# European Wireless Infrastructure Association Report

Report on the economic contribution of the European tower sector

March 2015

EY

Building a better working world

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Section 1

# Introduction

# 1 Introduction

## 1.1 Report overview

1.1.1 This report considers the benefits that wholesale wireless infrastructure providers ("TowerCos") can provide in generating investment and promoting an efficient use of communication towers and the role they can play in delivering the EU's 2020 Digital Agenda.

1.1.2 The report's main aim is to facilitate discussion between TowerCos and regulators on different models for promoting wholesale wireless infrastructure investment in Europe.

1.1.3 It is based on analysis of a mix of publicly-available data and information that has been provided by the EWIA, as well as on EY's extensive experience in advising on tower transactions.

## 1.2 About EY

1.2.1 EY is the leading provider of professional services to the Telecom sector – we serve all of the top 20 telecom operators ranked by market capitalisation; six as auditors and 14 as advisors.

1.2.2 EY's leading transaction advisory practice is based on deep tower infrastructure and telecommunications sector experience, making our advice relevant to clients.

1.2.3 We have a large pool of tower infrastructure knowledge emanating from:

- Our global presence — we have offices in over 90 countries. Telecoms and network infrastructure advisory is centred in London and Delhi.
- Our extensive range of telecommunication audit clients in the sector.
- Our extensive range of advisory clients in the sector.
- Our Global Telecommunications Centre that provides thought leadership and telecommunications research on current issues affecting the industry.

1.2.4 This knowledge and reach gives us access to a large network of key decision makers within telecommunications operators and businesses.

## 1.3 About the EWIA

The European Wireless Infrastructure Association is comprised of nine companies with in excess of €60 billion invested in wholesale wireless infrastructure assets globally. In Europe its members have operations in Germany, France, UK, Italy, Spain, Netherlands and Ireland. EWIA's members are funded either through infrastructure investors or through the public markets and have plans to significantly grow the size of the sector in Europe. Over the last five years two thirds of members have either entered the European tower market or more than doubled in size.

Section 2

# Executive summary

# 2 Executive summary

2.1 Communication towers provide the essential 'passive' infrastructure on which public communication network operators (Network Operators) such as Mobile Network Operators (MNOs) and other network operators (including fixed line wireless broadband, broadcast, emergency services and machine to machine networks) place the 'active' equipment which is used to transmit data to enable mobile and other network services. There are over 400,000 developed communication sites in Europe today including around 300,000 towers, with growth expected as mobile broadband speeds accelerate and data volumes increase rapidly.

2.2 Towers can be owned or managed by either Network Operators (mainly MNOs), or by wholesale wireless infrastructure providers (TowerCos). TowerCos currently manage around 20% of towers in Europe. TowerCos differ from MNOs in that they invest in communication towers solely for the purpose of providing wholesale access to Network Operators on a shared basis.

2.3 TowerCos play an important role in enabling the telecoms industry to make most efficient use of its passive infrastructure, and therefore in reducing costs for Network Operators and in improving service coverage across Europe. As Tom Wheeler (Chairman of the US Federal Communications Commission) noted in a recent address to the US tower sector (where over 80% of wireless infrastructure is outsourced), "every day the infrastructure builders and owners and those who help upgrade our network are key to meeting the national broadband goals that President Obama has set" and that wireless infrastructure companies were "the reason we are leading the world in 4G LTE deployment."

2.4 There are significant fixed costs involved in constructing and maintaining towers. However the costs to industry can be significantly reduced if more efficient use is made of towers: Increasing the utilisation rate of each tower ensures that the unit costs for Network Operators can be much lower. It makes it cost effective to improve service coverage, including to areas where it is currently unprofitable for Network Operators to invest in additional infrastructure – such as in rural areas. Furthermore, by reducing the pace at which new towers need to be constructed it enables the faster rollout of wireless broadband network expansion and upgrade.

2.5 Improving the utilisation of passive infrastructure is therefore valuable for delivering the EU Digital Agenda for 2020, which promotes access to faster data speeds across Europe and particularly in areas with poor service quality today.

2.6 TowerCos have a proven record of increasing the utilisation rates of towers acquired from MNOs and from other Network Operators. Analysis of the rate of networks per tower (co-location ratios) – which is a major contributing factor to tower utilisation – shows that TowerCos are able to achieve significantly higher utilisation of towers through providing access to multiple operators. The higher rate of co-location achieved by TowerCos reduces the need to build more towers, speeds up deployment and reduces Network Operator lifecycle costs. TowerCos have also proven themselves able to drive down operating costs and achieve a lower cost of capital as a result of towers being their core business and so having greater expertise in the delivery of passive infrastructure.

2.7 Over recent years the TowerCo sector has seen an expansion in the share of the towers that they manage – both globally and within the EU. This has principally been driven by MNOs facing a need to realise cash for investment in rolling out 4G or for market expansion. MNOs and other Network Operators have also been driven to sell off towers by the desire to achieve cost efficiencies and to concentrate on their core market service line.

2.8 However there remains scope for a substantial further increase in the size of the TowerCo sector, as is illustrated by the US market where the share of towers managed by TowerCos is 84%, compared with only 20% in Europe today. EY estimate that an increase in the degree of outsourcing to TowerCos (i.e., to match the levels seen in the US today) would have a net benefit of €23 billion to the European economy over the next decade, and could reduce the

number of new towers that would need to be constructed by 80%. In addition, EY estimate that outsourcing to TowerCos can unlock €27 billion in capital investment by allowing MNOs to release capital by selling their passive infrastructure to a TowerCo.

2.9 There are alternative ways in which the industry can reduce the cost of passive infrastructure. One is through greater cooperation between network operators – e.g., MNOs forming joint ventures with each other and agreeing provisions for pooling their joint network assets. Another model is through market consolidation: MNOs merging or acquiring other MNOs reduces the necessity for sharing infrastructure as each MNO's network will be serving a greater share of the market.

2.10 While much of the efficiency gains from sharing passive infrastructure could also be achieved through closer cooperation between MNOs (as is currently occurring with the increase in RAN-sharing), TowerCos provide a means of sharing passive infrastructure in a way that is pro-competitive and reduces barriers to entry for new MNOs and other Network Operators. Infrastructure sharing through TowerCos therefore makes it easier for new companies to enter the market – or for existing MNOs to expand – as they can secure the wholesale services they need to establish a network with consistently high service quality from the TowerCos.

2.11 Given the significant growth in mobile data services, and the importance of improving access of the population in Europe to high speed broadband, TowerCos can play a vital role in lowering costs for network deployment and improving access to high-speed broadband across Europe.

Section 3

# Background to the European tower sector

# 3 Background to the European tower sector

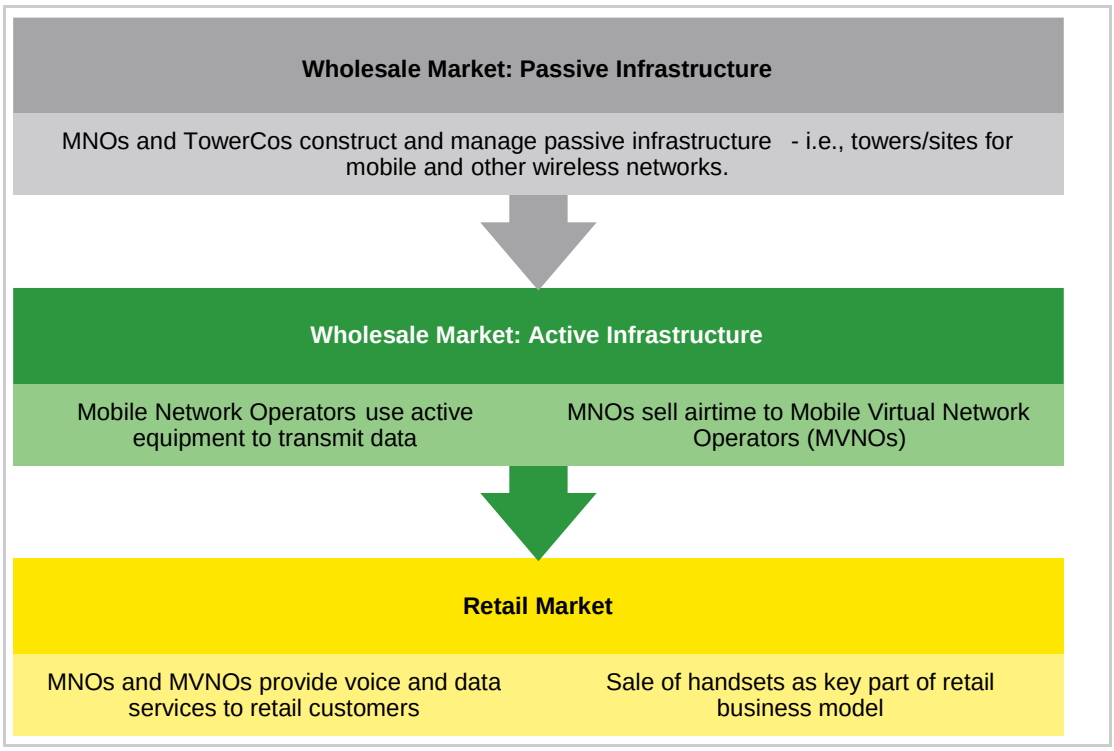
## 3.1 Role of towers in telecommunications sector

