<td>1393</td>
<td>2014-15</td>
<td>5897</td>
</tr>
<tr>
<td>1392</td>
<td>2013-14</td>
<td>5383</td>
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<tr>
<td>1391</td>
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<td>5005</td>
</tr>
<tr>
<td>1390</td>
<td>2011-12</td>
<td>4350</td>
</tr>
<tr>
<td>1389</td>
<td>2010-11</td>
<td>3977</td>
</tr>
<tr>
<td>1388</td>
<td>2009-10</td>
<td>3184</td>
</tr>
<tr>
<td>1387</td>
<td>2008-9</td>
<td>2736</td>
</tr>
<tr>
<td>1386</td>
<td>2007-8</td>
<td>2091</td>
</tr>
<tr>
<td>1385</td>
<td>2006-7</td>
<td>1067</td>
</tr>
<tr>
<td>1384</td>
<td>2005-6</td>
<td>567</td>
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<tr>
<td>1383</td>
<td>2004-5</td>
<td>311</td>
</tr>
<tr>
<td>1382</td>
<td>2003-4</td>
<td>89</td>
</tr>
<tr>
<td>1381</td>
<td>2002-3</td>
<td>0</td>
</tr>
</tbody>
</table>

Source: MCIT, Afghanistan

### Estimated site count for Australia

- **Ground based towers**
  - Axicom
  - Broadcast Australia
  - Other independent developers
  - nbn
  - Telstra
  - Vodafone
  - Optus
  - Others: government agencies, local wireless operators and ISPs

Source: TowerXchange
# Key tower deals in Asia 2008-2018 (excluding carve-outs)

<table>
<thead>
<tr>
<th>Year</th>
<th>Country</th>
<th>Seller</th>
<th>Buyer</th>
<th>Tower count</th>
<th>Deal value US$</th>
<th>Cost per tower US$</th>
<th>Deal structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018</td>
<td>India</td>
<td>Vodafone India</td>
<td>American Tower</td>
<td>10,200</td>
<td>$592,900,000</td>
<td>$58,127.45</td>
<td>SLB</td>
</tr>
<tr>
<td>2018</td>
<td>Indonesia</td>
<td>Providence (KIN)</td>
<td>Protelindo</td>
<td>1,400</td>
<td>$101,780,000</td>
<td>$72,700</td>
<td>Company acquisition; still to close</td>
</tr>
<tr>
<td>2018</td>
<td>India</td>
<td>Reliance Communications</td>
<td>Reliance Jio</td>
<td>43,000</td>
<td>$3,750,000,000</td>
<td></td>
<td>Asset acquisition; still to close</td>
</tr>
<tr>
<td>2017</td>
<td>Indonesia</td>
<td>PT Sampoerna Telekomunikasi</td>
<td>PT Inti Bangun Sejahtera (IBS)</td>
<td>371</td>
<td>$31,000,000</td>
<td>$83,557.95</td>
<td>SLB</td>
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<tr>
<td>2017</td>
<td>India</td>
<td>Vodafone-Idea Cellular</td>
<td>American Tower</td>
<td>19,821</td>
<td>$1,200,000,000</td>
<td>$60,541.85</td>
<td>SLB</td>
</tr>
<tr>
<td>2017</td>
<td>Pakistan</td>
<td>Pakistan Mobile Communications</td>
<td>edotco &amp; Dawood Hercules</td>
<td>13,000</td>
<td>$940,000,000</td>
<td>$72,307.69</td>
<td>SLB</td>
</tr>
<tr>
<td>2017</td>
<td>India</td>
<td>Nettle Infrastructure (Bharti)</td>
<td>Secondary share sale on BSE and</td>
<td>39,211</td>
<td>$402,000,000</td>
<td></td>
<td>Sold 3.65% (6.75 crore shares)</td>
</tr>
<tr>
<td>2017</td>
<td>Pakistan</td>
<td>Towershare (Tzanite Tower)</td>
<td>edotco</td>
<td>700</td>
<td>$88,900,000</td>
<td>$127,000</td>
<td>Company acquisition</td>
</tr>
<tr>
<td>2017</td>
<td>India</td>
<td>Ascend Telecom Infrastructure</td>
<td>IDFC Alternatives</td>
<td>5,222</td>
<td>$91,200,000</td>
<td></td>
<td>Acquiring 33% stake</td>
</tr>
<tr>
<td>2017</td>
<td>India</td>
<td>Bharti Airtel (Infratel)</td>
<td>Nettle Infrastructure Investments (Bharti)</td>
<td>90,255</td>
<td>$1,061,500,000</td>
<td></td>
<td>Acquiring 11.32% stake</td>
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<tr>
<td>2017</td>
<td>India</td>
<td>Bharti Airtel (Infratel)</td>
<td>KKR/CPPIB consortium</td>
<td>90,255</td>
<td>$951,600,000</td>
<td></td>
<td>Acquiring 10.3% stake</td>
</tr>
<tr>
<td>2017</td>
<td>Australia</td>
<td>Southern Cross Austereo</td>
<td>Axicom</td>
<td>56</td>
<td>$9,500,000</td>
<td>$169,643</td>
<td>SLB</td>
</tr>
<tr>
<td>2017</td>
<td>Malaysia</td>
<td>edotco Group</td>
<td>Kumpulan Wang Persaraan</td>
<td></td>
<td>$100,000,000</td>
<td></td>
<td>Acquiring 5.4% stake</td>
</tr>
<tr>
<td>2016</td>
<td>Malaysia</td>
<td>edotco Group</td>
<td>Innovation Network Corporation of Japan</td>
<td></td>
<td>$400,000,000</td>
<td></td>
<td>Acquiring 21.5% stake</td>
</tr>
<tr>
<td>2016</td>
<td>Malaysia</td>
<td>edotco Group</td>
<td>Khazanah Nasional Berhad</td>
<td></td>
<td>$200,000,000</td>
<td></td>
<td>Acquiring 10.7% stake</td>
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<tr>
<td>2016</td>
<td>Vietnam</td>
<td>VNI (SEATH)</td>
<td>OCK Group</td>
<td>1,972</td>
<td>$50,000,000</td>
<td>$25,355</td>
<td>Company acquisition</td>
</tr>
<tr>
<td>2016</td>
<td>Indonesia</td>
<td>XL Axiata</td>
<td>Protelindo</td>
<td>2,500</td>
<td>$250,000,000</td>
<td>$100,000</td>
<td>SLB</td>
</tr>
</tbody>
</table>
## Key tower deals in Asia 2008-2018 (excluding carve-outs)

<table>
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<tr>
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</thead>
<tbody>
<tr>
<td>2016</td>
<td>India</td>
<td>Viom Networks</td>
<td>American Tower</td>
<td>42,200</td>
<td>$1,180,000,000</td>
<td></td>
<td>Acquiring 51% controlling stake</td>
</tr>
<tr>
<td>2015</td>
<td>Myanmar</td>
<td>Digicel MTC</td>
<td>edotco</td>
<td>1,250</td>
<td>$221,000,000</td>
<td></td>
<td>Acquiring 75% controlling stake</td>
</tr>
<tr>
<td>2015*</td>
<td>Australia</td>
<td>Crown Castle</td>
<td>MIRA-led consortium</td>
<td>1,772</td>
<td>$1,600,000,000</td>
<td>$902,934</td>
<td>Company acquisition</td>
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<tr>
<td>2015</td>
<td>India</td>
<td>KEC International</td>
<td>American Tower</td>
<td>381</td>
<td>$13,000,000</td>
<td>$34,121</td>
<td>Company acquisition</td>
</tr>
<tr>
<td>2014</td>
<td>Malaysia</td>
<td>KJS</td>
<td>YTL Power Int'l</td>
<td>309</td>
<td>$15,000,000</td>
<td>$48,544</td>
<td>Company acquisition</td>
</tr>
<tr>
<td>2014</td>
<td>Indonesia</td>
<td>XL Axiata</td>
<td>STP</td>
<td>3500</td>
<td>$460,000,000</td>
<td>$131,429</td>
<td>SLB</td>
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<tr>
<td>2013</td>
<td>Indonesia</td>
<td>Hutchison</td>
<td>STP</td>
<td>300</td>
<td>$68,000,000</td>
<td>$226,667</td>
<td>SLB</td>
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<td>2012</td>
<td>Indonesia</td>
<td>Hutchison</td>
<td>Protelindo</td>
<td>503</td>
<td></td>
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<td>SLB</td>
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<td>2012</td>
<td>Indonesia</td>
<td>PT Central Investindo</td>
<td>Protelindo</td>
<td>152</td>
<td></td>
<td></td>
<td>Company acquisition</td>
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<tr>
<td>2012</td>
<td>Indonesia</td>
<td>Indosat</td>
<td>Tower Bersama</td>
<td>2500</td>
<td>$519,000,000</td>
<td>$207,600</td>
<td>SLB</td>
</tr>
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<td>2011</td>
<td>Indonesia</td>
<td>Infratel</td>
<td>Tower Bersama</td>
<td>595</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>2010</td>
<td>India</td>
<td>Essar Telecom Infrastructure</td>
<td>American Tower</td>
<td>4450</td>
<td>$432,000,000</td>
<td>$97,079</td>
<td>SLB</td>
</tr>
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<td>2010</td>
<td>Indonesia</td>
<td>Hutchison</td>
<td>Protelindo</td>
<td>1482</td>
<td>$165,900,000</td>
<td>$111,943</td>
<td>SLB</td>
</tr>
<tr>
<td>2010</td>
<td>India</td>
<td>Aircel</td>
<td>GTL Infrastructure</td>
<td>17500</td>
<td>$1,800,000,000</td>
<td>$102,857</td>
<td>SLB</td>
</tr>
<tr>
<td>2009</td>
<td>India</td>
<td>Viom Networks</td>
<td>QTIL</td>
<td>18000</td>
<td>$2,407,000,000</td>
<td>$133,722</td>
<td>Company acquisition</td>
</tr>
<tr>
<td>2009</td>
<td>India</td>
<td>Transcend Infrastructure</td>
<td>American Tower</td>
<td>327</td>
<td>$23,000,000</td>
<td>$70,336</td>
<td>Company acquisition</td>
</tr>
<tr>
<td>2009</td>
<td>India</td>
<td>XCEL Telecom</td>
<td>American Tower</td>
<td>1730</td>
<td>$170,000,000</td>
<td>$98,266</td>
<td>Company acquisition</td>
</tr>
<tr>
<td>2008</td>
<td>Indonesia</td>
<td>Bakrie</td>
<td>STP</td>
<td>543</td>
<td>$34,000,000</td>
<td>$62,615</td>
<td>SLB</td>
</tr>
<tr>
<td>2008</td>
<td>Indonesia</td>
<td>Hutchison</td>
<td>Protelindo</td>
<td>3692</td>
<td>$500,000,000</td>
<td>$135,428</td>
<td>SLB</td>
</tr>
</tbody>
</table>

Totals / average: 309,073 towers, $18,628,280,000 deal value, $118,486.24 per tower.

*Crown Castle Australia (now Axicom) transaction excluded from totals and averages as it not a natural comp for the other S and SE Asian transactions.

**Bharti Airtel (Infratel) tower count inclusive of its shares in Indus Towers.

***Average cost per tower is calculated only on deals involving 100% acquisitions/SLB.

****Also includes ~178,000km of optic fiber cable, 4G spectrum and 248 media convergence nodes.

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around 20,000 rooftop sites, although not all of these are occupied.

