

The background features abstract, overlapping green geometric shapes in various shades, including light green, medium green, and dark green, creating a modern and professional aesthetic.

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“A connected future - regulatory and competition aspects”

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The mobile sector: the starting point

- ▶ We start from the observation that the mobile industry has been structurally stable since it began in the 1980/90s:
 - the number of MNOs has gone up - and down - but not by much
 - the same operators have persisted, with name changes and under different ownership
 - the degree of vertical integration has been consistent, give or take a few MVNOs
 - this stability has survived a translation from analogue to digital, 3 or 4 generational changes in technology, and expansion from voice into data

Regulation of mobile has also stabilised

The demand side challenge

- ▶ Communications regulation used to be about - well - regulating communications services (voice, texts, emails, video, social media)
- ▶ Increasing communications are the vector of (and a small part of the cost of) different services, known as ‘verticals’ such as:
 - Mobility (connected cars, shared transport)
 - Health (tracking)
 - Financial transfers

This creates new competition to ‘own the customer’ of the new services; in the connected car vertical, for example, between car manufacturers, mobile companies and tech companies

It also creates new ‘who does what issues?’ in regulation

The supply side challenge

- ▶ At the same time network architecture is changing in two ways:
 - Software defined networking (SDN) transfers the functionality needed in the core network such as switching and handover from hardware to software, enabling variation in services and functionality to be made more readily.
 - Network function virtualisation (NFV) involves implementing the functions of the communications infrastructure in software running on standard computing equipment, following the precedent of data centres, which have gone through a similar transformation. This reduces costs and simplifies the addition of new services.
- ▶ New networks can be adapted, 'sliced' and decentrally controlled by different users. A network can have multiple 'tenants' or MVNOs

How might these affect horizontal and vertical integration?

- ▶ The 4G starting point is vertically integrated control by each MNO of a core network, a RAN, and some content services, facing competition in certain content or electronic communications services from OTTs
- ▶ Changes provoked by 5G may include:
 - *more RAN (and backhaul) sharing or concentration*
 - *more core and RAN network heterogeneity - via wifi, new networks (IoT) or 'slicing'*
 - *untying of RAN and core networks*
 - *expanded verticals - automotive, health - in which the communications element of service cost is diminished*
 - *expansion of MVNOs*
 - *struggles for access to/control of customer among MNOs, verticals and tech companies (already visible in automotive sector)*

Impacts on the radio access network

- ▶ At the start, 5G will focus on enhanced mobile broadband, supplying it at higher speeds and better spectrum and cost efficiency on existing bands.
- ▶ If a step change in capability occurs, this is likely to entail use of the higher bands, which - with shorter range - will entail 'densification'.
- ▶ Asia, where base stations are already denser than Europe and the US, can do this quicker. Elsewhere, the US is relying on competition, the EU on a harmonised '5G action Plan'
- ▶ 'Densification' expands incentives for merger or network sharing
- ▶ RANs, or slices of RANs, providing differentiated services (for IoT, eg) may multiply, and become MVNOs

Regulatory implications

- ▶ Need for tighter regulation of (fewer) RANs
- ▶ Maintenance of pro-competitive spectrum award policies
- ▶ Focus on foreclosure of competition by existing gatekeepers
- ▶ Scrutiny of mergers and acquisitions involving potential competitors in the emerging industry structure
- ▶ The collapse of net neutrality rules