3.1.1 This report examines the role that the European Tower Sector plays in the telecommunications sector by providing infrastructure, sites and services to cellular and other wireless networks.

3.1.2 Towers provide a key part of the infrastructure that is critical in the supply of wireless services – including mobile networks, fixed line wireless broadband, fixed line transmission, emergency services, TV and radio broadcast, Machine to Machine (IoT) and PMR networks. The largest users of communication towers are the mobile networks and this report focuses on this segment of the market.

3.1.3 Looking more specifically at the mobile networks, towers represent the 'passive infrastructure' in wholesale mobile infrastructure. MNOs situate antennas, base stations and transmission equipment ('active infrastructure' or 'Radio Access Network') on towers in order to transmit signals. The active and passive infrastructure together enable the MNO to provide telephony and mobile data services to retail customers. The overall market structure is illustrated below:

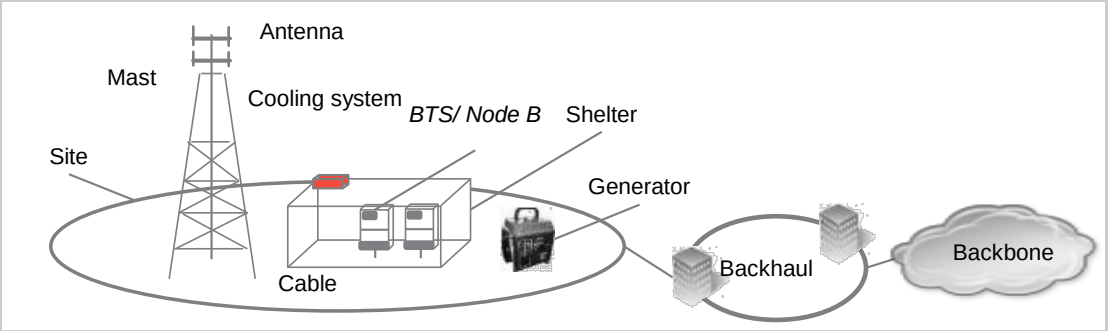
**Figure 1: Supply chain for mobile network services**




3.1.4 In addition to communication towers, TowerCos also develop utility assets and wholesale small cell platforms for high density urban and indoor locations such as indoor distributed antenna solutions. In this case the wholesaler retains ownership and responsibility for operation of the active infrastructure and can facilitate multiple operators on a single infrastructure. The TowerCo provides a design of the solution, develops and maintains the network, and manages the relationship with the real estate owner and with any other site users. This report focuses on communication towers.

3.1.5 The physical infrastructure in mobile networks (active and passive) is represented on the diagram below:

**Figure 2: Equipment on a tower site**




3.1.6 The passive infrastructure includes the site, tower and can also include shelter and back-up power. These are used to host the active infrastructure – the antenna, transmission equipment, base station and other equipment. TowerCos manage the site and are responsible for the ensuring the multiple networks using the site can all operate their networks effectively.

3.1.7 This report focuses on the role and economic benefits of independent tower companies in the wholesale market for mobile network services. However it should be noted that the role of a wholesale infrastructure provider is a common feature across the telecoms sector. For instance:

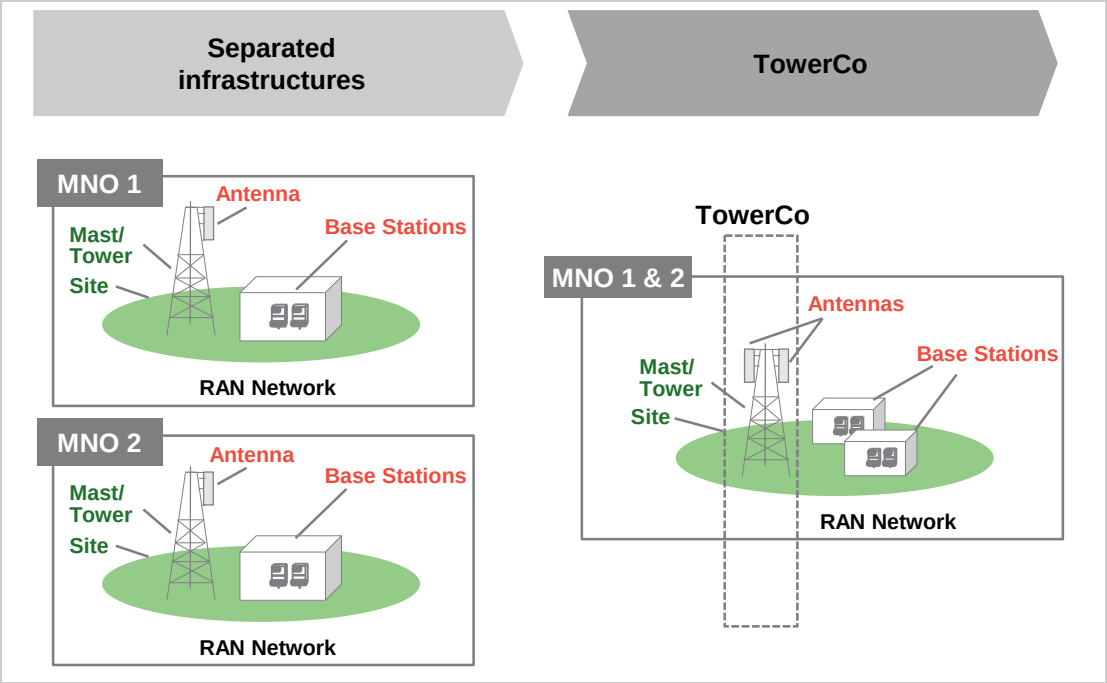
- **Copper and Fibre networks**: The passive infrastructure for landline calls and high-speed broadband is typically a monopoly that provides access to the network at a regulated price to retailers on an equal access basis. In addition, many new dark fibre operators have wholesale business models.
- **Data-centres**: Providers have customised property and infrastructure assets that they use to lease data storage and facilities to multiple service providers.
- **Satellites**: Wholesale providers lease access to satellite assets (as well as teleports, transponder capacity and spectrum rights) to multiple service providers for data capacity and broadcast.
- **MNO Networks**: MNOs actively engage in wholesale activities through sale of capacity on their networks to MVNOs and other networks.

## 3.2 Role of Tower Companies

3.2.1 TowerCos develop, acquire and operate communication towers, providing the passive infrastructure needed for telecoms and media services to be provided to consumers. TowerCos invest in communication towers, small cell networks and associated utility and real estate rights. These investments are made not for TowerCos' own public communication networks but the purpose of providing wholesale access to mobile and other network operators on a shared basis.