In late February 2017, Axicom purchased 56 towers (45 transmission sites) from Southern Cross Austereo for A$12.6mn (US$9.25mn) in a sale and leaseback deal. This is the first deal involving a tower portfolio between a broadcaster and an independent towerco. The portfolio will help Axicom, which now owns over 1,900 sites in the country, expand its footprint into five regional markets in NSW, Queensland, Victoria, South Australia, and Tasmania.

Competition is also heating up as the fourth operator TPG Telecom enters the market. TPG spent A$1.26bn for two blocks of 700MHz spectrum and will spend A$600mn to build out its network, with an initial 2,400 sites to start. There will likely be some co-location opportunities for independent towercos. For now the regulator ACCC has decided against mandatory infrastructure sharing in rural areas, which would’ve allowed TPG to access Telstra or Optus’ networks.

On 8 March, the government announced that 125MHz of spectrum in the 3.6GHz band will be sold at competitive auction, in anticipation of 5G service provisioning. Currently the band is used in the country for fixed satellite service earth stations, point-to-point links and site-based wireless broadband services. The auction is expected to take place in October.

**Bangladesh:** Estimates vary between there being just under 30,000 and 35,000 towers in Bangladesh, of which 6,500+ have been shared amongst the operators to date. TowerXchange believes the actual total to be around 29,900. As of June 30, 2016, there were 69,009 base transceiver stations across the country according to the government.

There are currently four operators in the country with Telenor’s Grameenphone (GP) as market leader with 55mn+ subscribers. GP’s network covers 99%+ of the population, with 12,000+ 2G sites and 10,000+ 3G sites; the split for greenfield sites versus rooftop is 55% to 45%.

Meanwhile, VEON (formerly VimpelCom) is preparing Banglalink’s towers for sale, with the portfolio set to be optimised through ongoing consolidation of sites duplicated by the edotco portfolio. There are 5,890 assets, excluding in-building solutions (IBS), which Banglalink may add to the process, bringing it up to about 6,000 total. Out of that, about 50% are green field sites which predominantly service suburban and rural areas, with the other 50% being urban rooftops.

In light of the particular climate of Bangladesh, especially during monsoon season, the autonomy of cells sites is of particular concern in the country. edotco operates a network of 8,242 towers, the majority of which were transferred from Axiata’s Bangladeshi opco Robi. As a result of the Robi and Airtel merger, edotco is currently assessing which sites of the 3,000+ in Airtel’s portfolio it will absorb into its portfolio.

One of the most anticipated developments in the country is the towerco licensing regime. A final draft of the guideline was submitted by the Bangladesh Telecommunication Regulatory Commission (BTRC) to the government for approval in July 2017. Industry consultation on the framework began in 2016 and after a few revisions now propose the issuance of three licenses for telecom infrastructure management, 60% foreign direct investment and exclusion of MNOs from being eligible for application. edotco Bangladesh currently operates under a statement of non-objection. Assuming edotco applies and receives one of the licenses, this opens the door for either a new local towerco to enter the market and/or acquisitions by towercos seeking expansion and growth beyond their home markets.

Infrastructure sharing in Bangladesh started back in the early 2000s, when the first barter arrangements took place between two MNOs CityCell and Aktel (now Robi). Commercial tower sharing then kicked in following the introduction of tower sharing guidelines by the BTRC Grameenphone was the pioneer, establishing its wholesale business division back in 2010, followed by others in 2013 and 2015.

Meanwhile, the February auction in Dhaka is paving way for 4G rollouts in Bangladesh. Market leader Telenor spent US$155mn on the 1800MHz
band, while Banglalink picked up both 2100MHz and 1800MHz bands for a total of US$308.6mn. The other two MNOs Robi Axiata and Teletalk did not take part, and will instead rely on their existing spectrum for provision of 4G services. 4G licenses are available to the MNOs at a fee of US$1.2mn. Mobile users are expected to enjoy 4G services in the coming weeks.

Cambodia: For the latest updates on this market, please read “edotco Cambodia: up to 750 new builds planned over next three years” which appears later in the journal.

China: Now covered in China FAQs

India: Market restructuring continues in India as MNOs negotiate mergers to stay competitive, while divesting towers and other infrastructure assets to raise funds to reduce debt.

The country’s #2 and #3 ranked MNOs Vodafone and Idea Cellular are nearing completion of their merger, expected in Q2 2018, pending final regulatory approvals. The new entity will emerge as India’s largest telecom operator, with over 400mn subscribers.

Vodafone has also just announced the sale of its 10,200 towers to American Tower (ATC) at an “enterprise value of INR38.5bn” (~US$592.9mn) subject to final close. Late last year it was announced the two MNOs would sell their respective standalone towers totaling 20,000 to ATC for ~US$1.2bn.
While the ATC and Vodafone-Idea deal is progressing as expected, what came as a bit of a twist was the announced asset sales of Anil Ambani’s Reliance Communications (Rcom) to Reliance Jio owned by his brother Mukesh Ambani. The assets include ~43,000 towers, ~178,000km of optic fiber cable network across India, 4G spectrum in the 800, 900, 1800 and 2100MHz bands, and 248 media convergence nodes.

Another pivot in the industry came courtesy of Bharti Infratel, who at one point looked at buying out the Vodafone stakes (42%) in their joint-venture towerco Indus Towers, as well as those of other shareholders (Idea Cellular at 11.15% and Providence at 4.85%), then selling to investors. The latest news out of India speaks of a merger between Bharti Infratel and Indus Towers, with an eye to capturing value further down the line, once MNO consolidations shake out and remaining players re-invest in infrastructure to meet data demand.

In terms of the state-owned MNOs, BSNL has received the green light for the carve out of its 66,000 towers into a separate infrastructure unit while the other State-run MNO, MTNL, is considering divesting its 10,000 tower portfolio in an attempt to reduce its debts. BSNL’s carve out could be valued up to US$3bn and analysts are excited by the potential of these towers coming to market as many are in prime locations with considerable tenancy ratio growth potential, having not been proactively marketed before.

Further rational consolidation is welcomed by towercos who would prefer to see spectrum holdings consolidated into four or five companies with the capital and appetite to rollout. With India’s 3G overlay around half finished and expected to reach 95% coverage in the next 18-24 months, the 4G rollout has already started in tier one and tier two cities. In the near term, the 4G rollout is expected to have a marginal impact on the profitability of Indian towercos, whilst the majority of BTS are added through ‘loading’ - the addition of a second set of antenna by an existing tenant - but when 4G rollout progresses to adding infill sites for densification, expect to see a significant increase in tower cash flow.

Indonesia: Indonesia remains one of the most mature tower markets in the world, with solid tenancy ratios, excellent organic growth, and strong market caps boasted by three major towercos; Protelindo (14,854 towers), Tower Bersama (13,461) and STP (6,900). IBS Tower, Centratama (formerly known as Retower), Persada Sokka Tama and Balitower also have some scale in Indonesia. Indonesia’s towercos build 3,000-5,000 towers, rooftops and infill sites per year, tenancy ratio growth compares favourably to many other global tower markets, with around 0.13 tenants added per tower per year.

The future of Telkom-owned Mitratel and their
13,113 towers remains uncertain with the cancellation of the proposed share-swap acquisition of Mitratel by Tower Bersama at the behest of the commissioner. Telkom still has a further 18,000 towers on their balance sheet, of which 13,000 could potentially be sold at an unspecified point in the future, although it remains unclear whether some of these towers are being marketed by Mitratel.

Protelindo and Tower Bersama are holding firm against downward pressure on lease rates, which are believed to average around US$1,200 in Indonesia.

Over the years, towercos in Indonesia have expanded their catalogue offerings, moving beyond traditional ground-based towers to include fibre, microcell poles, IBS and nano-sites.

Consolidation also continues as Protelindo recently announced the acquisition of shares in KIN and its ~1,400 tower portfolio. Meanwhile, the sale of STP which was initiated around last summer has reportedly been cancelled.

**Japan:** Japan is one of the most sophisticated mobile markets in the world. Yet towers are still seen as a source of competitive differentiation, which perhaps explains why initial interest in carving out a towerco a few years ago seems to have tailed off, and why tower count data is so hard to find – readers should consider our estimate a very rough guide. Japan is famous for having the fewest number of subscribers per tower in the world –
reportedly around 500 – suggesting a staggering tower count of around 220,000 for a nation of 127mn people and a landmass of just 378,000sq km. LTE was launched as early as 2011 by former State-owned monopoly NTT DOCOMO and in 2012 by the other MNOs, SoftBank and KDDI (au). DOCOMO has already started rolling out LTE-A. Japan’s three leading MNOs are believed to have each added up to 30,000 microcells and small cells as infill sites. TowerXchange understand several tower companies are trying to establish themselves in the Japanese market, but to date their penetration remains negligible.

Laos: The 7,473 towers in Laos all remain operator-captive, but there are possible opportunities to acquire towers from all but the market leading MNO Unitel, which owns 4,000 towers, and is a 51-49% joint venture between the State and Viettel. The State also owns 51% of number two operator LTC, whose co-investor Shenhington Investments may seek an exit. 100% State owned MNO ETL is heavily indebted and needs cash for 4G rollout, while Veon has long sought to exit Beeline Laos, whose towers could potentially be monetised by an acquirer.

Malaysia: Towercos own roughly 64% of Malaysia’s towers, led by edotco’s 4,000 towers carved out of Celcom/Axiata. A further 3,200 towers are owned by 14 different State-backed and other independent towercos, while turnkey infrastructure provider OCK Group owns ~200 sites in this market with plans to build an estimated 70 to 100 more sites in the country. Naza Communications and Omnix Malaysia are also active.
There are an estimated 22,682 towers now in Malaysia, representing almost 2,000 mobile subscribers per tower. A new ground-based tower in Malaysia costs around RM300,000 (US$69K).

Around 1,000 new towers went up in 2015, with Celcom building through edotco and Maxis and DiGi building their own – although DiGi has since signed a collaboration agreement with edotco which includes co-location and new BTS sites. The State-backed tower cos also continued to expand, including through over 2,000 rural sites supported by Malaysia’s Universal Service Provision Fund.

It has been estimated that an additional 8,000 structures may be needed in Malaysia for 4G, although much of that demand will be met by microcells, lamp-poles, DAS and IBS.

**Mongolia:** In 2013 the government separated telecom service providers from infrastructure providers in the challenging 3mn population, 1.5mn sq km Mongolian market. The infrastructure providers, including State-owned ICNC, Mobi Network and Sky Network, run towers, active equipment, fibre and microwave backhaul. More than half Mongolia’s ~1,000 towers are shared.

