

RESEARCH STRATEGY REPORT

SMALL CELLS: TO REALISE THE BENEFITS OF 5G, THE MOBILE VALUE CHAIN MUST ALTER ITS APPROACH TO DENSIFICATION

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About this report

This report analyses the role that small cells will play in operators' programmes to densify their networks during the migration to 5G. We argue that unless mobile network operators (MNOs) and regulators radically alter the way they treat small cells, the potential of a dense network with strong services at the edge will be wasted.

Operators, regulators, planning authorities, towercos and vendors must stop treating small cells as miniature macrocells, and instead adopt some of the processes of the public Wi-Fi industry, such as open interfaces, neutral host and simplified equipment, to achieve cost-effective densification.

If they do not adopt these processes, much of the potential of densification and multi-access edge computing (MEC) will be lost. This will affect MNOs most because challengers such as cablecos and web providers have other tools to use, including MuLTEfire, enhanced Wi-Fi and, in the US, the new shared 3.5 GHz band. These tools will help MNOs to avoid many of the complexities that are holding back densification.

This report is based on several sources, including:

- a survey of 78 MNOs worldwide about plans, drivers and barriers to densification
- interviews with MNOs, towercos and small-cell vendors
- a survey of 24 public Wi-Fi network deployers or neutral hosts.

KEY QUESTIONS ANSWERED IN THIS REPORT

- How can vendors kick-start densification with simplified equipment, deployment processes and with open APIs?
- What is the importance of densification to mobile network operators' (MNOs') 5G strategies, and what are the risks of failure?
- What challenges do MNOs face from alternative ecosystems such as public Wi-Fi, unlicensed LTE and cable wireless?
- What can regulators and standards bodies do to progress the market?
- How can towercos and other infrastructure owners, including SCaaS, participate in small cells and drive momentum?

WHO SHOULD READ THIS REPORT

- CTOs, CIOs and business development executives in vendors providing small-cell solutions to MNOs or other operators. These include pure-play small-cell providers, network equipment providers (NEPs) and Wi-Fi access-point vendors.
- Decision-makers at towercos, city planning authorities and neutral-host providers.
- CTOs and network strategists in MNOs and public Wi-Fi network providers.

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ABOUT THE AUTHOR AND ANALYSYS MASON

Executive summary

Dense networks of small cells will be an essential element of the case for 4.5G and 5G, but they will not be deployable at scale unless the entire mobile value chain alters its approach.

After several years of effort, the barriers to large-scale densification remain high. Cost, planning and roll-out are unworkable beyond a few cells per square mile.

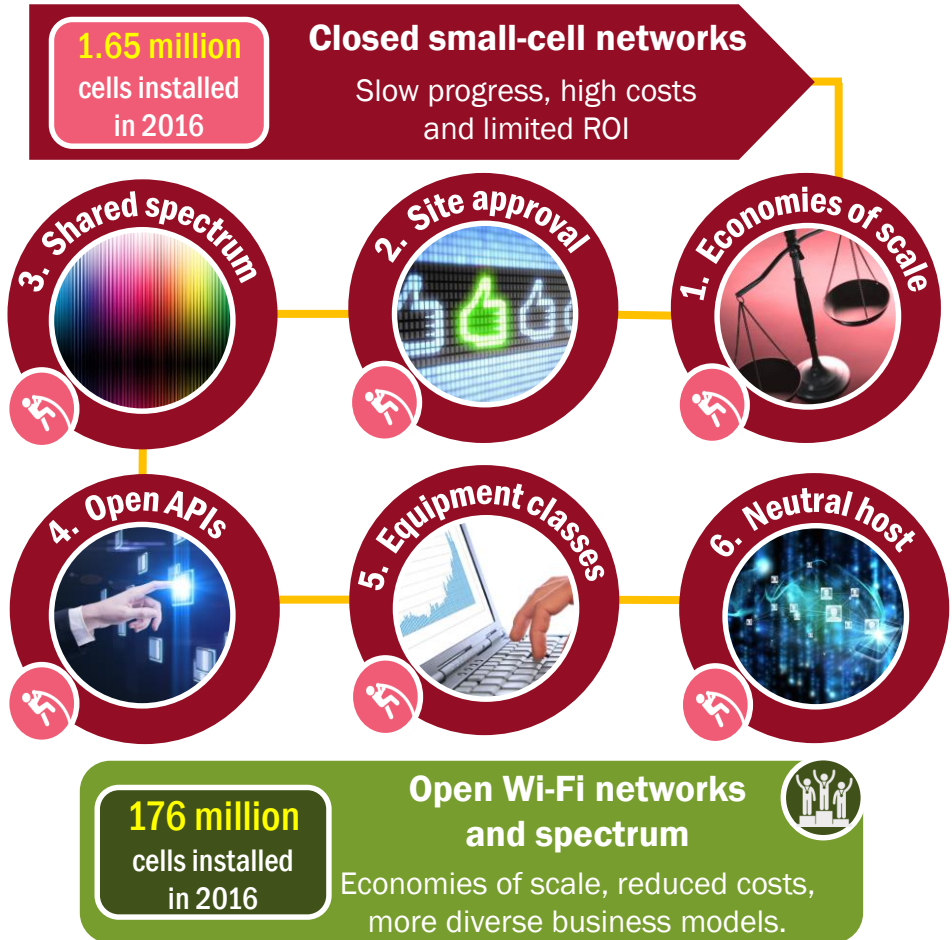
Unless these barriers are lowered, densification will be unachievable for many MNOs. That will limit their ability to increase capacity in a targeted, optimised way, and to enhance user experience through localised technologies such as multi-access edge computing (MEC) and context awareness.