3.2.2 The provision of tower infrastructure by TowerCos provides an alternative to the Network Operator managing their own passive infrastructure, as represented below:

**Figure 3: How TowerCos facilitate infrastructure sharing**




3.2.3 There are a number of arrangements by which TowerCos can provide services to Network Operators for the management of passive infrastructure:

- **Out-tasking:** Network Operators can outsource the operation of towers to TowerCos while retaining ownership for the infrastructure

- **Out-sourcing:** Network Operators can transfer functional responsibility to TowerCos, who then use their own resources to develop, operate, maintain and optimise the network, or elements of it. Under this arrangement, ownership of the tower can either transfer to the TowerCo or reside with the MNO – with leaseback arrangements (where ownership reverts to the MNO after an agreed period of time) often used in developing markets, and divestment more often chosen in mature markets. Either way, the management of the tower is allocated to the TowerCo, who is then able to share the infrastructure with multiple network customers.

3.2.4 This report considers the benefits to the economy of outsourcing of passive infrastructure to TowerCos. These benefits are in the form of lower costs to Network Operators and enhanced service reliability for consumers of mobile and other wireless services.

3.2.5 Under outsourcing models, the division of responsibilities between the Network Operator and the TowerCo is typically as follows: tower companies are responsible for maintaining the passive infrastructure on a particular site – including the tower, civil works, fences, and shelters – and hold responsibility for health and safety compliance at the site. The tower company also takes on the contracts for the infrastructure, including the ground lease and resolving access and multi-operator use issues. By contrast the Network Operators typically retain responsibility for maintaining the active infrastructure on the site – particularly the antennas and wireless equipment. Commercial relationships are typically covered in complex multi-site arrangements including infrastructure access and other services (including upgrade services).

3.2.6 The provision of passive infrastructure is a major component on Network Operator capital expenditure, due to its capital-intensive nature. However it represents a small fraction of the overall cost base of Network Operators, which is dominated by operating expenditure.

## 3.3 MNO Radio Access Network Sharing

3.3.1 MNOs can engage in more extensive sharing of infrastructure through RAN Sharing which involves the active network. Under RAN Sharing two MNOs would operate from a single set of active equipment on a site and run a combined backhaul link to the site with each operator splitting out the traffic to its core network. The aim of MNOs in sharing active infrastructure is to achieve significant cost reductions. However this also results in the elimination of competition between the operators over the strength and depth of their Radio Access Network.

## 3.4 Role for towers in the future

3.4.1 As technology has evolved, users have been able to do more and more with their mobile phones: Second generation (2G) technology enabled users to make voice calls and send text messages. Third generation (3G) technology enables users to access the internet while on the move. The current rollout of fourth generation technology (4G) enables users to access superfast mobile broadband at speeds roughly equivalent to those one could expect from a fixed broadband connection. The fifth generation technology is already under development.

3.4.2 With the rollout of each new technology, users consume more and more data remotely. As an illustration, Morgan Stanley notes that when a Vodafone Europe customer moves from 3G to 4G, data usage increases from 825Mb/month (3G) to 1.5Gb/month (4G) – with Cisco forecasting data usage continuing to grow to 5.5Gb/month by 2018. This increase in data consumption will put pressure on network capacity and will drive:

- A continued need for new points of presence in networks (and therefore new towers to be built); and/or
- A greater degree of infrastructure sharing as a means of reducing the amount of new infrastructure build needed to meet demand for mobile services.

3.4.3 A further driver for investment in passive infrastructure will be the move to higher spectrum frequencies used, particularly in urban areas. This shift will enable a greater volume of data to be transmitted from a particular site but will also limit the size of areas around the site that is able to receive coverage, prompting a need for additional towers and infrastructure sharing.

3.4.4 The degree to which increased infrastructure sharing can limit the need for new build depends in part on where the additional coverage is most needed. Infrastructure sharing can be particularly beneficial in expanding coverage to rural and suburban areas with lower population density. However the urban environment needs increased levels of cell splitting and so shared infrastructure can improve service reliability by allowing MNOs to use towers on a wider range of sites.

3.4.5 The drive to improve data coverage, and reduce the number and size of so-called ‘not-spots’ – areas with poor signal issues – are an important part of the EU Digital Agenda for Europe,[1] which seeks to ensure that, by 2020:

i All Europeans have access to much higher internet speeds of above 30 Mbps; and

ii 50% or more of European households subscribe to internet connections above 100 Mbps.

3.4.6 The Digital Agenda for Europe identified the need for investment in broadband networks – both fixed and wireless – as one of the seven principal obstacles to having fast, open and competitive internet networks that will be the arteries of a future economy. The European Commission recognises that wireless broadband (terrestrial and satellite) can play a key role in ensuring coverage of all areas including remote and rural regions.

3.4.7 The deployment of 4G technology will enable wireless download internet speeds in excess of 30 Mbps, although this will depend on the level of network investment. Towers can therefore

[1] http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52010DC0245R(01)&from=EN

play a significant role in cost-effectively widening access to high-speed broadband in line with the Digital Agenda.

3.4.8 Expanding access to wireless internet – and the likely increase in data usage that will follow from higher internet speeds – is likely to necessitate a significant increase in points of presence. This could require a significant increase in new towers needed, particularly if infrastructure is not utilised in the most effectively way – i.e., with multiple Network Operators making use of each site.

Section 4

# Economic benefits of shared passive infrastructure

# 4 Economic benefits of shared passive infrastructure

## 4.1 Overview

4.1.1 There are significant fixed costs involved in constructing and maintaining towers. However the costs to industry can be significantly reduced if more efficient use is made of towers: increasing the utilisation rate of each tower ensures that the unit costs for Network Operators can be much lower.

4.1.2 In addition to lowering costs for Network Operators it also makes it more cost effective to improve service coverage to areas where it is currently unprofitable for Network Operators to invest in additional infrastructure – such as in rural areas. Furthermore, by reducing the pace at which new towers need to be constructed it enables the faster rollout of wireless broadband network expansion and upgrade.

4.1.3 This report considers the economic benefits created by Network Operators (specifically MNOs) in outsourcing passive infrastructure to TowerCos. These benefits are principally arrived at from increasing the utilisation of towers. However TowerCos offer additional economic benefits by driving down the cost of capital and achieving efficiencies in operating expenditure, as well as in unlocking substantial additional capital for MNOs. The benefits from the provision of TowerCo towers to other Network Operators have not been quantified in this report.

4.1.4 It is recognised that the potential benefits from TowerCos increasing tower utilisation could theoretically also be achieved through market consolidation or increased cooperation between MNOs. However the use of TowerCos provides a pro-competitive model for promoting network sharing in the market, by reducing barriers to entry or expansion in the retail market for mobile services.

## 4.2 Estimate of net benefit from greater outsourcing:

4.2.1 EY estimates that a greater role for TowerCos would create a discounted net benefit of €23 billion to the European economy over the next decade and could release capital for investment of €27 billion from MNO balance sheets.

4.2.2 The economic benefits of TowerCos result from driving cost efficiencies in three different ways:

i **Efficient tower operation**: TowerCos can reduce operating expenditure for towers through their greater expertise in managing infrastructure.

ii **Reduced cost of capital**: TowerCos can finance investments at a lower cost of capital than MNOs.

iii **Increased co-location**: TowerCos can more effectively ensure that infrastructure is shared by multiple networks, which EY estimate can reduce the need for over 100,000 additional new towers to be constructed over the next decade.