**Myanmar:** Currently ~62% of the cell sites in the country are owned by tower cos. The 14,303 sites in Myanmar are unequally spread across seven tower cos and three MNOs. State-owned MPT owns 3,500 sites, while Telenor and Ooredoo

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**Breakdown of ownership of the 14,303 towers TowerXchange estimates have been built to date in Myanmar**

<table>
<thead>
<tr>
<th>Towercos</th>
<th>Independent towerco towers</th>
<th>MNO captive towers</th>
</tr>
</thead>
<tbody>
<tr>
<td>IGT</td>
<td>2500</td>
<td></td>
</tr>
<tr>
<td>Apollo</td>
<td>1800</td>
<td></td>
</tr>
<tr>
<td>edotco</td>
<td>1400</td>
<td></td>
</tr>
<tr>
<td>PAMEL</td>
<td>1250</td>
<td></td>
</tr>
<tr>
<td>OCK</td>
<td>703</td>
<td></td>
</tr>
<tr>
<td>EFT</td>
<td>550</td>
<td>~500</td>
</tr>
<tr>
<td>New tower cos</td>
<td>1200</td>
<td></td>
</tr>
<tr>
<td>MIG</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td><em>Telenor</em></td>
<td>300</td>
<td></td>
</tr>
<tr>
<td><em>Ooredoo</em></td>
<td>400</td>
<td></td>
</tr>
<tr>
<td>Myanmar</td>
<td></td>
<td>3600</td>
</tr>
</tbody>
</table>

*Telenor and Ooredoo portfolios are primarily rooftops

Source: TowerXchange
have about 1,500 between them, though mostly rooftops. The fourth operator consortium, led by Viettel may utilise consortium partner Star Holdings Corporation’s ~400 captive towers (up to 1,000 including co-location with MPT), which were previously utilised by MECtel. The new MNO will operate under the Mytel brand with formal launch in 2018, and it will use a combination of co-location with towerco and MNOs, as well as BTS and own build in order to roll-out its network. The split between co-locations and new builds will be around 50/50.

TowerXchange has learned of several new towerco now active in the market place including New Tower Development (NTD), Myanmar Technology Gateway (MTG), MNT, DLRE, CommBiz, ITMB, MAPCO, MNT, along with potentially a handful more others. Out of the list, MTG was also a previous sub-contractor for Ooredoo and Telenor, building about 200 towers. We are in the process of crystallising all the new entrants; as expected, there are several connections to the consortium of minority stakeholders in Mytel. Industry sources estimate ~500 new builds have come from the new players.

The word on the street is most have been awarded BTS with Mytel, in the range of 75 to 100 sites, growing up to 300 sites for the next round.

At the same, KBZ Towers is operating as a rooftop-only player, offering space from KBZ Bank branches across the country.

On average, most of the mature towers that are two-plus years old have a tenancy ratio around 1.6, with some portfolios reportedly as high as the 1.8 to 1.9 range. By late 2017 and beginning of 2018, the Myanmar market will certainly have some portfolio tenancy ratios growing to 2.0 once Mytel rolls out.

Grid power is unreliable even in major cities and in rural areas often non-existent, so Myanmar’s towers typically have robust backup power systems. Lithium batteries are now being tested and solar integration will also be explored. Ooredoo’s dalliance with retaining power assets is now behind them, so all new towers are built on a tower+power business model.

The first ESCO contract was signed in 2018, between new towerco MNT and Voltalia, an international player in renewable energies. The agreement covers an initial batch of 171 telecom towers, of which 80% are not connected the national electricity grid. The contract is for 10 years, with Voltalia responsible for power supply to the sites at 2kW each, located in the Bao and Ayeyarwaddy regions of Myanmar.

The MNOs are ramping up 4G rollouts as MPT, Telenor and Ooredoo each acquired the 1800MHz spectrum, valid for 12-years, at a cost US$80mn.

**Nepal:** Axiata Group has closed the acquisition of a majority stake in Nepalese market leader Ncell from TeliaSonera, in a deal believed to be worth US$1.365bn. There have been no tower deals in Nepal to date, but this move by the Axiata Group may pave the way for edotco to enter the market in the near future.

In fact, there is a draft Infrastructure Development and Sharing Regulation put together by the Nepal Telecommunications Authority (NTA) that is currently under review by the Ministry of Information and Communications (MoIC). It introduces a license for the provision of telecommunications infrastructure, though some concerns were raised as the draft appears to suggest that should such license be extended, it would not be available to another provider for five-years, effectively creating a monopoly.

Some infrastructure sharing appears to be underway, as Nepal Telecom (NT) had indicated in June it will extend coverage to 175 locations within a year, with 138 with “base transceiver stations (BTS) or network extension platforms that will be shared with other phone companies.” The State-owned operator is said to be at the final stage of inviting bids for the procurement of equipment including BTS towers.

TowerXchange will be looking to undertake further market studies for a dedicated report on Nepal’s telecom infrastructure landscape.

**New Zealand:** There are early signs of a nascent tower industry emerging in New Zealand, where Spark and Vodafone New Zealand have substantial but ageing tower networks, newer entrants 2degrees have leveraged co-location...
where possible while building a few hundred towers. 2degrees may have an appetite to sell their towers and partner with a towerco on BTS. Parallel infrastructure is substantial, while the need for improved rural coverage, particularly on the South Island where tourist and agribusiness drive demand, has prompted the government’s Rural Broadband Initiative to invest in over 100 towers. A total of around 4,000 ground based towers are supplemented by around 7,000 rooftop sites, primarily used in the larger cities.

Pakistan: Roughly 40% of Pakistan’s towers will soon be owned and operated by edotco, which is consolidating 13,000 towers from Jazz (Mobilink+Warid) together with Tanzanite Towers’ 700 sites, both acquisitions coming at a cost of a little over US$1bn. edotco’s acquisition of Pakistan’s largest and most pervasive tower network, securing the market leading MNO as their anchor tenant, is a milestone in the country’s increasing adoption of infrastructure sharing. With over 10,000 co-locations on Pakistan’s ~36,300 towers, tenancy ratios are already over 1.25, and growing at around 0.06 per year, driven by 3G and more recently 4G rollout.

While #2 and #3 MNOs Telenor Pakistan and CMPak (Zong) have been pioneers in RANsharing, neither is under pressure to divest their towers. However, Telenor has co-locations on over 1,500 towers. #4 MNO Ufone may be more inclined to monetise their 6,100 sites.

There are opportunities to create efficiencies by decommissioning parallel infrastructure in Pakistan, for example 2-3,000 of edotco’s sites are believed to be within 250m of each other. However, many sites may be retained for the densification of the network as MBB penetration rises from a relatively low base of 24%.

Pakistan’s MNOs have called for neutral hosts to deliver up to 100 IBS.

Power remains the number one operational challenge in Pakistan, although grid conditions are improving.

Philippines: For a comprehensive market overview, please read “The Philippines: the next towerco frontier?” which appears later in this Journal.

South Korea: According to GSMA Intelligence, SIM penetration was at 113% among a population of 50.4mn in Q4 2015. South Korea boasts one of the most sophisticated telecommunications infrastructures in the world, cultivating an insatiable demand for high speed mobile broadband among its citizens. Mobile broadband penetration in South Korea is above 99% and fibre has been widely deployed. South Korea is a three operator market featuring SK Telecom, KT and LG Uplus. The Ministry of Science, ICT and Future Planning (MSIP) has tried multiple times over the
years to license a fourth MNO, however, failed again in February 2017 as none of the three applicants (Sejong Telecom, K Mobile, and Quantum Mobile) met the criteria.

South Korea was the first market in the world to migrate the majority of users to LTE, with LTE-A rollout now well under way. SK Telecom recently noted it will invest KRW 6tn in infrastructure for network leadership in 2017, while maintaining overall capex similar to 2016. Meanwhile, KT is looking to make the 5G experience available at the 2018 Winter Olympics.

TowerXchange is starting to pick up the first faint signals that towerco activity may be emerging in South Korea.

**Sri Lanka:** As of the end of 2017, edotco managed ~3,375 towers in the country. High levels of bilateral sharing means tenancy ratios are closer to two than one all over the country. Sri Lanka is now mostly covered with 3G, and 4G is driving need for cell site densification. Dialog and Mobitel hold all of the 4G spectrum, and any other players that want to offer this will need to engage in RANsharing. There are around 7,500 towers in the country.

Bharti Airtel had been rumoured to be looking at selling its 2,500 towers, but seems to have cooled on the idea.

**Thailand:** Thailand has a tower market unlike any other in the world! Ownership of towers is in dispute as a function of BOT (Build-Operate-Transfer) concessions that are now expiring. Thailand’s three commercial MNOs were due to transfer 2G infrastructure back to SOEs CAT and TOT. The 2G equipment has little value, but of course the towers do. CAT, which ran the concessions for the 850 and 1800MHz bands, failed to reach an agreement with majority stakeholder DTAC to create a 49-51% JV towerco, into which 11,000 disputed towers were to be injected. Negotiations to create a prospective 12,000 tower JV towerco between AIS and TOT, which ran the 900MHz concession, were called off late in 2015, but the process has resumed with the recent creation of a committee to pave the way for the creation of the joint venture.

CAT and TOT have started to discuss an informal partnership without a merger, and may consolidate some of their similar core businesses to remain competitive in the post-concession era. At the same time, AIS and TOT are expected to sign a contract signalling the launch of a joint-trial commercial service on the state agency’s 2.1GHz spectrum.

TowerXchange estimate there are 52,483 towers in Thailand, of which 12,183 sit on the balance sheet of DIF, formerly TRUEGIF, a towerco created by True Corp and SCB Asset Management and successfully listed on the Thai stock exchange. DIF has little debt, a high leverage ceiling, and an appetite to consolidate more Thai towers – especially if True reduces their shareholding to increase the perceived independence of the entity.

A further 10,000 towers were built by AIS and 800 by DTAC outside the concession for 3G usage. True’s non-concession towers sit on DIF’s balance sheet... It all gets very confusing!

The steady lease-up of DIF’s towers is a good sign, but there is little progress towards any joint ventures. With one auction for 900MHz spectrum cancelled after the successful bidder Jasmin failed to pay its first installment, a re-auction was held in which AIS was the only bidder. The Thai market continues to be complex and unpredictable; this and the 49% FDI limit may deter some investors.

Towards the end of 2016, TOT announced its intention to sign a partnership contract with Advanced Wireless Network (AWN) to help grow its existing 5,320 base stations in the 2.1GHz band. Under the agreement, AWN would roll out 11,000 new base stations for TOT, for which TOT would later purchase the total capacity of the network at the set budget of Bt10bn. AWN is also leasing towers from TOT at Bt3.6bn per year for 15 years, as well as TOT’s 2G-900MHz at Bt2bn per year for a duration of five years.

A September 2017 note by Daiwa Capital Markets suggested growth to the DIF portfolio as TRUE may add more telecom towers and optical fibre into the fund.

**Vietnam:** For updated details on the Vietnam towerco market, please read “Vietnam: towerco and supplier opportunities in 2018” which appears later in this Journal.
Estimated tower ownership in Thailand

Source: AEC Advisory and TowerXchange

Towerco penetration in Asia now and forecast by Q418

Current penetration  | Forecast, Q4 2018
--- | ---
China | 100% | 70%
Myanmar | 62% | 68%
India | 68% | 67%
Indonesia | 64% | 66%
Malaysia | 34% | 34%
Sri Lanka | 31% | 30%
Australia | 28% | 28%
Thailand | 26% | 26%
Bangladesh | 24% | 24%
Cambodia | 19% | 19%
Vietnam | 18% | 18%
Pakistan | 38% | 38%
Asia heatmap

Legend
- TowerXchange research has not revealed any infracos or towercos to date
- Towercos or infracos active in the market. No recent transactions have taken place and none rumoured to take place soon
- Towercos or infracos active in the market. No current transactions taking place but an attempted tower sale has taken place in the last 3 years or there are unconfirmed rumours of a deal in this market.
- Towercos or infracos active in the market. Rumours of deals confirmed in the market.
- Towercos or infracos active in the market. Deals of significant size have taken place in the last 5 years.
- Towercos or infracos active in the market. Deals have taken place in the last year and more imminent deals rumoured.