A wide range of stakeholders must work together to create the right environment for small cells, especially outdoors. There are commercial benefits for each stakeholder, but only if they radically alter their approach to small cell deployments.

- MNOs must be more open to new business models such as neutral host,¹ or may risk losing out on small-cell benefits to 'Wi-Fi-first' challengers.
- Vendors must learn from the Wi-Fi industry and deliver a commoditised product that is deployable at scale, deriving value from other areas such as cloud management services.
- Site and tower owners can expand their business if they drive new streamlined processes, contracts and relationships.

¹ One network deployed by a third party and shared by several MNOs.

Figure 1: Obstacles that must be removed in order for small cells to scale and challenge the impact of Wi-Fi



Source: Analysys Mason

Dense networks and MEC are critical elements of the pre-5G business case, but current deployment norms will waste the opportunity

Small cells are essential to MNOs' 4G and 5G strategies, but if vendors make them open and deployable (more like Wi-Fi than macro cells), they will be able to address a far wider market.

Small-cell deployments have increased slowly in the public network. They have been useful for in-fill, but are not strategic, and many of their functions have been fulfilled by public Wi-Fi.

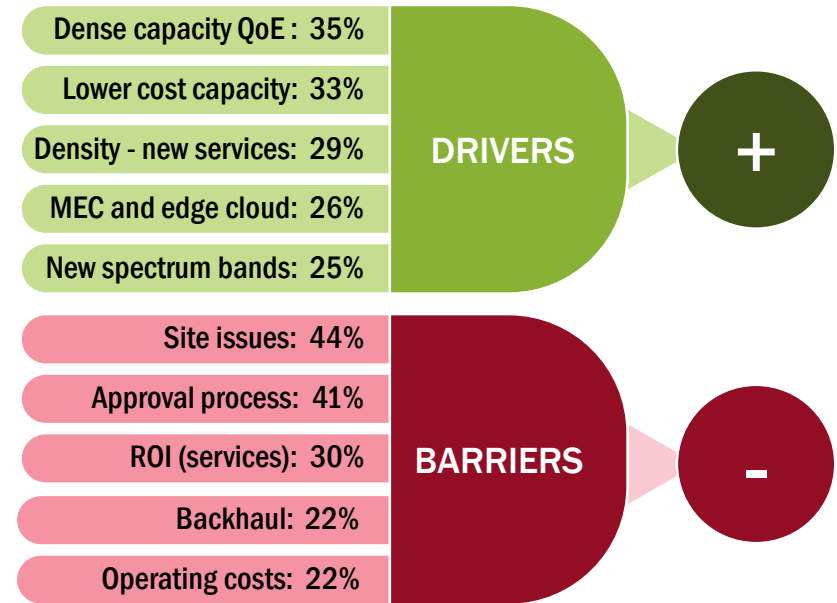
This is changing – cellular small cells are now essential to new networks en route to 5G. According to our survey of 78 operators, MNOs want small cells for three reasons:

- densification to enable higher capacity at lower cost per Mbps
- Unlocking the potential of MEC and context awareness leading to 5G
- harnessing new spectrum sources, especially higher frequencies.