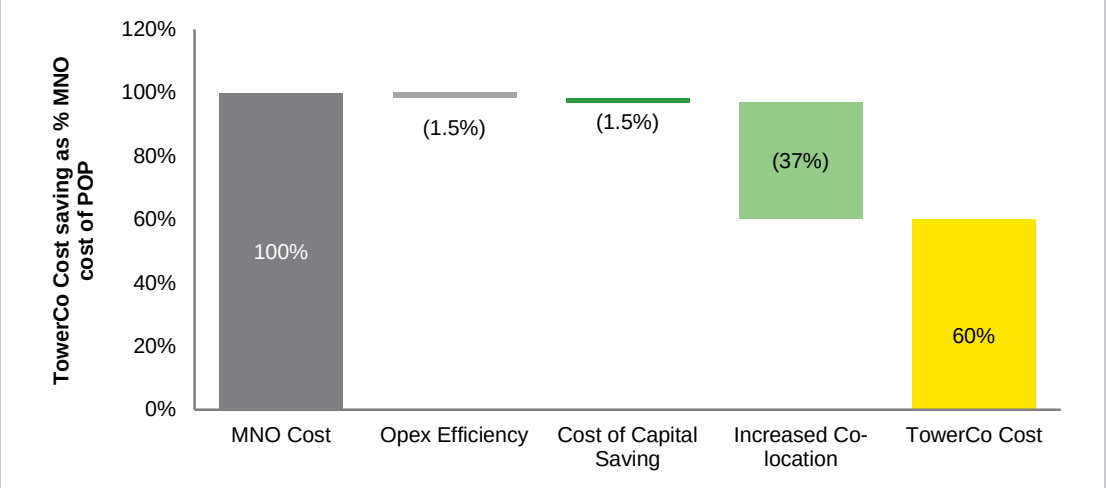
4.2.3 We have estimated the effect of cost efficiencies by looking at the cost of providing a ‘Point of Presence’, i.e., the cost of tower use for a single network, in scenarios where either the MNO or the TowerCo manage the tower. This analysis considers the cost of construction of a tower (including financing over a 10 year payback period), with the cost discounted back to a present value and shared between the users for a given tower.

4.2.4 In this analysis, we have estimated that a typical Point of Presence managed by a TowerCo is 40% more efficient than one brought forward by an MNO. The differences in efficiency between the two business models are driven by differences in assumptions around co-location ratio, cost of capital and operating expenditure. However the ability of TowerCos to

achieve higher co-location is the principal factor behind this result – as illustrated in the waterfall graph below:

**Figure 4: Cost per Additional Point of Presence for MNOs vs. TowerCos**

*Source: EY analysis.*




4.2.5 This saving therefore largely represents the economic benefit from having to build fewer new towers to host a given number of Points of Presence. On the assumption of a 3% annual net growth in points of presence over the next ten years, we anticipate the number of points growing by a third in the next ten years. If TowerCos were to manage a larger proportion of towers in Europe – i.e. matching the TowerCo share of towers in the US today – the need for new towers could be reduced by 80%. The aggregate benefit to the economy of the increase in outsourcing to TowerCos has a present value of €23 billion over the next decade.

4.2.6 While the difference between the two business models is a benefit to the economy, the distribution of benefits may depend on pricing strategy of the MNOs and TowerCos: In the first instance either the TowerCo or the MNO will benefit from outsourcing, with the allocation of benefits depending on the level of mark-up the TowerCo would be able to charge on their cost level. Given there is already competition between TowerCos and between MNOs this is likely to be limited and ultimately would expect the economic benefit to go to retail consumers, as competition in the wholesale market would drive down the mark-up that TowerCos can charge, and competition in the retail market would dampen the prices MNOs can then set for end-users.

4.2.7 By bringing down the cost to MNOs of adding Points of Presence, outsourcing also makes it more profitable for MNOs to increase deployment of infrastructure to areas that are currently poor served.

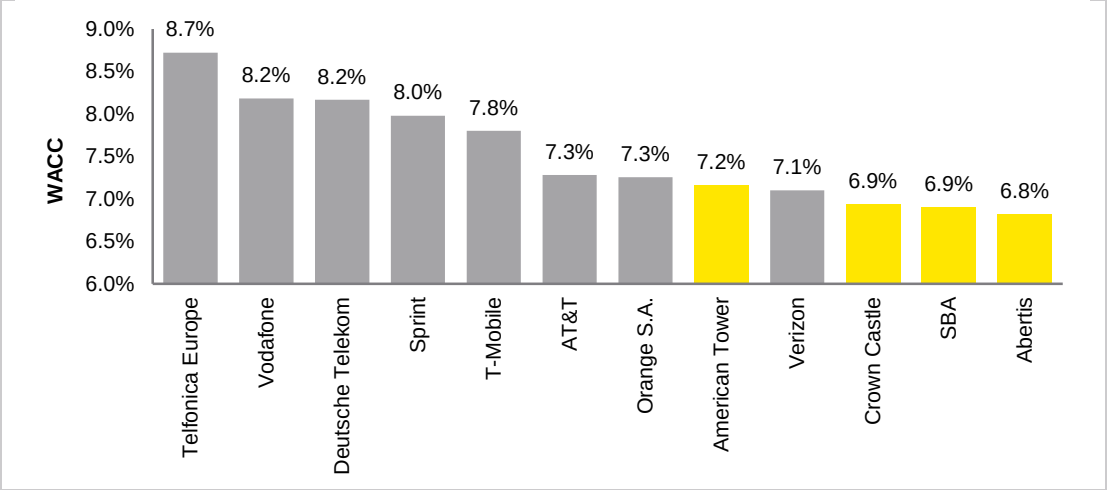
4.2.8 Much of the benefits of outsourcing in terms of increased utilisation of infrastructure can also be achieved through other models of network sharing – such as through market consolidation. However TowerCos provide the most pro-competitive solution to the challenge of increasing network utilisation. This is considered further in Section 3.7.

### 4.3 Reducing the cost of capital:

4.3.1 TowerCos are typically able to attain finance at a slightly lower cost of capital than MNOs. EY analysis of brokers reports suggests that MNOs in the US and Europe have a Weighted Average Cost of Capital (WACC) that is 0.8% higher than that of equivalent European TowerCos. This is illustrated for different MNOs and TowerCos in the chart below. This translates into the financing costs being over 10% higher for MNOs than for TowerCos.

**Figure 5: Cost of Capital for MNOs vs. TowerCos in Europe and the US**

*Source: EY analysis of brokers' reports in 2014.*




4.3.2 Economic theory suggests that the cost of capital for a given economic activity should reflect the riskiness of the project, and so an MNO should be able to obtain finance for funding tower investment at a similar rate to a TowerCo. This means that the difference in weighted average cost of capital between MNOs and TowerCos could reflect the fact that TowerCos focus solely on infrastructure and do not engage in the other activities that an MNO conducts which would be likely to require a higher cost of capital and attract a different pool of investors.

4.3.3 However there is reason to think that TowerCos may be seen as a lower risk party to manage towers and this may also drive the difference in cost of capital: TowerCos have greater experience in operating towers (i.e., economies of scale and scope). TowerCos may also be seen as a lower risk party due to the fact they supply a higher number of MNOs, and so the returns to their management of the tower is less dependent on the success of particular MNOs in competing over market share at the retail level.

4.3.4 A related benefit is that the expansion of the TowerCo sector has added considerable liquidity to the market for sale and acquisition of infrastructure. This is a 'positive externality' to the TowerCo sector, as the divestment of towers from an MNO to a TowerCo has benefits that are felt by other parties (whether MNOs or Tower Cos) through enhanced market liquidity. This means that MNOs are able to take greater account of the 'terminal' value of the asset, as they know they will be able to sell the asset for a fair price if they wish to do so at a later point. This improves the profitability of investment in tower infrastructure and so enables improved service coverage.

4.3.5 The outsourcing of infrastructure is also an effective way for MNOs to attain a source of cash that is immediately available. This is commonly used by MNOs to invest in network upgrades and expansion or to finance their activities more cost effectively. If Europe outsourced to the same level as the US, an additional €27 billion of capital would be released in the European tower sector.

**Case Study: Cash Realisation**

October 2013, USA – AT&T that it has agreed to lease the rights to approximately 9,100 of its company-owned wireless towers to Crown Castle International Corp. Crown Castle will also purchase approximately 600 AT&T towers. In exchange, AT&T will receive about €4.3 billion in cash up-front proceeds.

'This deal is good for AT&T and our shareholders,' said Bill Hogg, Senior Vice President – Network Planning and Engineering, AT&T Services Inc. *"This deal will let us monetise our towers while giving us the ability to add capacity as we need it. And we'll get additional financial flexibility to continue to invest in our business, maintain a strong balance sheet and return value to our shareholders."*

## 4.4 Reducing Opex:

4.4.1 TowerCos, for whom the management of towers is their core business, typically have more expertise in identifying efficiencies to reducing operating expenditure – for instance through having greater skills and knowledge in contract negotiations for the site and in minimising maintenance costs. This is reflected in our analysis by assuming that Opex for a tower is 10% lower for a TowerCo.[2] This assumption is based on EY's experience of working on tower transactions and represents a lower bound estimate of the efficiencies in Opex that are typically found from outsourcing.