Note: Russia is covered under Europe; we estimate it to have a 5% towerco penetration and we expect it to be a growth market.

Source: TowerXchange
Special feature:

Roundtable and panel discussions reports

The TowerXchange Meetup Asia 2017 featuring The Future Network included five keynotes, ten executive panels, as well as 40+ interactive roundtable and technology working group discussions. In the following pages, we offer our readers insights into top findings and discussion points from selected sessions.

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35 Opportunities and investibility of the Asian tower industry
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Suresh Sidhu on economies of skill: the marrying of agile and structural approaches

edotco CEO’s call to arms for best-in-class 21st century towerco

At the fourth annual TowerXchange Meetup Asia, edotco’s CEO Suresh Sidhu delivered a thoughtful keynote on how towercos can deal with and embrace the multiple forces currently shaping the Asian tower industry. And while edotco is one of the fastest growing towercos, the heart of the presentation was not on how to scale a towerco, but rather on the notion of skills and the concept of economies of skill; in Sidhu’s words “a key anchor to the new towerco value propositions, where manual operations become digitalised, limited services become increased, and a passive focus is replaced by semi-active.”

Sidhu opened his keynote with some statistics TowerXchange readers would be familiar with. Notably the rise of the towercos and infracos who currently own approximately 69% of the estimated 4.3mn towers worldwide. Granted, China Tower Corporation does represent a significant portion of the holdings (~1.9mn), however, even if CTC’s figures were removed, towerco ownership has been growing steadily over the past few years.

**Forces shaping the Asian tower industry**

Against the backdrop of increasing towerco holdings, Sidhu identified six forces as having an impact on the future of the industry:

1) **Mobile customers:** In five years, smartphone penetration will grow an estimated 29% up to 77% and mobile digital payments will reach 50%. Mobile web traffic and mobile digital media use time will both climb to 85%, with 35% and 8% growth respectively.

2) **National interest:** The creation and rise of towercos have been beneficial for the telecom industry, and also the countries they operate in and provide service to. Increasingly, as towercos seek entry into a new market, along with their investments, they are bestowed a role in contributing to urban esthetics, driving universal access, and/or facing pressure to go green. There is also the case of evolving licensing regimes and more stringent local council requirements.

3) **MNOs:** While MNOs in Asia historically favoured retaining tower ownership, this is changing as...
they are facing challenging market dynamics and precarious financial positions. There is also a shift in the MNO business model to that of a digital service provider. The economics of the telecom industry are still a mix of the old and new, with carryover impact on the tower sector, most notably exemplified by India right now.

4) Technology: With large 4G rollouts and 5G and IoT on the horizon, the implications for towercos may not be adequately acknowledged. The next generation network (HetNets) could reshape what towercos do potentially, requiring different architectural designs. Plus the potential complexity of active equipment that has traditionally been part of the MNOs’ domain.

5) Climate change: As infrastructure players in the telecom industry, towercos will bear the brunt of costs associated with more frequent and unpredictable extreme weather, extended dry season drought, rising sea levels, and more. All countries will face climate-associated issues moving forward and towercos will be picking up the costs for refurbishments, assurance, servicing and maintenance.

6) Social media: The industry served by towercos is a social one, where social media penetration will reach 75% in five years, and data consumption per smartphone will grow ten-fold compared to now.

Value proposition enhancement

Given the various changes from climate change to shifting MNO business models to new technologies, 21st century towercos need to evolve to offer increased services, digitalised operations, and a semi-active focus.

On services, Sidhu cited the example of regularly hearing from MNOs who want SLAs linked to active quality, even though a towerco traditionally deals with passive assets only! To that MNOs say, “you can do active management.” So looking ahead, towercos will need to increase their services scope, not because they necessarily want to, but will instead be shaped into doing so by the forces active in the market.

Operations also need to be more digitalised, to drive changes in the fairly manual way of how the industry has typically worked.

In terms of the shift from passive to semi-active (would still shy away from active), this can be welcomed. Towercos can provide small cell up to the shared antennae and/or provide fibre fronthaul for some of the small cell as well.

Economies of skill

Ultimately Sidhu believes towers will stay up and stand the test of time. However, what towercos
assure and what towercos offer will change if they
go down the path of semi-active. And what he
believes is at the heart of the change, is the creation
of economies of skills.

While economy of scale is crucial to a towerco,
a best-in-class business needs to look at not just
the people, but also the right tools, processes and
analytics platform. It’s thinking more critically
on what people are equipped with, so they can be
agile and fluid in their responses. Processes need
to be simplified, while analytics can guide sound
decision-making. For example, the cyclones in
Bangladesh forced edotco to dig into the analytics
as it needed to plan upgrades for its energy
investment.

edotco also invests time and money on employee
engagement. The job is repetitive for a lot of people,
so the company looks to make it interesting and fun;
to let there be commitment in the final outcomes of
what they do. Training programmes also play a role
here.

Economies of skill include the fluidity of resources,
which might mean allowing time on the ground to
work out where to put a battery in dynamic real-
time.

A high degree of standardisation is also part of the
mix, but where enough room is left for natural
innovation to flourish, such that how people do
things country-by-country that may result in
something interesting can be moved to another
market.

Benefits by achieving economies of skill

At the end of the day, the multiple forces faced by
the tower industry bring about more volatility.
But by getting the skills right, towercos can reduce
the amount of variation. As costs are driven by
variation, when more stability is created, the more
stable costs will be.

Again, as towercos shift to increase service
offerings, digitalised operations and semi-active
focus, the missing link to success is through
economies of skill. Benefits include:

- More efficient processes
- Ease of scaling up operations
- Quick propagation of lessons learnt across
  footprint
- Near real-time management of operations
- Highly engaged workforce
- Faster reaction time to market demands and
  industry shifts
- Less variation across multi-country footprint

Structural + agile approaches

Sidhu drew inspiration from the Roman and British
Empires, who demonstrated that despite being few
in numbers, adaptive people can conquer the world.

As a towerco with an eye to operational excellence,
edotco has a clear vision. However, part of the
challenge in today’s environment is providing all
the information available to the teams in such a way
that they can be as nimble as the Roman Empire.

This led to the conclusion to marry the need for
structure and standardisation of some processes,
with the dynamic ability to respond to situations
across markets.

Jobs titles and shared services are well served as
standards. Even in a world of volatility, finance
and procurement are best done one way, where
the emotions are removed. Structure is an ally to
mobility, to self-driven learning and empowerment.
It’s real-time analytics and common KPIs that
allow people to use structure, but also respond to
situations as they see fit.

For example, when edotco secured assets in
Cambodia, it needed to build 200 towers in the next
six months, but there was no team locally to do it.
The job scope is simple and the towerco had a great
team in Bangladesh. It then regularly mobilised
some of the team to Cambodia to help with the
rollout; they knew what to do as the job scope is
standardised. The benefit manifested as ease of
resourcing.

Conclusion

Sidhu’s call to arms for the future is for towercos
to move from “scale” to “skill,” and to enable
it through a marriage of structural and agile
approaches.

He believes there are many tailwinds that
are positive for the industry in spite of MNO
consolidation, technology changes, et cetera;
the increasing shift by government for shared infrastructure and drive for quality connectivity bodes well for towercos.

At the same time, for the future relevancy of SLAs (and towercos), skills need to get into the equation (beyond scale for cost structures). Towercos are encouraged to think through the common elements that can be part of structures and standardisation and what can be put in place to give people the agility and mandate to respond.

The word “mandate” may seem like an old-fashioned word in changing times, yet it is befitting for towercos of the 21st century – where people have authority to do everything necessary, with authority to go beyond but within the mandate. It’s about how to marry the complexity of an asset-intensive business that can respond more nimbly to changing situations.
Opportunities and investibility of the Asian tower industry

What acquisitive towercos and institutional investors look for in their investments

At the fourth annual TowerXchange Meetup Asia, a panel of leading towerco executives and industry analysts from edotco, American Tower, J.P. Morgan Asset Management, New Street Capital Asia and IHS Towers, which is currently eyeing Asian opportunities, took the stage to discuss capital markets, towerco value proposition, valuations and diversification, the impact of MNO consolidation and more. With its mix of mature and new markets, Asia offers unique opportunities for towercos and investors alike. This panel was particularly timely as while American Tower is already a listed entity, IHS is in the process of an anticipated listing in 2018, and edotco is widely expected to do so down the road.

Keywords: Acquisition, Africa, American Tower, AMT, Anchor Tenant, ARPU, Asia, ATC, Build-to-Suit, Business Model, Co-locations, Country Risk, DAS, Deal Structure, Decommissioning, edotco, Exit Strategy, IBS, IHS Towers, India, Indonesia, Infrastructure Sharing, Investment, J.P. Morgan Asset Management, Lease Rates, Market Entry, Meetup Review, Middle East, MLA, Myanmar, New Street Capital Asia, NOC, Novation of Leases, Palladium Partners, Private Equity, Regulation, Risk, Sale & Leaseback, Skilled Workforces, Small Cells, Tax, Tenancy Ratios, Urban vs Rural, Valuation

Towers and investors

Relatively speaking, the tower asset class is small, housing approximately 40 towercos with market cap in excess to US$1trn (Infratel at $20bn). However, the appeal is there for investors since telcos have the concept of locked-in revenue that not many industries have and there is also more visibility on the financial profiles of the players when it comes to regulations, taxation, spectrum, et cetera.

For institutional investors with an appetite for five to ten years holdings, towers may be a fit. With longer term markets, the cash flow is relatively stable, less volatile and the ROE/dividend can be very attractive. However, the industry needs to think about the correct debt levels. In particular, the under-geared tower assets can be a challenge for investors focused on equity, since the returns are not as attractive.

Tower investors right now have an increased level of clarity on the business model and focus on a few metrics that are stable, such as tenancy ratios, value per tower, the different types of structures and fibre.

Towerco acquisitions

Shifting from the capital market perspective of the industry, the panel discussion then focused on how market opportunities are evaluated, as listed and potentially soon-to-be-listed towercos seek to grow their portfolios, business and value.

Read this article to learn:

- Towercos’ value propositions now and in the future
- Framework to assess market opportunities and acquisitions
- Benefits of multicountry towerco strategies
- Factors that affect towerco valuations
American Tower looks at all the markets openly but applies a three-gate process as it considers its entry into a country. The first being the rule of law, regulations, and macro economic drivers. Next is the attractiveness of the telecom wireless market based on the number of operators, data growth, et cetera. Lastly, the number of operators in the region that run businesses across a number of countries. Another factor is whether the towerco is already in a particular geography and additional opportunities are available. For example, if the talent pool created in one country can serve the surrounding countries and economies of scale can be achieved.

edotco takes a similar approach as American Tower, with the extra focus of entering markets where others might not be as comfortable; the company has thus far enjoyed success with this mindset in countries like Pakistan and Bangladesh.

Markets with at least three competing MNOs would be considered interesting and appealing, and even more so if the MNOs agree the tower sharing model makes sense.