However, small cells cannot deliver these benefits if they are deployed like mini-macrocells. New approaches are essential to improve scale, economics and flexibility. These include neutral host (one network deployed by a third party and shared by several MNOs) and shared spectrum; and streamlined deployment rules.

If vendors support such platforms, they can accelerate MNO deployment and also work with challengers such as cablecos, which can use tools like MuLTEfire to drive new revenue from small cells (for example, in smart city and enterprise services).

Figure 2: Top-five drivers and barriers for MNOs in deploying public-access small cells, including the percentage of survey respondents¹



Source: Analysys Mason

¹ Source: Analysys Mason's survey of 78 MNOs, July 2016. Respondents named their top drivers and barriers in a free response, and of the 10 most cited factors, they ranked their top three in each case.

Vendors, towercos, city planning authorities and regulators must work together to create a new framework for large-scale, small-cell deployment

Neutral host platforms, shared spectrum and streamlined planning are essential; the whole ecosystem needs to engage to create a more Wi-Fi-like environment for cellular players.

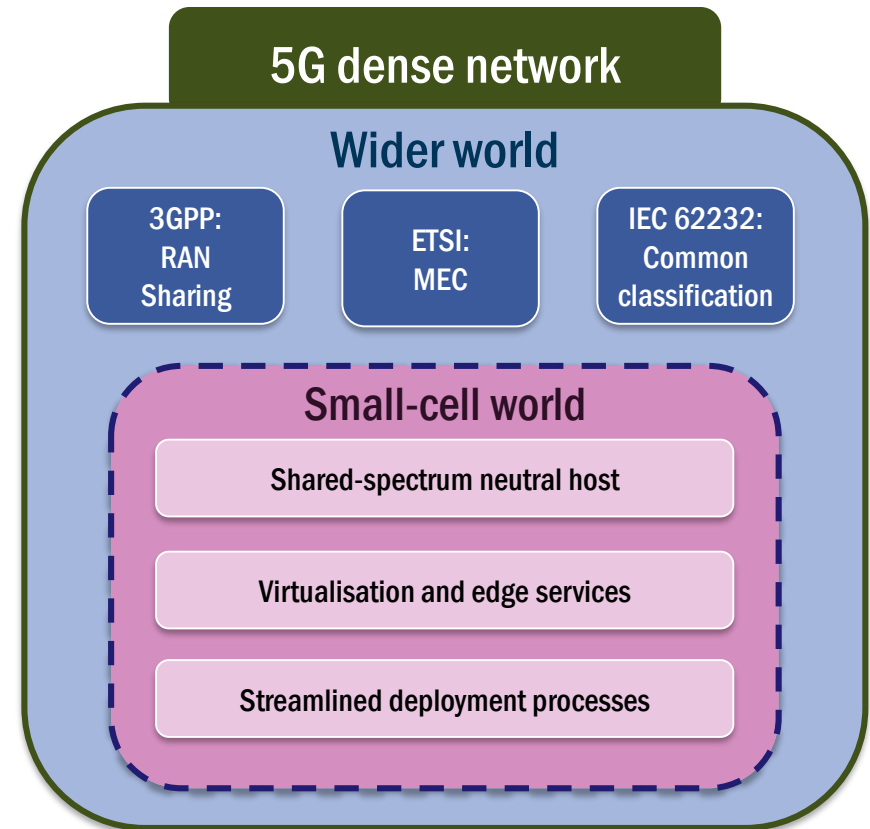
Stakeholders from the traditional cellular community need to adopt new strategies to unlock revenue from small cells.

- **Vendors.** The ‘macro equivalent’ is generally unscalable for vendors. Simple, interoperable, easily deployable cells are key. These products will expand the addressable market for suppliers.
- **Towercos.** There are opportunities to extend into small-cell sites and fibre backhaul (as is the case for Crown Castle), but this will entail significant changes to business models, including different payback cycles and management of active kit.
- **Regulators:** Dense networks with greater QoS than Wi-Fi need lower-cost, flexible spectrum options to scale (such as US- shared CBRS (Citizens’ Broadband Radio Services) band in 3.5 GHz).
- **MNOs:** MNOs still resist loss of control or exclusivity. They must adopt a new attitude to neutral host, spectrum sharing, sharing of cost and risk (for example, with enterprises and cities).