**Case Study: Reducing Opex**

October 2012, Cameroon and Côte d'Ivoire: MTN announces sale of mobile network towers in Côte d'Ivoire and Cameroon to IHS for a total of €250 million.

MTN stated that its *"sale of towers is in line with MTN's infrastructure sharing strategy aimed at the monetisation of its assets and cost optimisation. The agreements include a commitment from IHS to roll out a build-to-suit programme to support MTN's future requirements in both countries, as well as pursue opportunities to build tower sites for other wireless operators."*

## 4.5 Increasing co-location

4.5.1 TowerCos tend to make more efficient use of the infrastructure through investment and business focus. This translates into higher co-location rates on TowerCo owned towers when compared to MNO owned towers. Increased co-location has a major impact on reducing the cost per 'Point of Presence' as it means the significant fixed costs per tower are shared between multiple network operators.

4.5.2 In theory MNOs could also achieve a high co-location rate and so bring down the costs of passive infrastructure to users. In practice, however, TowerCos have a demonstrably better record of achieving a more efficient utilisation of infrastructure over time. The increase in co-location on towers acquired by TowerCos from MNOs is not immediate – in practice it is likely to take several years for co-location to significantly increase as the TowerCos find additional users for each tower. However evidence from industry shows that TowerCos do manage to increase co-location ratios over time:

**Table 1: Co-location rates for Towers owned over five years**

*Source: EWIA data, EY analysis.*

| Market | Co-location rate: MNOs | Co-location rate: Tower cos |
|---|---|---|
| America | 1.6 | 2.8 |
| Europe | 1.3 | 3.0 |

4.5.3 One explanation for the higher co-location rates among TowerCo portfolios is that the use of passive infrastructure is not a core business activity for MNOs, whereas TowerCos are strongly incentivised to find additional customers as this is central to their profitability: For instance, American Tower, who own a fifth of towers in the US, say that a new tower with a single customer would attract a 3% return on investment – but this would grow to 11% if there were an additional customer, or to 18% if a third customer were found.[3]

4.5.4 A further potential explanation may be that MNOs – who compete with other MNOs on the quality of their service coverage – could be argued to have a perverse incentive not to share infrastructure with other MNOs so as to maintain an advantage over their competitors.

[2] This assumes an equal tenancy ratio. Tower Cos also tend to have additional network customers to MNOs, which can lead to a slight increase in operating expenditure.
[3] 'Introduction to the American Tower Industry and American Tower,' 30 June 2014

4.5.5 Regardless of the reason why MNOs might not share their infrastructure as effectively as TowerCos, the difference in co-location rates is an observed characteristic across many different companies and continents and so represents a significant economic benefit to TowerCos managing passive infrastructure.

**Case Study: Co-location Benefits**

30 December 2013: Spanish conglomerate corporation Abertis Infraestructuras is said to have closed the acquisition of 1,741 mobile towers from Telefonica Espana (Movistar) and Yoigo for a total of EUR171 million.

The development represents the first phase of an August 2013 agreement under which Abertis said it would buy at least 4,227 mobile-phone towers from the two mobile operators for EUR385 million, in a transaction it said would contribute around EUR60 million a year to EBITDA.

On the back of the completion of the first stage of the deal, Movistar and Yoigo will now jointly use the infrastructure acquired by Abertis, while it will also be made available to other operators on a wholesale basis.

In a statement to the Comision Nacional del Mercado de Valores (CNMV), Abertis was cited as saying that acquisition of the first batch of towers would contribute to the 'consolidation of the group as a key player in the rational use of fixed telecommunications infrastructure and mobiles in Spain,' while it would also 'enable the development of new business opportunities for sharing in the necessary deployment of fourth generation mobile phone infrastructure.'

## 4.6 Improving service coverage

4.6.1 A further potential benefit to consumers from outsourcing infrastructure is that it can improve the quality of service for customers:

4.6.2 The higher infrastructure sharing rates should mean that more efficient use of existing infrastructure enables an improved quality of service for customers by increasing the numbers of available points of presence for MNOs.

4.6.3 By reducing the costs to MNOs of adding Points of Presence it makes it more profitable to deploy or upgrade infrastructure to areas that are currently poorly served – such as in sparsely-populated rural areas. As is recognised in the EU's 2020 Digital Agenda, widening the access to high speed broadband can have a significant benefit in terms of boosting economic growth.

4.6.4 The outsourcing of towers to TowerCos can also help MNOs to release a significant amount of capital: an additional €27 billion of capital could be released if Europe outsourced to the same level as the US. Given the scale of investment needed in the roll-out of 4G LTE, the capital released by increased outsourcing of towers could help drive forward increased investment in the infrastructure needed deliver an improved quality of service to customers.

## 4.7 Increased competition

4.7.1 A significant benefit of the use of TowerCos is in promoting competition in the Telecoms market at the retail level:

4.7.2 The provision of passive infrastructure by TowerCos reduces barriers to entry or expansion among MNOs in the retail sector by limiting MNOs' ability to slow down network access to their competitors. Infrastructure sharing through TowerCos therefore makes it easier for new companies to enter the market – or for existing MNOs to expand – as they can secure the wholesale services they need to establish a network with consistently high service quality from the TowerCos.

4.7.3 This can be contrasted with alternative models by which MNOs can increase the utilisation of their passive infrastructure: MNOs can form joint ventures to pool their infrastructure networks. Another model is for the market to consolidate – with one MNO acquiring or merging with another MNO. Both forms of network sharing are common models in the telecoms market today. However outsourcing to TowerCos remains the only model for making more effective use of infrastructure that is pro-competitive – i.e., that reduces barriers to entry into the retail market for mobile services whilst achieving many some of the efficiencies of further market consolidation. This is an important factor given the potential competition risks from market consolidation: for instance, the OECD notes that mobile service prices in Austria jumped by about 10% in 2013 following the acquisition of Orange's Austrian MNO by Hutchison-3G.[4]

4.7.4 MNO cooperation has increased as a model for sharing active infrastructure (RAN sharing). A greater degree of cooperation between MNOs may be crucial to limiting the rise in capital expenditure needed to deliver the rollout of LTE. However while RAN sharing has the ability to reduce costs for consumers, it also involves MNOs collaborating with their competitors, by forming joint ventures to share wholesale network infrastructure. This creates a risk of promoting further market consolidation at the retail level, or acting as barrier to entry for non-vertically integrated MNOs. RAN sharing also requires strong exchange of information and eliminates competition between RAN share partners in the reach and capacity of their active networks.

## 4.8 Benefits to other Network Operators

4.8.1 This report has focussed on quantifying the benefits of TowerCos supplying points of presence to MNOs. There is a wide range of other Network Operators that utilise towers such as national and regional wireless broadband operators, utilities, emergency services, machine to machine networks, and fixed line wireless backhaul. Network Operators in these markets can often be wholly reliant on existing towers for their networks and wholesale sector has a critical role to play. The benefits are not quantified in this report.