**Regional versus single-market strategy**

IHS Towers, best known for its presence in Africa, is seeking to better understand the opportunities in Asia, especially with operators that want to execute a broader tower strategy (beyond single market). IHS has seen the importance of expanding beyond the home market as it has grown over the years, and looks for synergies that may benefit its existing customers. This approach with MTN in Africa allowed the towerco to support the operator to execute and accelerate on its broader strategy in Nigeria, Cameroon, Rwanda and beyond. IHS is now doing the same in the Middle East, undertaking multiple portfolios to share the benefits not just for the anchor tenant, but the market in general.

As carriers in Asia are looking to offload their assets in multiple markets, IHS believes a towerco that comes in with the capital, resources, experience and skill-sets for multi-country operations would be a key partner for the MNOs. A multi-country towerco can benefit from centralised procurement, diversification, NOC, and/or contractual conversations on revenue and co-locations.

**Valuation benchmarks: multi-country premium?**

The counter perspective on cross-market synergies is that evidence and proof of success stories are currently limited. Towercos that have discussions with investors need to be clear on the synergies and provide examples on how to operate with the right cost of capital across different countries and regulations. If the likes of
Vodafone and Singtel try to list their assets, they need to have benchmark prices for each, even if they are illiquid. The idea of cost synergies across multiple markets has not generally played out in the telecom industry.

Carriers trade at single digits compared to towercos that do so at 12 to 20x. With ARPs being so different across different countries, there are various factors at play. The cost of capital to build a tower for Vodafone in India versus Australia will not be the same. However, a multi-country towerco portfolio makes sense, as staff can be transferred from one place to another, in a way that telecom service operators can’t benefit as similarly. The main issue is that historical data on the successes of multi-country operations aren’t available in emerging markets and towercos should not assume investors will pay a multi-country premium.

### Valuation benchmark: captive vs. independents

For captive towercos, those listed in India compared to true independents on a regional and/or global basis, valuation discounts do come into play. Big difference is whether it is investible. It’s hard to find examples of larger group towercos that have the right leverage profile.

There are limited publicly listed towercos so MNOs look at Crown Castle and American Tower, and may want to hold onto assets since the idea is they could be worth more later. This creates issues on leverage and willingness to share. In addition, there is generally not a big investor base in Asia for yields (dividends). As pension and retirement funds develop in the region, a bigger investor base for it could follow. For now, the capital level discipline is lower in Asia, so the return to shareholders is not as high.

In theory, independent towerco multiples should be high, whereas captive towercos have MNO-owner pressure to keep prices down. But there is currently no consistency across the various markets.

At the end of the day, the US towercos are players in a mature market, where investors have been educated since the early 2000s. For IHS and edotco, which could be the next towercos going public, their listing will require an education process, whether the listing takes place in Hong Kong, London or New York.

#### Evolution path of towercos

Towercos seeking to remain competitive generally need to explore and/or expand beyond the traditional grass+steel model. Part of the panel discussion explored how different skill sets (i.e. small cell) or new capabilities (i.e. fibre) or moving capital from build-to-suit programmes to acquisitions are becoming part of the business. Towercos in the region need to explore what can be done in emerging markets compared to say what Crown Castle has done in the U.S. with its diversification projects into small cells and beyond. What would a towerco build and invest in and what might operators bolt on?

IHS does have fibre and small cell as part of its catalogue but the towerco also applies very careful consideration with regards to which markets could be attracted to new solutions. In a city such as Lagos in Nigeria with 17mn people in a dense area, a fibre or tower-to-tower fibre strategy could make sense.

American Tower evaluates all options available, market-by-market and has seen different needs and adopted tailored strategies in each individual market from Latin America to Asia.

From edotco’s perspective, for additional offerings such as in-building or small cells, the towerco will assess its capability to deploy in-house versus the possibility to partner with technology providers. The key for the towerco is to look at all the different ways to approach the issue. Anything beyond traditional towers does change the skill-sets and requirements and an investment in fibre or small cells is very different to building incremental tower revenue.

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**About IHS Towers**

Founded in 2001, IHS Towers provides services across the full tower value chain – colocation on owned towers, deployment and managed services. IHS continues to grow and develop its business with leading market positions in Cameroon, Côte d’Ivoire, Nigeria, Rwanda and Zambia. IHS also led in market consolidation in Africa through its acquisition of Helios Towers Nigeria in 2016, and announced an agreement in October 2017 to acquire Zain’s towers in Kuwait, subject to certain regulatory and statutory approvals. Its portfolio include over 23,300 towers.
Vietnam: towerco and supplier opportunities in 2018
Mobile market overview, power requirements and on-the-ground insights

Boasting 331,210km² and population of ~93mn, Vietnam is home to global mobile network operator Viettel, as well as MobiFone, Vinaphone, Vietnamobile and Gtel. There are tens of independent towercos scattered around the country, mostly small, “mom and pop shops.” While urban centres such as Ho Chi Minh and Hanoi are littered with rooftop structures, towers of all types and sizes can be seen all across the land, which include mountainous and coastal areas. Building on recent research as well as discussions from the fourth TowerXchange Meetup Asia, in this editorial we revisit this unique tower market.


Mobile market

TowerXchange’s last in-depth look at the Vietnamese telecom tower market was back in 2015 and since then the local industry has continued to grow rapidly.

According to Vietnam’s Ministry of Information and Communications (MIC), the country had roughly 130mn phone subscribers, with 68.8mn as 2G, 54.2mn as 3G and 7.3mn as landline subscribers as of June 30, 2017.

MIC also noted SIM subscribers for 4G totaled 6.3mn in mid-2017, while a survey by IDG noted actual active 4G users to be 3.5mn, with 88% living in Hanoi and Ho Chi Minh city. With an approximate population of 93mn, smartphone penetration reached 55% at ~48mn devices.

According to the GSMA, Vietnam had 150% penetration as of Q4-2014, though the government had been attempting to clean up SIM registrations and blocked 10mn+ pre-activated ones by the summer of 2017.

While subscriber growth has hit a saturation rate, the rollout of 3G and now 4G services is playing a role in boosting mobile broadband penetration and enhancing connectivity. The government is keen for the successful implementation of 4G and eventually 5G to support initiatives of e-Government, Smart Cities, and Smart Agriculture.

Read this article to learn:
- What are the baseline statistics of the Vietnamese mobile market
- The country’s towerco landscape and business model
- What are the power/energy requirements of sites across Vietnam
- Which challenges and opportunities to expect in this market
Mobile network operators

When it comes to the MNO landscape, military-owned Viettel leads the pack; while state-owned MobiFone (Vietnam Mobile Telecom Services, subsidiary of VNPT) and Vinaphone (VNPT) occupy the number two and three spots. Both MobiFone and VNPT have been urged by the government to complete their equitisation by 2018 and 2019 respectively.

The market has two other significantly smaller players which are Vietnamobile, a joint venture of Hanoi Telecom and Hutchison Asia Telecom Group, and Gtel now owned by the Ministry of Public Services and formerly known as Beeline when it was owned by VEON.

Status of 3G and 4G

In mid-October 2016, the government issued 4G licenses on the 1800MHz band to Viettel, MobiFone, VNPT (Vinaphone) and Gtel. The fifth license was granted to Vietnamobile two months later.

Shortly after receiving its license, Vinaphone officially launched the country’s first 4G service on the island of Phuc Quoc on 3 November. By the end of 2017, it would have installed approximately 21,000 base transceiver stations (BTS) nationwide to support network expansion, with an additional 9,000 BTS for 3G.

In April 2017, Viettel launched its 4G LTE network, delivering nationwide coverage for 95% of the population thanks to 36,000 BTS installed. This rapid rollout came six months after having received its license for 4G service provisioning, with average download speed of 30 to 50Mbp, which is 7-10x times faster than 3G.

Over the years, Viettel has built up a 3G network of 35,000 stations and 2G network of 25,000 stations, as well as 350,000km of fibre optic cable. And by February 2018, the military-owned operator was said to have increased its reach to 37,000 BTS including in rural and remote areas.

Following the heels of Viettel, MobiFone started offering 4G services in July 2017, at which time it had built 4,500 BTS with 30,000 more planned for the 2017-18 period. Recently it announced the addition of 1,500 4G stations in central Ho Chi Minh City to support the peak traffic expected as part of the Lunar New Year holiday.

Vietnamobile on the other hand does not appear to be in a rush to offer 4G, as its CEO Elizabete Fong had previously stated in 2016 that “in cities, people have shown interest in 4G, but in rural areas, most of the smartphones being used are 3G. 3G is still the more popular and more easily accessible technology.” By the fall of 2017, the operator had completed its 3G network rollout across all 63 cities and provinces, covering 90% of the population. The MNO is not expected to invest in 4G technology for another few years. With ~40% of the country being 25-and-under, Vietnamobile also launched two new

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Estimated MNO market share in Vietnam

![Pie chart showing market share of mobile network operators in Vietnam]

Source: Exclusive from Huawei
data packages for the youth segment as part of its 3G rollout.

In general, 4G uptake has been relatively slow, in part due to the limited number of smartphones that are 4G compatible in the country, which also tend to be more expensive. In addition, the partial switchover of some 3G users to 4G has eased up the pressure on the network, allowing 3G users to have a more improved experienced compared to before and therefore less immediate need to convert. The increased availability of Wi-Fi as a result of fibre optic expansion across the nation also means consumers have other means of accessing data. By the end of Q2-2017, Viettel had 52% of the 4G market share, followed by MobiFone at 27% and Vinaphone at 21%, according to an IDG report.

**Towerco market**

Having set the context for Vietnam’s mobile market through recent baseline statistics, this report now dives into the ground realities of the infrastructure side of things, courtesy of insights from the country-focused roundtable at the fourth TowerXchange Meetup Asia, hosted by John Seet, CEO of SEATH (OCK).

Currently there are an estimated 70,000 towers/structures in the country, up from ~55,000 in June 2015.

The towerco ecosystem in Vietnam is truly fragmented, with tens of towercos owning portfolios made of anything between five and 100 towers. The majority of tower ownership remain in the hands of the MNOs.

Malaysia-based OCK is currently the market leader, with ~2,000 towers acquired from Southeast Asia Telecommunications Holdings Pte. Ltd. (SEATH) for US$50mn in January 2017. This portfolio had been built up over ten years by VinaCapital, who also sold its ~120 IBS portion to JTOWER of Japan for US$10.2mn the summer of the same year.

Golden Towers is the other known towerco of some scale, at 350 towers. And there is said to be another towerco with 600 to 700 towers, though TowerXchange has not yet been able to verify this.

Lease rates are all denominated in local currency and while amongst the lowest in the region, indicate ample room for growth. Due to inflation and advancements in the country, prices are surging and this include land rentals fees also.

Tenancy ratio is low and ranging between 1.2 and 1.3. With no official mandate for infrastructure sharing in the country, the MNOs still build the bulk of their towers. Sharing between MNOs also tend to be limited, and when they do it is on a barter basis rather than commercial.

Once operators start working with towercos, they tend to outsource every aspect of the deployment and this may very well represent one of the
limitations in the advancement of towercos across Vietnam. In fact, MNOs employ a large workforce to deal with infrastructure and large-scale outsourcing could lead to the undesired effect of employment loss at the State-owned and military-owned entities.

**Site acquisition**

Without regulations governing telecom infrastructure development, it means the operators are allowed to build next to each other resulting in plenty of parallel infrastructure across Vietnam.