Other operators have emerging tools to harness small cells, even without spectrum (for example, MuLTEfire).¹ Cablecos, web providers and others may drive the platform, and then seize the advantages of new services enabled by density and edge-based services.

¹ A Qualcomm-driven technology for running LTE in 5GHz unlicensed spectrum without the need for an anchor network in MNO-licensed spectrum (as LTE-Unlicensed requires, for instance).

Figure 3: Small-cell industry initiatives must integrate tightly with broader activities



Source: Analysys Mason

Recommendations

1

Equipment vendors must create a cost-effective, interoperable, commoditized hardware platform and derive their value from scale, services and virtualisation/MEC platforms.

The argument for a macro equivalent small cell is over. To achieve hyperdensity, which is essential to 5G services in certain scenarios, the cell must be low cost, easily deployable, commoditised and simple, as is the case with Wi-Fi access points. Some vendors may address this as a scale business, others will use the cells as loss leaders for higher value, density-related activities such as SCaaS, MEC services, integration and self-optimising networks (SONs).

2

If MNOs, and not their challengers, are to benefit from density, as well as MEC and context-aware apps, they must break down their resistance to neutral host and spectrum sharing and focus on the service potential.

Mobile operators are falling into the trap of treating small cells like mini-macrocells. They need to learn from Wi-Fi, and ensure Wi-Fi-first rivals do not gain the competitive advantage in markets that rely on localised network resources, including smart cities, personalised apps, mobile video and autonomous vehicles. That means achieving scale by sharing as much infrastructure as possible, even at the risk of enabling their competitors.

3

Infrastructure owners, such as towercos, fibre owners, landlords, city authorities, must also adopt new processes to enable streamlined site deployment to generate new revenue from densification.

Site issues (for example, identification, negotiation and approval) have been the primary barrier to scaled-up outdoor small-cell deployment since the formation of the industry. Many stakeholders (some of which may not have worked with MNOs before) can lower these barriers by adopting new, open and simplified processes and regulations. In adopting these new approaches, they can generate incremental revenue from their physical assets.

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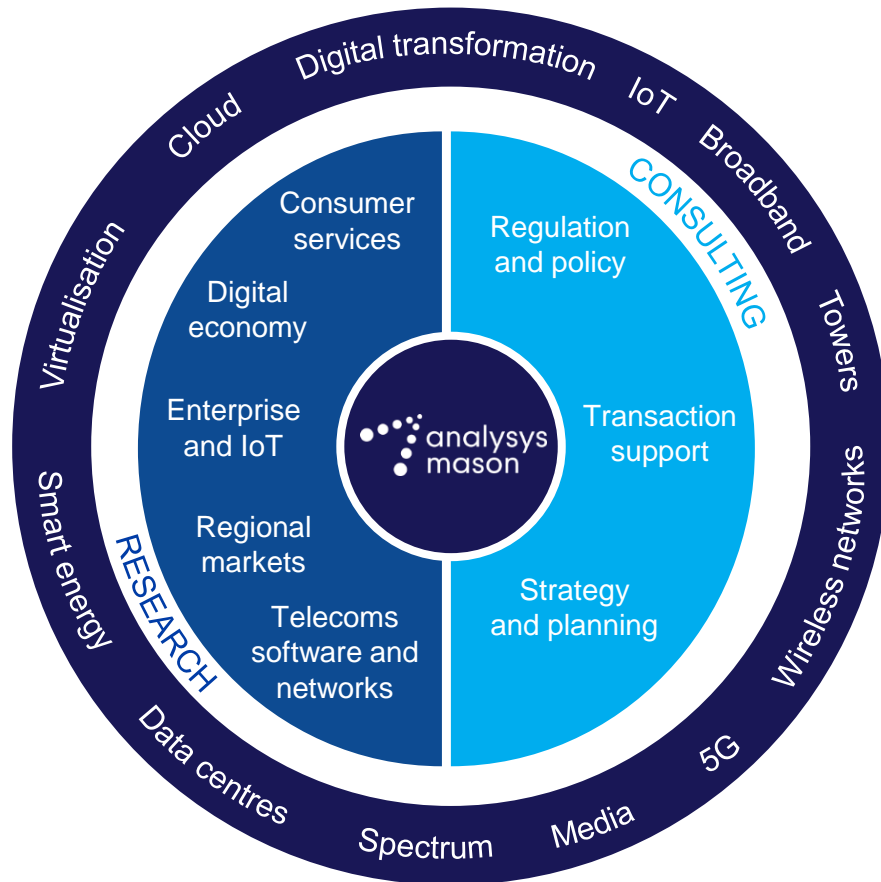
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Caroline Gabriel is a senior contributor to Analysys Mason's *Next-Generation Wireless Networks* research programme. Caroline contributes to Analysys Mason's published and custom research content and works directly with our research clients to advise them on wireless network trends and market developments. She has been engaged in technology analysis, research and consulting for 30 years, and has focused entirely on mobile and wireless since 2002. As co-founder and research director of Rethink Technology Research, Caroline has developed a research base and forecast methodology based around deep contacts with mobile and converged operators worldwide.