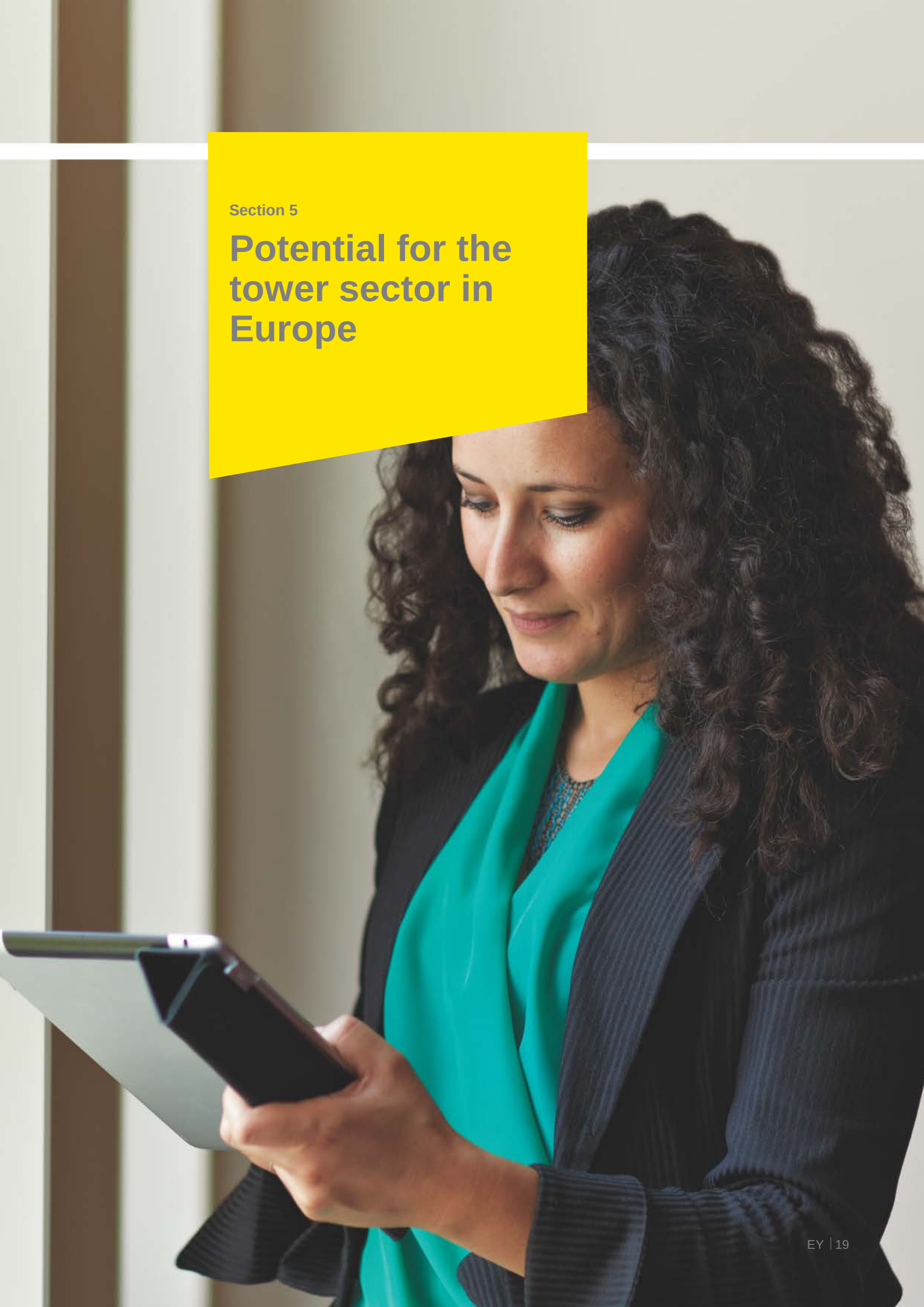
## 4.9 Environmental benefits

4.9.1 A further benefit to the use of TowerCos is around the reduced visual impact of towers. By facilitating more effective sharing of passive infrastructure the TowerCos reduce the need for constructing more towers and therefore diminish the visual impact of new towers, particularly in rural areas.

[4] OECD (2014), 'Wireless Market Structures and Network Sharing', OECD Digital Economy Papers, No. 243, OECD Publishing. http://dx.doi.org/10.1787/5jxt46dzl9r2-en

Section 5

# Potential for the tower sector in Europe



# 5 Potential for the tower sector in Europe

## 5.1 Size of tower sector in Europe today

5.1.1 There are currently 300,000 towers across Europe, with a quarter managed by TowerCos.[5], with most of the rest of the tower sector managed by MNOs. However there are sizeable differences in the size of the independent tower sectors between EU member states – for instance with outsourcing more widely employed in France and the Netherlands.

**Table 2: Key players in European tower sector**

*Source: European Wireless Infrastructure Association.*

| Market | Total Sites[6] | Towers | % Towers controlled by TowerCos | Major Tower Cos | Major MNOs |
|---|---|---|---|---|---|
| France | 55,000 | 33,000 | 27% | FPS, TdF | Orange, SFR, Bouygues, Free |
| Germany | 27,000 | 18,000 | 11% | American Tower | Telecom, Vodafone, E-Plus, O2 |
| Ireland | 4,500 | 2,800 | 28% | Towercom | Vodafone, 3, Meteor |
| Italy | 48,000 | 33,600 | 7% | EI Towers, Abertis | TIM, Vodafone, Wind, 3 |
| Netherlands | 11,000 | 4,100 | 42% | OTC, Shere, Protelindo, WIG | KPN, Vodafone, T-Mobile |
| Spain | 45,500 | 34,125 | 13% | Abertis, Axion | Movistar, Vodafone, Orange, Yoigo |
| UK | 38,000 | 27,000 | 33% | Arqiva, WIG; Shere Group | EE, O2, Vodafone, 3 |
| **Average** | | | **20%** | | |

5.1.2 The number of MNOs in a given market will have an important impact on the role of TowerCos: For instance the entry of a fourth MNO, Free, into the French market in 2013 raises the importance of infrastructure sharing to avoid the need for duplication of networks. Conversely, where there is market consolidation then there is a reduced benefit from network sharing as each MNO commands a larger share of the market.

[5] This is based on data for the countries shown in Table 2. However this may overestimate the proportion of towers operated by TowerCos across Europe as the TowerCo share is likely to be lower in the countries for which EWIA members are not present.

[6] Figures for total sites are based on EWIA estimates and include only active sites (i.e. they exclude unused structures that are suitable for telecoms, such as buildings and pylons). The estimate of total sites in Germany is based on the total sites to tower site ratios for other markets.

**Table 3: Recent TowerCo acquisitions from MNOs in Europe**

*Source: Market reports*

| Announced Date | Region | Target | Acquirer | Enterprise value (€mn) | Towers | EV/Tower (€k) |
|---|---|---|---|---|---|---|
| **Europe** | | | | | | |
| May-14 | Italy | TowerCo | Abertis | 95 | 306 | 310 |
| 2013-2015 | Spain | Telefonica& Yoigo | Abertis | 380 | 3,224 | 120 |
| Nov-12 | Germany | E-Plus Mobilfunk | American Tower | 395 | 2,031 | 190 |
| Nov-12 | France | Bouygues Telecom | Antin Infrastructure Partners. | 205 | 2,166 | 90 |
| Oct-12 | Netherlands | KPN | Protelindo | 75 | 261 | 290 |
| Apr-12 | Spain | Telefonica | Abertis Infraestructuras | 50 | 1,000 | 110 |
| Dec-11 | Netherlands | KPN | Shere Group | 115 | 460 | 150 |

5.1.3 There has been an increasing number of European tower acquisitions by TowerCos in recent years, particularly in Spain, where Abertis announced a deal that would see them acquire an additional 14% of towers in the country from MNOs Telefonica and Yoigo. Six of the nine TowerCo members of EWIA have either entered the market or more than doubled their investments in the last five years. Moreover a number of tower acquisitions are expected in 2015: Orange SA, France's largest MNO, is reported to be considering the sale of over half its Spanish tower network (9,400 towers).[7] Wind Telecomunicazioni SpA, Italy's third-largest wireless carrier controlled by VimpelCom, is looking to sell about 6,000 towers in Italy,[8] while OiSA, Brazil largest landline phone company, is said to be considering the sale of 3,000 towers in Portugal.[9]

5.1.4 In some cases MNOs have established joint vehicles as an alternative means to share passive infrastructure, for instance with T-Mobile and Orange in Poland founding a joint vehicle in 2013, called 'NetWorkS!', to reduce their overall number of sites.

5.1.5 There has also been a greater focus on active network sharing among MNOs – for instance with Orange and Vodafone in Romania agreeing a network-sharing deal in 2013. The move to active network sharing has been spurred by the drive to reduce backhaul costs, as well as by the start of the rollout of LTE since 2012.