Overlapping towers are common as not only are landlords happy to lease to a second customer to generate additional income, contractors who are engaged for site acquisition are also keen to get the business to build rather than reporting an existing tower that could be available for sharing.

Another challenge in the country is that MNOs tend to own the land under their sites, especially Viettel due to its military and government links. Viettel doesn’t often engage in sharing its infrastructure and prefers to build and own sites.

**Permitting**

Tower build permits were fairly recently introduced in the country, so all existing towers needed to apply for issuance. However, the process is said to be inconsistent across provinces, where some grant existing towers as they are, without any paperwork. There is a mix of relaxed and stringent approaches that towercos must contend with at the moment.

In Hanoi, new builds are said to be halted as there are inter-governmental department disputes on who has the right to issue the build permits. Until this is resolved, any new builds in the area are expected to be fined heavily.

Even with a build permit, there are risks as neighbourhood consent is not so straightforward in Vietnam. A resident living two blocks away with sightline to the tower would be able to file a complaint and halt the process. And this could very well happen after the foundation work has started and concrete has been poured in, by which point it costs more to remove. An estimated 20 to 30% of sites may experience this, meaning out of ten towers, every two to three might be incomplete due to a complaint. This also means the towerco is not getting paid, driving up cost per site over time.

One solution to counter the challenge of acceptance
is the use of cell-on-wheels (COW), which allows testing of the structure in an area, leading to a permanent build if no complaints are received within a certain period of time. While this does mean extra investment and an overall longer process, it may be worth it ultimately to get a site up.

**Power requirements**

Compared to Myanmar, where power supply is amongst the lowest in the region covering only ~40% of the population, and thus one of the main pain points for MNOs and towerco's, the grid in Vietnam is much better. Roughly 90% of the sites have grid connections though there is a difference between a good versus bad grid. While the grid tends to be unstable, cutting out more often, it generally comes back within two hours, at worst four to six, or up to eight hours.

Most sites have a standby genset and the heart of the SLA is more or less centred around how quickly maintenance personnel is able to reach the site and turn it on if there is a power outage. If the genset has not been well maintained or serviced and fails to turn on in time of need, then it’s a matter of how quickly a standby genset could be brought onsite.

While there are no complicated power solutions currently in need or deployed in Vietnam, it may be ready for green energy, which is still new to this marketplace, but a direction that telecom players around the world are moving towards.

What is also worth exploring in Vietnam is advanced lithium solutions, with backup and recharge time different to that of generators. While the reality is gensets will always have a role to play in rural sites that are off-grid, towerco's are being challenged to take the lead in bringing reliable and alternative energy onto the site.

Understandably, industry solutions providers are keen to push for adoption of new technologies. One participant at the TowerXchange Meetup Asia roundtable cited payback of advanced lithium solutions on the capex investment as two years in Myanmar. On the other hand, towerco's who are the site owners and operators see no incentive for the capex investment of a complete set of solution involving genset, solar, battery, et cetera. Any reduced consumption on genset runtime or grid ends up being a benefit to the MNO at the expense of the towerco, as diesel and electricity charges are often contracted as pass-through.

Of course, the general rise of the ESCOs and the potential role they could play is something to consider for the Vietnamese market. Though again, towerco's in general are assessing the costs to partner versus doing it in-house, as minimising opex is key for a towerco to optimise or improve revenue.

**Opportunities for towerco's and suppliers**

Given the context for the Vietnamese tower market, with a large geographical spread and fragmented ecosystem, there are certainly opportunities for consolidation. This is a market where economy of scale allows costs to be optimised.

In addition, some of the smaller towerco's also struggle with financing to rollout sites and meet SLAs as they do not have the resources to maintain and service their sites. An experienced towerco with access to financing could be well positioned to make a difference.

While the availability of the grid negates the need for complicated power set-ups, green energy is an area to be explored.

Upgrading site monitoring systems may be another opportunity to modernise a lot of the sites which are old.

Most MNOs use microwave right now, however as fibre is brought to the site and the equipment offloaded, more space is created on the tower for antennas.

New structures such as cell-on-wheels (COW) could provide relief on testing neighbourhood acceptance and tower manufacturers could play a supporting role here.

In conclusion, growth opportunities remain in Vietnam, as the government has introduced more MNOs to increase competition and affordability of communications. With 4G rollout in place and 5G in the future, more sites will be needed for capacity and tower sharing should very much play a role.
Regulatory working group proposes global Infrastructure Forum for the Digital Economy
Positioning towercos as Nation Builders and offering a neutral voice for government and regulatory liaison

Concerns about, and lessons learned from, the regulation of small cells

Some forecasts have suggested that there could be need for ten small cells for every macro in the 5G heterogeneous network. Early adopter towercos such as Balitower, Cellnex, Crown Castle, Digital Bridge, INWIT, Protelindo and Russian Tower have taken up the mantle to integrate small cells into their portfolios.

The deployment of small cells has faced a number of the same impediments as macro cells. While installation of small cells on street furniture is relatively easy, forming partnerships with municipalities and other owners of street furniture has proved more challenging, as has zoning.

"State, local and municipal governments can create and raise taxes, levies and fees and consequently not get the communications infrastructure they need to enhance their Digital Economy," said one participant, "or they can partner with communications infrastructure providers and can derive new revenues from, and investment in, their street furniture.”

Concerns were shared that small cells and pico cells may be taxed as if they were macro cells. While campaigners are still calling for a separate fee structure for small cells, the situation varies by region, with Brazil highlighted as a success story: small cells used to be subject to the same taxes as macro cells in Brazil, but are now subject to a distinct

Keywords: Bankability, Communications Infrastructure Regulatory Working Group, Country Risk, EWIA, European Union, IFC, IFDE, India, Infrastructure Forum for the Digital Economy, Infrastructure Sharing, Leasing & Permitting, Multi-Region, Regulation, Research, Small Cell Forum, Small Cells, TAIPA, Towercos

Read this article to learn:
- The common regulatory issues faced in the deployment of macro and micro cell sites
- The diversity of regulatory regimes in Asia
- How the EWIA is engaging with the EU
- The search for a best practice exemplar
- Next steps: proposing a global Infrastructure Forum for the Digital Economy
Breaking down the barriers to small cell and microcell deployment: Small Cell Forum offers support

The Small Cell Forum (SCF) has offered to pool resources with the Communications Infrastructure Working Group, seeking to align their efforts on behalf of micro sites with the Working Group's agenda concerning macro sites.

CEO of the SCF Sue Monahan introduced her organisation, which is led by a board of directors including carriers, leading vendors and which more recently includes American Tower, Crown Castle and ExteNet Systems (in which Digital Bridge is a lead investor) representing towercos and neutral hosts.

The SCF was created to break down barriers to small cell deployment, gathering requirements in terms of technology, marketing, business drivers and regulatory issues. For example, the Small Cell Forum has published a piece to educate regulators about small cell siting for 5G Americas (www.scf.io/en/documents/192_Small_cell_siting_challenges.php); they’ve also worked with the GSMA’s technology working groups on regulator education in Latin America; with the TIA on rights of way for cabling for 5G; and they’ve responded on behalf of the industry to the recent veto of the small cell bill in California. The SCF presented facts to 28 member states via the European Commission Communications Committee Technical Working Group, again with a view to educating regulators about what was needed for small cells, and why they’re different from macro cells.

The SCF has a track record of doing the hard work by enabling some of the critical operational considerations that facilitate deployment of cell sites, for example they have done some important work on installation classes for small cells – installation rules for RF compliance for workers and for the general public based on IEC Standards.

The SCF shares the Communications Infrastructure Working Group’s goal of educating regulators to achievable, scalable, repeatable policies for the approval, siting, installation and switching on of cell sites, seeking harmonisation at regional level. They advocate simplified administrative procedures; optimised flows and approval timing; clear, reasonable site fees and taxation; ultimately enabling more attractive regulatory conditions.

Readers can download the Small Cell Forum’s research free at www.scf.io

regime. In other regions, both micro and macro cell sites are subject to a revenue levy, while in some this expense is compounded by application fees and fixed fees to utilise local government structures.

Another challenge is that certain towerco license regimes prohibit the deployment of small cells, which represents a missed opportunity to utilise the balance sheets of the US$300bn towerco asset class and leverage towercos as neutral hosts to deploy capex into multi-operator coverage and capacity solutions.

The Small Cell Forum (SCF) have been trying to get ahead of such impediments, educating stakeholders that small cells have much less impact than macro cells, and are more akin to Wi-Fi modems.

Regulatory liaison priorities in Asia

The Asian tower market continues to operate amidst a hotch-potch of disparate and varied towerco licensing and regulatory regimes, ranging from mature, investible licensing regimes in countries

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like Malaysia and Pakistan; recently drafted but generally very positive regulatory regimes like Myanmar’s; to countries where the towerco licensing regime remains a work in progress, such as Bangladesh and The Philippines.

India was highlighted as a “light touch” regulatory regime benchmark, where towercos are not formally licensed, instead they are registered as infrastructure providers (“IP-1s”), and have been accorded Infrastructure Status since 2012. Infrastructure Status brings it benefits such as accelerated depreciation, access to low cost capital, lower import duties, and a tax holiday.

The Tower And Infrastructure Providers Association (TAIPA) represents India’s towercos in addressing common regulatory, legal, financial and operational issues. TAIPA has propagated a simple message: site acquisition must be accelerated, with bureaucracy and costs reduced, as more sites are needed to improve mobile coverage and capacity, enabling the fulfilment of Digital India and Smart City visions.

“We don’t focus on sharing towers or independent data centres when lobbying government,” agreed another participant. “Instead we talk about enabling National Broadband policies and the Digital Economy. If we focus our message on our own narrow agenda, we lack the resonance we need.”

One of TAIPA’s more recent successes has been to persuade government to initiate a process to offer common land and buildings as potential cell sites, in part as a remedy to QoS issues in government facilities. With rental fees fixed and transparent, and excellent security and power at most government properties, it could prove to be a big win.

Another of TAIPA’s successes has been to bring the government with them on education programmes to increasing awareness of the reality of EMF radiation, in dialogue with both State officials and members of the public.

TAIPA’s latest quest is a call to have IP-1’s

“Education of regulators on the fundamental business model and benefits of third party tower ownership remains an objective for Asia’s towercos and MNOs alike”
Should we redefine the Working Group as the ‘Infrastructure Forum for the Digital Economy’?

TowerXchange are currently soliciting industry stakeholder responses to a proposal to redefine the Communications Infrastructure Regulatory Working Group as a more formal entity, taking control of the image of the global tower industry and framing it in a positive light with regulatory and government stakeholders, and by doing so encouraging a progressive tax and regulatory framework.

The working title of such an entity, the Infrastructure Forum for the Digital Economy (IFDE), brands the tower industry as Nation Builders, connecting with Mobile Broadband investment and Smart City narratives, reflecting the goal to represent the industry as one which delivers significant socio-economic contributions to the markets it serves.

The proposed new entity would recognise and seek to interface with the work of regional tower industry associations such as the WIA (US), EWIA (Europe), TAIPA (India) and CITa (China). The IFDE could be structured as a federation of those associations, seeking to achieve a degree of alignment across those entities, whilst directly representing towercos in markets lacking a regional association, such as Africa, Russia and parts of Asia.