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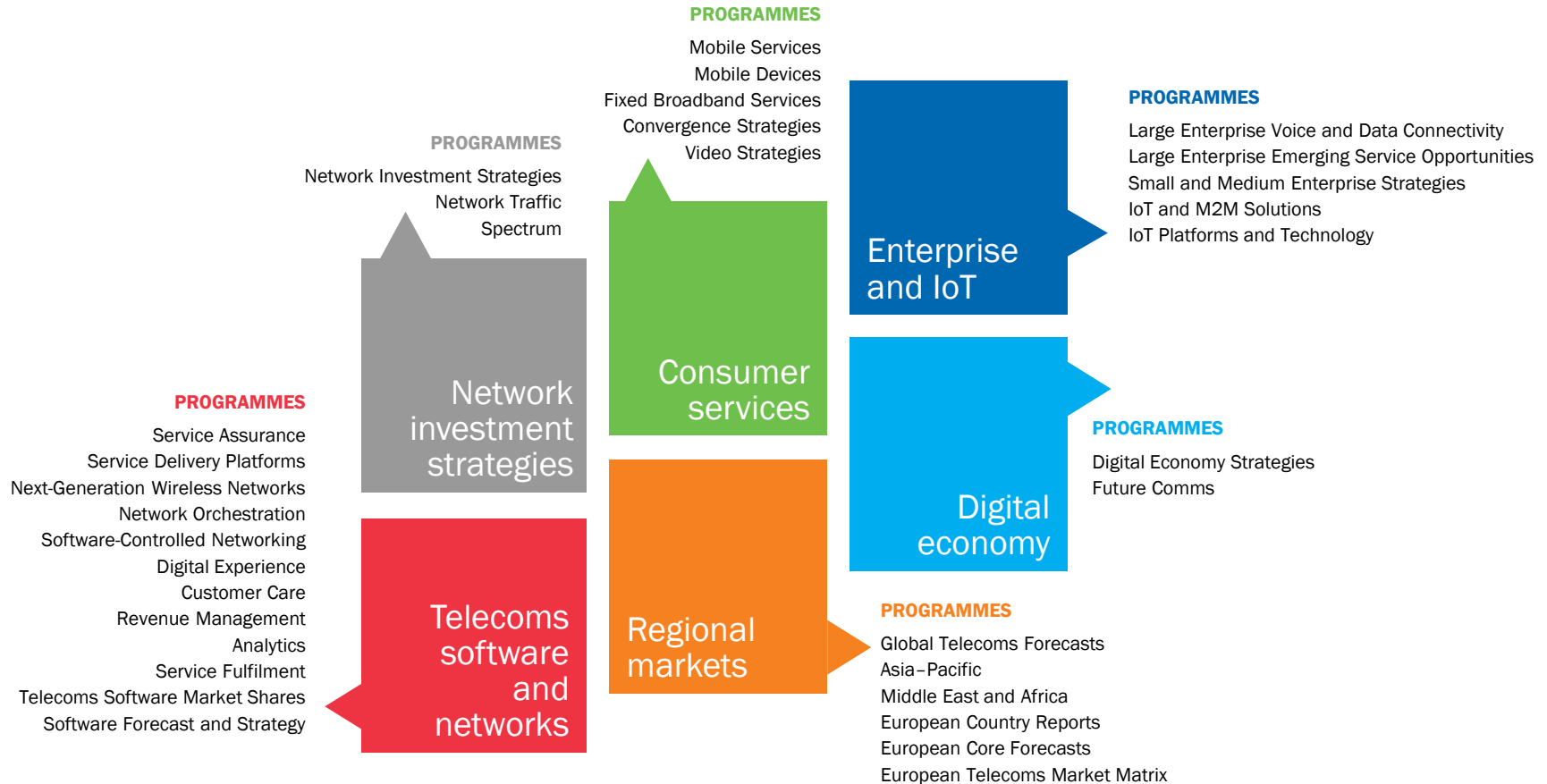