5.1.6 The sharing of active infrastructure has been seen by many MNOs as a greater priority than the outsourcing of passive infrastructure, as active sharing has the potential to reduce the costs of backhaul as well as of the active infrastructure. However the complexity involved in arrangements for active sharing may have deterred MNOs from seeking to outsource active infrastructure at the same time.

## 5.2 Comparison with US market

5.2.1 The American telecoms market has developed as the one with the highest share of independent wholesale telecoms providers. Co-location ratios in the US are around 2.8 for TowerCos, compared with around 1.6 for MNOs.[10]

[7] http://www.bloomberg.com/news/articles/2014-08-14/orange-said-to-study-sale-of-spanish-phone-towers
[8] http://www.bloomberg.com/news/articles/2014-11-11/american-tower-abertis-said-to-bid-for-vimpelcom-s-italy-assets
[9] http://www.bloomberg.com/news/articles/2014-10-16/oi-said-to-hire-barclays-to-sell-portugal-telecom-towers
[10] http://www.towerxchange.com/baseline-data-on-the-us-tower-market-and-a-view-on-europe/

**Table 4: Size of TowerCo sector in the US**

*Source: PCIA – The Wireless Infrastructure Association*

| Market | Towers | % Towers controlled by Tower cos | Major Tower Cos | Major MNOs |
|---|---|---|---|---|
| US | 120,000 | 84% | Crown Castle; American Tower; SBC Corporation | AT&T; Verizon; Sprint; T-Mobile |

5.2.2 The TowerCo's share of the US market has grown over time, with significant tower acquisitions occurring in recent years. For instance, in 2013 AT&T agreed a €4.3bn deal to lease or sell 9,700 towers to Crown Castle, enabling AT&T to free up cash for investment in network expansion, spectrum auctions and market expansion.[11] Crown Castle also bought the exclusive rights to lease and operate 7,200 towers from T-Mobile USA in 2012 in a €2.1bn deal.[12] This trend has continued into 2015, with Verizon announcing that it would be leasing the rights to 11,324 towers and selling an additional 165 towers to American Tower for €4.4bn in February this year. This deal helps Verizon to fund the company's €9.2bn recent purchase of spectrum licenses.[13] The Verizon transaction brings the TowerCo share of the US tower sector up from 80% to 84%.

**Table 5: Recent TowerCo acquisitions from MNOs in the US**

*Source: Market reports*

| Announced Date | Region | Target | Acquirer | Enterprise value (€mn) | Towers | EV/Tower (€k) |
|---|---|---|---|---|---|---|
| **America** | | | | | | |
| Feb-15 | USA | Verizon | American Tower | 4,400 | 11,489 | 390 |
| Oct-13 | USA | AT&T | Crown Castle | 4,270 | 9,700 | 440 |
| Sep-12 | USA | Tmobile | Crown Castle | 2,110 | 7,200 | 290 |
| Jul-08 | USA | Sprint Nextel | TowerCo | 590 | 3,080 | 190 |

5.2.3 The markedly higher market share of TowerCos in the US relative to Europe may partly be the result of the European market developing more advanced models for MNOs to share networks – as seen in higher tenancy ratios for towers managed by TowerCos. However the growth of TowerCos in the US has been driven by a number of factors that are similar to Europe – the need for MNOs to free up cash flow and reduce costs so that they can invest in network investment alongside the rapid acceleration in consumption of data.

## 5.3 TowerCos as an international business model

5.3.1 TowerCos operate across the globe, with a material presence in Central and Southern America, Africa, India and across Asia.

5.3.2 To provide an illustration of how quickly outsourcing can occur, it is worth looking at the African market, in which the TowerCo business model has emerged over the past five years to capture over a third of the market. Moreover the role of TowerCos is expected to increase rapidly over time. Wireless coverage is fast expanding, with many areas today having no access to reliable service, and with limited fixed line infrastructure available, mobile is now the cost-effective choice for communication. As wireless penetration continues to increase, improved network quality is crucial for carriers to add customers. This rapid expansion in the need for passive infrastructure is driving the increased role for TowerCos by enabling MNOs to divert capital towards other areas of infrastructure investment.

[11] http://www.bloomberg.com/news/2013-10-20/at-t-agrees-to-4-85-billion-tower-deal-with-crown-castle.html
[12] http://www.bloomberg.com/news/2012-09-28/crown-castle-to-buy-t-mobile-usa-towers-for-2-4-billion.html
[13] http://www.fiercewireless.com/story/verizon-offloads-towers-american-tower-5b/2015-02-05

**Table 6: Recent TowerCo acquisitions from MNOs in Africa**

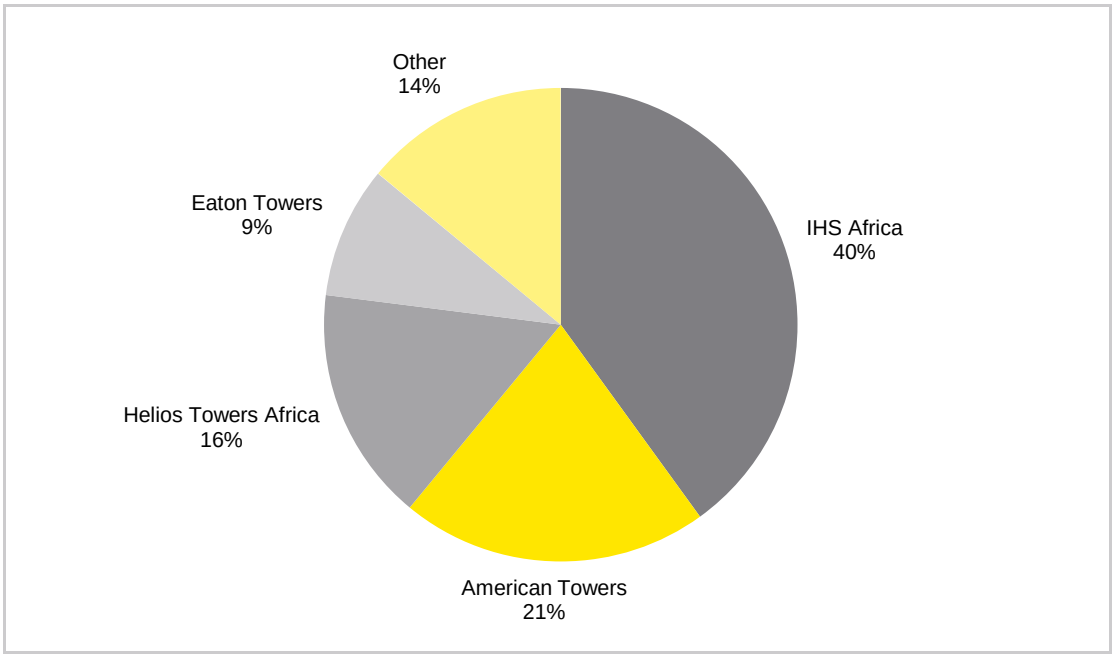
*Source: Market reports*

| Announced Date | Region | Target | Acquirer | Enterprise value (€mn) | Towers | EV/Tower (€k) |
|---|---|---|---|---|---|---|
| **Africa** | | | | | | |
| Dec-14 | Nigeria | Etisalat | IHS Africa | 350 | 2,136 | 160 |
| Sep-14 | 6 African Countries | Airtel | Eaton | 880 | 3,500 | 250 |
| Jul-14 | Unknown | Airtel | Helios | 420 | 3,100 | 130 |
| Jan-10 | Ghana | Tigo Ghana | Helios | 660 | 10,135 | 70 |
| Sep-14 | Nigeria | MTN | IHS | 1,580 | 9,151 | 170 |
| Oct-12 | Cote d'Ivoire | MTN Cote d'Ivoire | IHS | 120 | 931 | 130 |
| Oct-12 | Cameroon | MTN Cameroon | IHS | 130 | 872 | 140 |
| Dec-11 | Uganda | MTN Uganda | American Tower | 150 | 1,000 | 150 |
| Dec-10 | Nigeria | Starcomms | Swap | 70 | 407 | 180 |
| Dec-10 | Tanzania | Tigo Tanzania | Helios | 70 | 1,020 | 70 |
| Dec-10 | Ghana | MTN Ghana | American Tower | 380 | 1,876 | 200 |

5.3.3 The independent provision of towers is dominated by four companies (IHS Africa, American Tower, Helios Towers Africa and Eaton Towers), who operate 86% of the towers owned by Tower Cos.