The IFDE would function as an independent, global authority to influence regulatory policy debate and to represent towercos in dialogues with the ITU, GSMA, Broadband Commission and other such bodies. While regional associations would focus on deepening their already impressive relationships with local regulators, the IFDE would maintain a global brand and narrative, providing an informed voice backed by evidence collated in a global database of best practice case studies. The scope of the IFDE could naturally be extended, for example to cover technical, health and safety standards, while the creation of a simple, repeatable process for accelerated permitting would be an early priority.

In order to secure resourcing and credibility, a tiered membership structure is proposed based not just on scale but also on utilisation of the Forum, recognising that some towercos are already contributing to, and communicating through, their regional Association. It is proposed that IFDE be established as a separate entity from TowerXchange, which would continue to play a role in marketing and community hosting.

To share your views on the proposal to create the Infrastructure Forum for the Digital Economy, please email kosmotherly@towerxchange.com, or join our next meeting on April 18, co-located with the TowerXchange Meetup Europe www.towerxchange.com/meetup/meetup-europe/
infrastructure sharing and universal service, and benchmarks (preferably from within the region) are sought-after. The tower industry continues to find it difficult to identify and propagate regulatory best practice exemplars and case studies, which is something the Communications Infrastructure Regulatory Working Group, or indeed its proposed successor the IFDE, can help with.

**Regulatory liaison experiences in the EU**

The European Wireless Infrastructure Association (EWIA) called attention to their contrasting experience in dialogue with the European Union (EU), where there is a high degree of coordination across the 28 member States through EU legislation.

The EU is currently reworking its Communications Regulatory Framework, and one of the things they’re trying to do is to create better incentives for investment in shared infrastructure – particularly through Article 77 of the European Electronic Communications Code. Article 77 offers a light touch regulatory model for wholesale-only networks, like towercos, recognising their potential to attain significant market power, and limiting regulatory intervention to fair, reasonable and non-discriminatory access rules and dispute resolution as necessary.

The EWIA have got together as trade body to lobby to encourage the progress of Article 77, which is still being debated between Parliament and the EU. The EWIA’s message is consistent with their global peers: that independent infrastructure ownership is more efficient, improving connectivity at lower cost, and will thrive under a light touch regulatory regime.

The goal is to engender greater regulatory certainty, which in turn encourages investment. Another focus for the EWIA has been the EU’s Broadband Cost Reduction Directive, which can facilitate communications companies’ greater access to land. In the UK, measures have been taken to ease access to land and utility infrastructure, increasing and accelerating permitted development rights and easing installation of cell sites and equipment, as well as critical complementary infrastructure such as fibre. Indeed, the UK government are exploring potential five year tax holidays to encourage the installation of fibre.

Another EWIA member concluded by suggesting that through their work with the EU they hoped to derive “an exemplar of what good looks like, an exemplar we can share with other regulators, and ultimately help those regulators help us.”

This led to a discussion of whether the Communications Infrastructure Regulatory Working Group could be a platform through which to fund a study and derive an exemplar to improve dialogues with governments.
10 key objectives of the Communications Infrastructure Regulatory Working Group

1. Education of stakeholders
2. Fair, predictable taxation
3. Where licensing is necessary, the regime should be fair and clear
4. Ease rights of way and accelerating permitting
5. Encourage, rather than mandate, infrastructure sharing
6. Ease concerns about competition
7. Encourage foreign direct investment
8. Help deploy and secure critical national infrastructure
9. Seek access to government land and structures
10. Facilitate universal service

The search for an exemplar

Various ideas were discussed to stimulate and progress dialogue with regulatory stakeholders. One was a ‘readiness index’, with countries ranked by their regulatory regime’s attractiveness to communications infrastructure investment, functioning as both a reference to and recognition of positive regimes, and as a “naming and shaming” of regulatory regimes that were less attractive to investment. But, among the 15 participants at this latest working group, the greater enthusiasm seemed to be to derive one or more best practice exemplars to share with regulators.

Is there a “poster child” for an ideal country to benchmark against, in terms of the regulation of both macro and micro cells? What does an ideal regulatory environment look like over a 10-20 year horizon? The preference seemed to be to focus on the positive: where do we want to take regulators to, rather than what do we want to steer them against?

“I believe there are two priority issues today we should address with regulators,” suggested one participant. “Those issues concern infrastructure sharing policy and accelerated permitting regimes. We should develop best practice guidelines, show how countries do it, and how to implement it.” If regulators are more comfortable referencing benchmarks among their regional peers, should we aim to deliver one or more white papers that are regionally focused, perhaps driven by local sponsors? Can there be a one-size-fits-all exemplar to use across the diversity of local regulatory regimes, mobile and financial markets, and with such diversity in terms of scale and industrial organisation?

A provocative view was offered by one participant who called for the creation of a ‘Pitch Deck’ – a common narrative based on which to ‘sell’ shared infrastructure as a critical building block of the Digital Economy. Could the ITU be a useful forum through which to deliver such a pitch? Could we persuade a City, County or even Country to implement a regulation and policy based on this blueprint, enabling us to demonstrate a live case study exemplar?

Whatever form it takes, participants seemed in broad agreement that a joint effort from multiple tower companies, together with the Small Cell Forum, through the Communications Infrastructure Regulatory Working Group (or whatever entity succeeds it) would be useful. Collaboration and communication through an independent party or body would provide the necessary distinction from one towerco producing their own report based on their own research, as they could too easily be dismissed as seeking to further their own interests. With consensus achieved that it might be useful to commission a study from which to derive an exemplar / case study, it is proposed that the next meeting of the Communications Infrastructure Regulatory Working Group, to be held on April 18 in London, derive an actionable plan, as well as determining how such an undertaking would be funded.
What does 5G mean for MNOs and infrastructure providers?

20 predictions and forecasts from The Future Network at the TowerXchange Meetup Asia

When it comes to 5G, there are arguably more unknowns than knowns. Speeds will be faster and increased densification of sites will be required but how will this be achieved, how will it be monetised and what will be the implications on stakeholders in today’s market? As stakeholders search for clarification and answers, The Future Network reports back on the top 20 viewpoints and premonitions shared during December’s roundtable discussion.

Keywords: 5G, Active Equipment, Asia, Backhaul & FTTT, Business Model, Capacity Enhancements, Capex, Co-location, Core Network, DAS, Densification, Energy, Europe, IBS, Infrastructure Sharing, Installation, Investment, LTE, Leasing & Permitting, Network Rollout, Small Cells, Towercos, Urban vs Rural

Read this article to learn:
- The barriers holding MNOs back from investing in rural networks
- Different infrastructure sharing options being proposed
- Options for sourcing lower cost technologies and why simplification is key
- The potential for alternatives to GSM coverage
- The importance of how projects are financed

Predictions and forecasts surrounding 5G and its impact on telecoms infrastructure

1. Asia will see the first 5G deployments: Along with the USA; Japan and South Korea will be two markets where 5G is first to be rolled out with a general consensus that deployments will start in 2019 with the first systems online in 2020

2. More sites will be required: Increased densification of sites is universally recognised as being fundamental to the deployment of 5G

3. MNOs are still trying to work out use cases that make 5G make sense: It is essential that MNOs find ways to generate incremental revenue in order to offset the cost of 5G deployment. Driverless cars are widely being touted as one of the key use cases, although many feel this was a way off; additionally opportunities for MNOs in the content space exist but it is a tough game

4. Question marks exist over whether 5G is essential for many IoT applications: People talk a lot about 5G and IoT but many IoT solutions can actually work across 2G technology thus negating the requirement to upgrade networks

5. Frequency allocations likely to be 3.5GHz: Whilst it remained to be seen what the frequency allocations for 5G will be, 3.5GHz was the most commonly cited frequency that is likely to be used.

6. Rural deployment of 5G will depend on whether 700MHz spectrum is allocated: Whether 5G will be rolled out in rural areas people thought was dependent on whether lower frequency spectrum would be allocated to the technology. 700MHz
spectrum was seen as being the most useful and without it, it would be difficult to make a case for 5G

**7. Fibrisation of towers will be of paramount importance:** Provision of backhaul is a must in enabling 5G deployment, and fibrisation of towers will play a big part in this. Some work around fibrisation of towers has already been done during 4G deployment but more is required. There is a strong role for towercos in the fibre space with Crown Castle in the US and towercos in Indonesia already starting to get involved and offer fibre as a value added service. For the time being, it was thought that towercos would only be looking at fibre in urban areas

**8. Street furniture will be key:** With a requirement to densify, obtaining the rights to street furniture will be a key tactic in rolling out 5G in urban areas

**9. There will be a lot of trial and error long the way:** The business model for 5G rollout is far from defined and participants felt that there would be a lot of trial and error and water under the bridge as stakeholders strive towards a model that works

**10. New types of companies will emerge as competitors to traditional players:** Participants from outside of the existing industry are likely to start to play a role in the deployment of 5G, with entities which are working on land banking sites likely to be one such key stakeholder in the future

**11. Further MNO consolidation is likely:** With the investment required for 5G, it is likely that we will see further MNO consolidation in developed markets leading to no more than three of four players present in any given market

**12. As new companies delve into fibre and small cells, regulatory issues will arise:** Having solely operated passive equipment in the past, in many markets towercos have been outside of regulation. As infracos look towards fibre and small cells some regulators stipulate that new licenses will be required

**13. The right balance of integration testing needs to be struck for open protocol base stations:** Under open protocol, whilst different equipment can be put together in a base station it is important to ensure that this works efficiently as a unit. Whilst such testing is important, putting too much expenditure into testing pushes up the cost of the unit which hampers the economics that open protocol is trying to achieve

**14. Antenna will have higher power requirements:** Due to the high frequencies likely to be allocated to 5G, there will be higher energy consumption by the antenna which could create challenges, not least due to increased opex

**15. MNOs could look at sharing antenna to reduce costs:** Whilst regulatory issues need to be overcome, MNOs may look toward shared antenna in a bid to control the capex surrounding 5G deployment

**16. The step between 4G and 5G is less obvious than 2G-3G or 3G-4G:** The difference in capability moving from 2G to 3G was obvious. Whist the step from 3G to 4G was less clear, the difference was in the devices: as the iPhone came to market suddenly 3G data speeds weren’t enough. With 5G there is a feeling that people are already happy enough with the 4G speeds that they are receiving

**17. In markets where 4G enhanced exists it is likely to delay 5G rollout:** With 4G enhanced delivering an improved offering on top of 4G, markets where the technology exists would be likely to see a delay in the adoption of 5G

**18. Once the first movers move, 5G deployment will be an arms race:** Deployment of 5G by one MNO is likely to spur its competitors into deployment, even if the economics do not yet fully stack up

**19. Margins will be squeezed across the value chain:** Due to the high cost of deployment, it is inevitable that MNOs will continue to squeeze their suppliers and partners for price reductions from everything from the price of hardware from vendors to rents paid to towercos

**20. Small cells aren’t yet a tried and tested solution:** There have been announcements in the US in the past couple of weeks that small cells haven’t been working for MNOs in the country, further technological enhancements are required

How do you foresee 5G changing the telecoms landscape and what do you need to do to prepare? The next edition of The Future Network will be held at the 3rd Annual TowerXchange Meetup Europe, being held on 17-18 April at the Business Design Centre, London. Join MNOs, towercos, OEMs and other key stakeholders as we examine what the future network will look like and who the key actors will be. For more information visit our website at:

The role for small cells and towercos in future networks

Bharti Infratel, edotco and Aird Towers share their perspectives

India’s Bharti Infratel, Australia’s Aird Towers and pan-Asian player edotco joined discussions with the Small Cell Forum at The Future Network’s Asian Meetup to examine the role that towercos will play in the rollout and management of small cell networks and share their views on what barriers still need to be overcome.

