5G Seminar

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"How disruptive is 5G?"

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Background: the spread of digital transformation

- The first sector to be ‘digitised’ is communications
- But eventually, no act of consumption or production , public or private will be untouched....
- Illustrative sectors in the foreground currently are: education, energy, financial services, government administration, health, manufacturing, transport, etc.
- The ‘communications expenditure’ component of many of these services will be small
- Who will invest in, sponsor, and regulate them?

The long term demand side: what happens in digital transformation?

- A lot of things which are hard to predict.
- Among the more predictable effects of the transformation are:
  - new inputs acquire great value, notably data and intangible assets, especially intellectual property
  - new requirements are placed on the labour force (skills, supply & demand).
  - there are major wider social effects illustrated by the impact of social media.
  - new highly profitable players, illustrated at present by digital platforms such as Amazon, Google, Microsoft, Apple, Netflix, Uber etc.

An illustration of conflict: connected cars

- This intermediate step on the way to autonomous vehicles involves vehicles which provide a range of non time-sensitive time-sensitive applications including receiving updates, access to the internet, and a variety of sensors which are able to send and receive signals, sense the physical environment around them and interact with other vehicles and entities
- Automotive, mobile and tech companies fight or ally within this space; some car companies favouring a bespoke short range network, while mobile prefer a a long range cellular network based on 5G; or there may be an inter-operative solution
- This market place is nested in the much larger one of mobility as a service - MaaS

The supply-side: software defined networks

- But the thrust of this development is to strengthen the trend towards the heterogeneity of network provision. A single network can be configured into slices which produce a variety of different services, from low speed high latency to the reverse
- The outcome might be a series of MVNOs – a Netflix network, a smart meter network, a series of automotive network, etc.
- The mobile company might this be reduced to a ‘transport layer’, with no contact with confused end users (which is very profitable)

The implications of densification

- Access to higher spectrum bands will require densification of networks, which enhances the benefits of network sharing
- Asia, where base stations are already denser than Europe and the US, can do this quicker, often in an ‘industrial strategy’-led fashion.
- Elsewhere, the EU relies on a harmonised ‘5G action Plan’ and the US on deregulation and competition. At the same time, note a (quickly abandoned) US proposal for a single nationally co-ordinated 5G network

How will 5G develop? Two versions

- There is likely to be a great degree of spatial and temporal variety in its development
- This can be crystallised in two variants:*

- a limited version, in which 5G is a faster and more efficient version of 4G, specialising in enhanced mobile broadband, and

- an expansive version in which very fast and low latency communications capacity is going to be available everywhere, and employed in 'verticals' not yet much penetrated by connectivity, such as connected cars, advanced manufacturing and e-health

**See W Lemstra, 'Towards the successful deployment of 5G in Europe: What are the necessary policy and regulatory conditions?' Telecommunications Policy 2018.*

Verizon, 01/05/17, believes in version 2

- In a statement, [the company's] chief network operator said it is leading the charge towards 5G: "establishing the infrastructure that will allow businesses, government agencies, educational institutions and consumers to take advantage of this new technology."
- The network chief added 5G "won't be a wireless 'evolution', with better speeds and feeds, but a true revolution changing the way we work, interact, learn and play."
- Key features of the next-generation networks including enhanced fixed and mobile broadband, low-latency services and massive IoT "will thrive on mid-band and millimetre wave spectrum, which is where we are focused for growth."

Financial analysts are more sceptical, questioning the incremental revenue generated by the expansive version outside areas of very dense demand

The time scale question

- Adrian Scase (ETSI) says:

“the initial focus would be on enhanced mobile broadband (probably relying on sub 6GHz spectrum and technology) with the two other key elements of 5G – ultra-reliable low latency and massive machine-type communications, coming along later, perhaps in the mid-2020s

Before the disruption, a strong continuity

- We start from the observation that the mobile industry has been structurally stable since it began in the1990s:

- 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

Disruption issue no. 1: who will own the customer?

- The mobile companies have to date enjoyed substantial retail profitability
- But if they lose the customer, they may be reduced to providing a commoditised ‘transport layer’
- Two communications sector precursors:

- OTTs

- Google fi, a wifi service which rents space from an MNO to provide additional mobile coverage

- Will they/should they be able to hold onto a financial relationship with the customer in (for example) a government-run health vertical?

Disruption issue 2: structural change in mobile

- The 4G starting point is vertically integrated control by each MNO of a core network, a RAN which incorporates some sharing, often some content services, facing competition in certain markets from OTTs
- The changes provoked by 5G including more RAN network heterogeneity - *via* 'slicing' and densification;
- *more RAN (and backhaul) sharing or concentration*
- *additional entry or expansion into backhaul markets from fixed networks, including cable companies*
- *expansion of CDNs and untying of RAN and core networks*
- *verticals in which the communications element of service cost is diminished and is serviced by MVNOs, leading to struggles for access to/control of customer among MNOs, MVNOs/verticals and tech companies (already visible in automotive sector)*

Disruption issue 3: changes in regulation?

- Competition among mobile networks is currently regulated largely by merger control and interventions such as caps in spectrum auctions. Fewer 5G RANs (or components thereof) may need tighter (unilateral or joint SMP-type) regulation , even ‘common carriage’ obligations.
- Pro-competitive spectrum award policies may need rethinking
- There should be a focus on foreclosure of competition by existing mobile gatekeepers, and on their relations with prominent content providers (eg ISPs’ zero-rating policies)
- The overspill of these developments into adjacent markets must be monitored

Corollary: regulators must remember to promote inter-modal competition with 5G!

- What are the alternatives?
- 5G's greatest 'rival' is the extension of wifi-based services (which according to some will shortly carry 70-80% of terminating traffic)
- It has certain advantages:

- it can provide loads of indoor coverage
- it can be aggregated into a national network (Openzone)
- it can be a base service combined with cellular for mobile comms (Google Fi)

- It is also important to ensure that wifi is provided with necessary spectrum

A speculation about regional differentiation of policy and regulation

- A possible outcome:

EU – hobbled by diffuse industrial strategy decision-taking, low income growth and lack of dense networks: incremental capacity to come from 4G, followed by a slow spread of 5G

USA- seeking to use deregulation (of sites, for example) and existing levels of mobile competition to kick-start 5G; but hampered by lack of dense networks

Japan/Korea – a clear industrial strategy and dense networks (in Japan, the densest on the planet), to which further 5G access sites can be added; not short of capacity, but build-out likely