**Figure 6: Size of TowerCos in independent tower sector in Africa**

*Source: TowerXchange.*

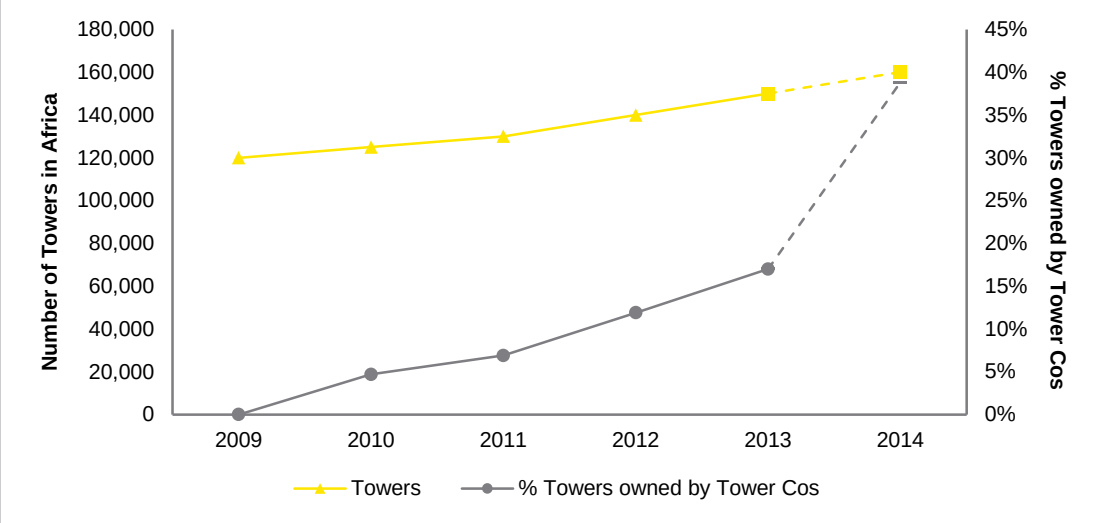


5.3.4 Africa's independent tower sector has seen remarkable growth, doubling in two quarters, following Airtel's sale of towers in 16 of their 17 African countries (including sales of 4,800 towers to American Tower, 3,500 to Eaton, 3,100 to Helios Towers Africa and 1,113 to IHS so far). Further Airtel sales are reported to be likely in 2015.

5.3.5 As a result of these transactions Africa has seen the size of its independent tower sector increase rapidly, with TowerCos owning close to 30% of the tower market in Africa, and with a significant number of transactions still in the process of going through (for instance the sale of around 3,500 towers currently owned by MobiNil in Egypt).

**Figure 7: Size of TowerCo Sector in Africa**

*Source: TowerXchange.*




## 5.4 Future growth of tower sector in Europe

5.4.1 The difference in co-locations rates between US and Europe – and the variation in ratios between European states – suggests there is significant potential for greater sharing of passive infrastructure in Europe.

5.4.2 Moreover with data volumes expected to increase, partly due to the rollout of LTE, significant investment will be needed in tower infrastructure to improve data coverage, and reduce the number and size of so-called 'not-spots' – areas with poor signal issues. The size of investment needed for LTE may also prompt some MNOs to sell tower assets as a means of raising the capital needed for investment in other areas of the business.

5.4.3 The US and international experience has shown that the TowerCo model is able to make more efficient use of passive infrastructure and so there should be commercial incentive for MNOs in Europe. Moreover the outsourcing of towers to TowerCos can help MNOs to release a significant amount of capital: An additional €27 billion of capital could be released If Europe outsourced to the same level as the US.

5.4.4 Reports of tower sales currently underway or being considered in Europe are evidence that outsourcing is likely to play a significant role in enabling greater network sharing.

5.4.5 However it should be recognised that outsourcing is not the only means by which MNOs can seek to increase the utilisation of their tower networks, and that MNOs may also look to other models of network sharing – such as cooperation, joint ventures or market consolidation.

5.4.6 The rollout of LTE means that MNOs will increasingly face pressure to find solutions to improve RAN sharing – for instance by setting up joint vehicles to manage the active network. MNOs may similarly seek to limit the need for new passive infrastructure by cooperating with other MNOs.

5.4.7 If the market were to undergo consolidation, MNOs would be able to achieve an increase in the utilisation of their towers without increasing the degree of co-location – which might decrease their incentive to outsource infrastructure. There is some indication that further consolidation is likely, for instance with Hutchison Whampoa Ltd announcing its intention to buy O2, Telefonica's British MNO, and merge it with Three UK, the smallest UK MNO, which it already owns. A significant factor in the degree of outsourcing to TowerCos may therefore be the positions taken by national regulators and the European Commission on whether to approve merger decisions that will lead to market consolidation.

Section 6

# Conclusions

# 6 Conclusions

## 6.1 Role of TowerCos in promoting shared infrastructure

6.1.1 The exponential growth in mobile data use over recent years – driven by the rollout of technologies enabling faster download speeds – has made it imperative for the industry to make the most effective use possible of its infrastructure.

6.1.2 Greater infrastructure sharing can reduce costs by reducing the capital investment needed in the industry – as shared infrastructure avoids the need to identify as many new sites and construct the physical assets. In doing so, it can also accelerate the advance towards a digital Europe and lower costs for Network Operators of expanding and upgrading networks in urban and suburban areas as well as improving coverage of remote or sparsely-populated areas that are currently poorly served. Access to high-speed broadband plays an important role in promoting economic growth and forms a key plank of the European Commission's 2020 Digital Agenda for Europe.

6.1.3 MNO outsourcing passive infrastructure to TowerCos has a large and positive role to play in increasing the effective utilisation of towers: TowerCos have a proven track-record in sharing towers with multiple network operators and driving up the co-location ratios for towers. TowerCos are also able to achieve cost-efficiencies in the operating expenditure of towers and to attain a lower cost of capital to the MNOs.

6.1.4 The outsourcing to TowerCos has become the predominant model in the US and Africa (as well as in India, South America and much of Asia), and has a proven track record in lowering costs through attracting additional network users, reducing capital costs and achieving operating efficiencies. The role of independent wholesale providers is also typical of other areas of the telecoms sector, such as in the provision of access to fibre and copper networks, data centres and satellite.

6.1.5 In Europe, there remains significant potential for the TowerCo sector to take on additional assets and bring down the costs of infrastructure sharing by increasing co-location ratios. If Europe were to match the US level of outsourcing to TowerCos this could offer an economic benefit for Europe of €23 billion over ten years. These benefits will result in lower costs for Network Operators and improved quality for mobile services.

6.1.6 Outsourcing to TowerCos is not the only model by which the telecoms industry can improve infrastructure sharing. MNOs can cooperate and either make pooling agreements or establish joint vehicles to pool their networks. Alternatively the market can avoid network duplication by consolidating – with MNOs acquiring or merging with other MNOs.

6.1.7 However TowerCos have a particular advantage over other forms of infrastructure sharing by promoting competition in the mobile services industry: The use of TowerCos helps to reduce barriers to entry by providing open access to infrastructure. This is a significant benefit as MNOs compete at a retail level on many factors, including the quality of service, and so may have a perverse incentive to prevent their competitors from making use of their network infrastructure. Greater outsourcing to TowerCos can also achieve some of the savings of market consolidation without the resultant loss in competition.

6.1.8 The expansion of the TowerCo sector can therefore play a valuable role in promoting more effective infrastructure use – enabling lower costs, increased coverage for remote areas, and increased retail competition for mobile services.

Section 7

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# 7 EY authors and contributors

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