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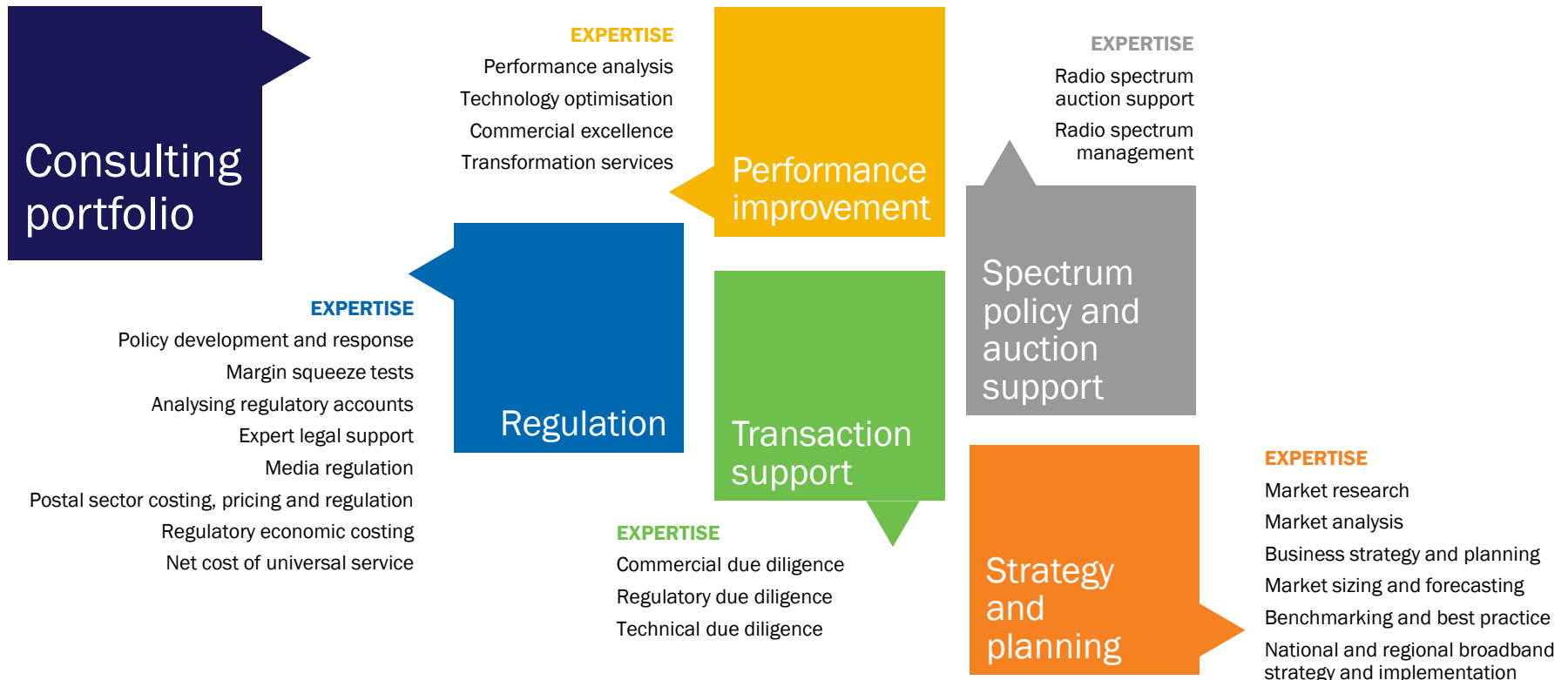
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