Asia Pacific is leading the way when it comes to small cell deployment globally, with the Small Cell Forum’s Sue Monahan observing that half of the worlds deployed small cells are located in the region. The progress made by leading APAC countries is a shining example of the urgency around hyperdensification with many markets on track to be hyperdense by 2021. Setting the stage for discussions, Sue Monahan referenced a study which showed that there will be 800% more small cells by 2020 with a forecast of 100-350 small cells per square kilometer. Whilst 5G, and preparation for it, is a big driver for the rollout, there are more imminent reasons for networks to be densified with smart cities and meeting data requirements in major stadiums being two such concerns.

“There are two billion smartphones in the world and data growth is going to be huge,” said edotco’s Gayan Koralage. “The current network of macrosites can’t handle the data throughput and cells are getting denser and smaller to address the challenge. The market is currently struggling to manage human communications never mind an extra layer of M2M being added on top of that”

Read this article to learn:
- Forecasts for small cells rollout
- MNO and towerco perspectives on barriers to small cells deployment
- What still needs to be addressed when it comes to DAS
- What role towercos see for themselves in small cells and DAS networks
- How relationships with building owners need to evolve for indoor coverage

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role they see themselves playing and what barriers they see as still needing to be overcome.

Aird Towers is a boutique Australian towerco which is progressively moving into the small cell arena in the country; Aird Towers were represented on the panel by their Managing Director, Tom Andrews. edotco Group, with a presence in six ASEAN markets has been examining the small cell market closely and has recently formed a new department dedicated to small cells and DAS. edotco Group were represented on the panel by the Director of Strategy and Commercial, Gayan Koralage. Indian towerco, Bharti Infratel are already active in the sharing of towers, fibre and WiFi and with regards to their small cell strategy, their plan is to deploy small cells so that they're there for the MNOs when they're ready. Bharti Infratel were represented on the panel by their CTO, Alka Asthana.

What are the biggest barriers in small cell deployment?

In 2017, the Small Cell Forum conducted a survey of 52 MNOs on the subject of small cell network rollout. Of the surveyed parties, 19% of MNOs said that they would like to start small cell deployment in one year but only 7% of those thought that this was likely. Of the barriers cited, 65% referenced deployment and 46% felt access to sites remained a major hurdle. Other barriers cited included TCO being too high, multi-vendor operability limitations, challenges interworking with macrosites and lack of available and affordable backhaul solutions.

edotco thought that there were three major barriers preventing small cells from getting off the ground. Firstly one must work to convince MNO CTOs to move away from DAS; with significant DAS networks already deployed, the challenge existed in persuading the CTOs to move on from these networks. Secondly the cost of small cells is still too high and work needs to be done on bringing this down. Thirdly, edotco felt significant barriers existed in multi-band multi-vendor operability. Currently if you have a macro network owned by Huawei and a small cell network owned by Ericsson, the two networks are not able to communicate effectively with each other.

Bharti Infratel voiced that whilst they also agreed that sharing and interoperability were core issues, the lack of planning when it came to small cells was also a major barrier to overcome. At present, they felt that small cells were almost considered as an afterthought; macro networks are planned and then small cells just need to plug in around that to fill any gaps. Such lack of planning has given rise to an “awkward” way of rolling out small cells, with no carefully considered design process. Overall Bharti felt that the drive for finding solutions in the small cell space seemed to be lacking.

Aird Tower's Tom Andrews commented that whilst in Australia the MNOs have not been reluctant to the concept of small cells, they have relied heavily on their macro networks. Indoor DAS is being used and whilst it is probably reaching the end of its lifespan and needs replacing, MNOs are still trying to patch up problem areas rather than invest in deploying a new small cell system.

What still needs to be addressed when it comes to DAS?

Panellists felt that there needed to be faster progress towards testing of technologies, technologies with open standard interfaces that can support multi-vendor solutions. A clear business case needs to be put in place which encourages enterprises to co-invest and there needs to be better integration with small cells in order to improve overall building TCO.

What roles should infracos play in the roll out of small cells and DAS?

edotco’s Gayan Koralage felt that the role of the towerco is as the manager of small cell networks. Ultimately any number of different entities could own or host small cells throughout a community, but the towerco can play a central role in securing key locations, bringing fibre to the location and making sure that there is an energy connection to the location. There are lots of infrastructure issues that need to be resolved and towercos can play a role in addressing them.

Alka Asthana from Bharti Infratel commented that the fundamental role of a towerco will stay the same; they need to put up infrastructure that multiple parties can use. When a tower is shared by multiple parties it brings down the cost to the MNOs.
and a similar model will be applied to the small cell network.

Whilst the panel felt that towercos would continue to play a critical role in small cell networks, they also commented how we could see new types and silos of businesses evolving. One thing that is yet to be worked out is the final use case of the information that is generated by smart city projects. When you put up a camera you generate huge volumes of data and this creates an opportunity for a new entity which could come in and analyse such data.

One limitation to the role of a towerco in a small cell network is regulation. In India, for example, not everyone can put up antennas as they are classified as active equipment, explained Bharti’s Asthana. In order to be able to carry about small cell deployment effectively, towercos need to be allowed to deploy the full solution. Whilst owning spectrum is a matter for licensing, putting up an antenna shouldn’t be bound by the same regulations. This legislation isn’t the same across the whole of Asia with edotco referencing that in Malaysia they are able to invest in antennae.

With towercos set to play a role in small cell network rollout, Aird Towers Tom Andrews explained how new opportunities will arise. With their involvement in street furniture, Aird Towers have been approached by councils to look at carrying out street lighting upgrades or installation of CCTV systems. Such opportunities present exciting new avenues for towercos to diversify their models.

**Improving in building coverage**

Questions from the audience asked about the possibility of towercos collaborating with building owners and authorities to bring coverage to buildings with poor connectivity. Aird Towers commented that there was a growing sentiment in some geographies that connectivity was part of an essential building service, with developers’ scopes increasingly including an allowance for in-building coverage. This model has been successfully adopted in Australia, particularly in retail environments where smartphones are part of the customer experience.

When working with a building owner to develop indoor coverage it is essential that the system deployed is effectively future proofed. The installation needs to be done in one set of works, returning to the building to lay additional cabling or to add an additional MNO irks the building owner due to the disruption that is caused.

Ultimately however, in spite of the some of the challenges still ahead, each of the towercos on the panel firmly believed there to be a significant future for them in the rollout and management of small cell networks. Whilst the macrosite business will still remain, small cells are going to become an increasingly important part of a towerco business model going forward.
The pressure being felt by MNOs globally is widely documented; data usage continues to grow exponentially thus necessitating increased investment in networks, capex costs continue to increase, competition from OTT players and new market entrants is on the up introducing further pricing pressures and all the while revenues continue to decline.

Whilst rural coverage needs to be improved, MNOs lack investible dollars and those investible dollars they do have usually get more bang for their buck in urban areas. The demand for data is there in rural areas, but a viable business model still needs to be developed; APRU in rural areas is lower and due to the remote nature of sites, opex costs tend to be higher. With the lack of specialised low cost base stations, capex costs remain high and backhaul remains a challenge with fibre not being present and microwave being costly. A host of different business models are starting to be developed which gives the impression that we are on the cusp of a breakthrough in delivering low cost rural coverage, but regulatory issues still need to to be ironed out and business models honed before wide scale deployment becomes a reality.

Sharing is fundamental to achieving cost effective rural coverage and towercos are experts at this. In the case of rural environments, the deeper the sharing the better, with sharing at the RAN level being important to achieve the desired economics. RANsharing requires close cooperation between MNOs and also requires a shift in mindset from regulators as third parties become more closely involved in the management of the active side of the network.
Sharing of spectrum represents a step further in achieving new cost synergies but there has, to date, been a lot of push back from the regulators. Whilst regulators cite that their raison d'etre is to drive towards an improved communications service to all in the country, one cannot overlook the fact that spectrum represents a valuable revenue source for them. To enable spectrum sharing introduces anxiety amongst regulators who fear a cut to a major source of income. To what extent the regulator is incentivised to enable spectrum sharing remains in question.

Lower cost technologies are required to compliment sharing and bring further reductions to rural network rollout. Whilst the major OEMs may not offer low cost solutions, the potential exists to go directly to the component manufacturers to access lower cost technologies. Facebook represents one such party which has eschewed the conventional products on offer and has developed their own routers and switches in a bid to adopt a more cost effective solution. Whilst many lack the R&D capabilities of an entity such as Facebook, their strategy serves as a valuable lesson to look outside the standard solutions and suppliers in the market. By making a fundamental change in the infrastructure used, observers believe that savings of 40-50% can be achieved.

As well as the technologies for rural coverage needing to be cheaper, it is important that they are simpler than many of their counterparts used in urban markets. When it comes to rolling out macro urban networks you will often find that you have a core network engineer, a RAN engineer, microwave experts and various other parties. In order to keep costs down for rural deployment, one must use local service providers rather than larger players and their thicker profit margins. Where you have been able to employ several experts to rollout a macrosite in an urban area, the rollout of a microsite in a rural setting becomes a lot more cost effective when only calling upon the services of one expert.

Achieving rural coverage cost effectively also requires companies to think outside of the box and examine innovative solutions which look very different from those that we have become accustomed to in a traditional mobile setting. In the case of public safety networks, one such solution has been the use of balloons which are tethered by a single cable. Inside the balloon there is the base station, core network and everything that is required to power the unit. The balloon works like a satellite and feeds back to the core network. Whilst not all solutions will be successful, and the business model remains as important as the technical capability, creative ideas will help to drive towards innovative solutions.

Designing rural networks that will stand the test of time requires a thorough grasp of next generation architecture requirements. Users that are coming online for the first time today have a very different mindset to those who have enjoyed connectivity for a number of years. Connectivity is viewed through the lens of social media and as such, there is an argument that WiFi could serve as a suitable alternative to GSM and its expensive spectrum. Whilst the suggestion scares MNOs, it is a discussion that needs to be had and a dynamic that needs to be understood. Keeping in mind the way that different users see connectivity, and how that is going to evolve, needs to be carefully ingrained in a rural connectivity strategy. MNOs as we know them today may not be the key players in years to come; already we are starting to see an emergence of white label wholesale players delivering connectivity over WiFi under a model where content providers pay.

In addition to looking at infrastructure sharing and innovative technology and business models, consideration also needs to be given to how the rollout of rural networks should be financed with lower cost financing available if you look in the right places. Social impact investors, whose KPIs are based on metrics beyond just financial returns may offer one such lower cost of capital. Enabling connectivity and the benefits that it brings to rural communities ticks one other box when it comes to the qualities that investors are looking for. Annually, over $150bn of development finance is spent on issues such as healthcare and education. MNOs need to improve their dialogue with such development finance institutions and look for solutions that bring both economic and social benefit to communities whilst providing commercial returns to the business.

Finding a solution to the rural connectivity problem is multi-faceted and one that requires creative thinking and pioneering business models. The Future Network, in cooperation with TowerXchange, looks forward to facilitating the interaction and stimulating the dialogue that is essential to driving forward real progress in the field.
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