

Wastefulness is smart and efficiency is dumb: the 5G contradiction and lessons from fixed networks

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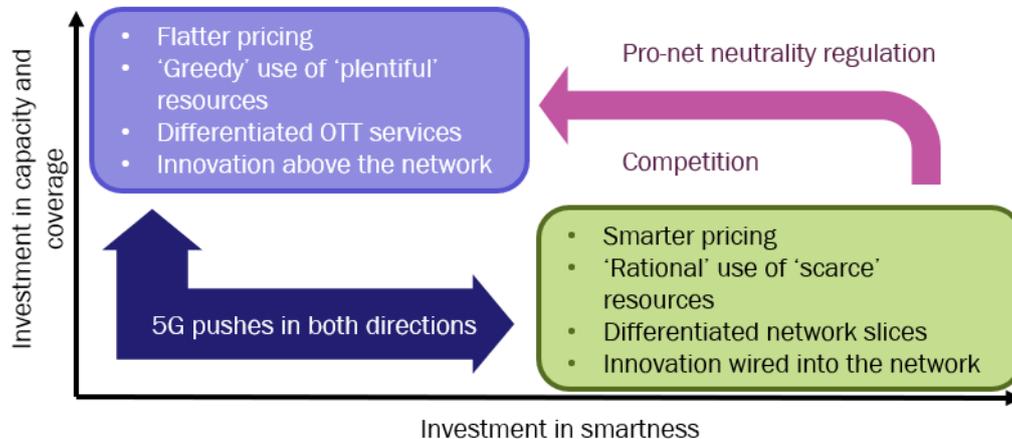
5G sets up the very conditions that undermine its ability to monetise smartness. This contradiction is not unique to 5G. The eternally renewed promise of price discrimination has rarely been fulfilled because telecoms networks are intentionally underutilised and because telecoms markets are not usually allowed to descend into oligopolies.

This comment explores how these trends will be realised as 5G is launched.

Contradictory investment aims in 5G

Everyone should now be familiar with the triangle of 5G use cases as originally proposed by the 3GPP: enhanced mobile broadband (eMBB), massive machine-type communications (mMTC) and ultra-reliable and low-latency communication (URLLC).

Figure 1: The two contradictory investment aims of 5G



Source: Analysys Mason, 2019

Figure 1 provides another way of looking at 5G, in which there are just the following two options:

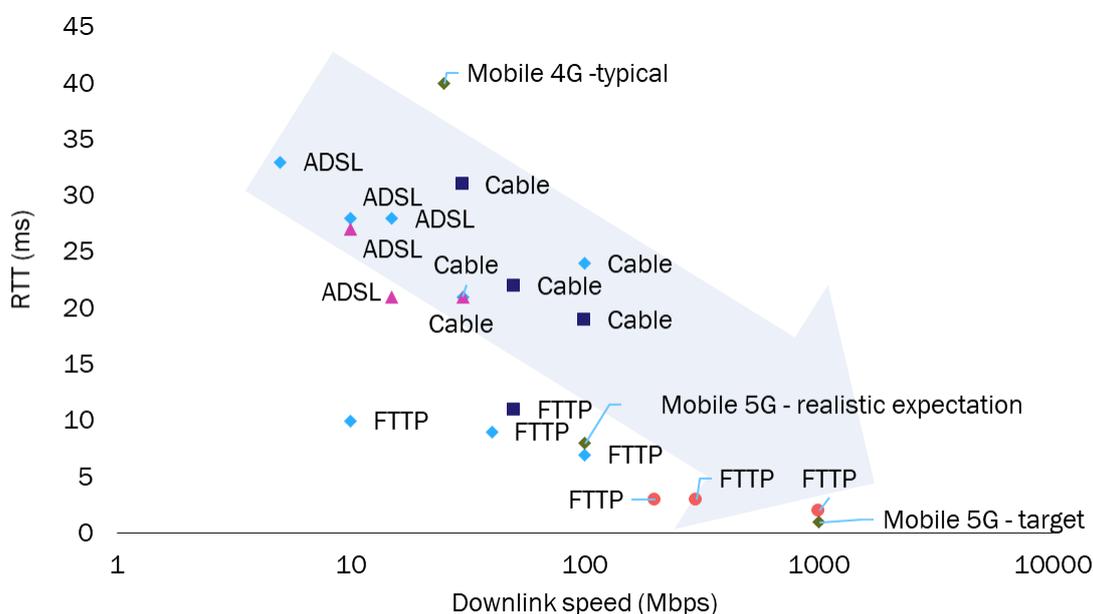
- an investment in huge additional capacity
- an investment in smartness, that is mechanisms that allow mobile network operators (MNOs) to be more efficient or to discriminate between the prices of different use cases.

Bandwidth in modern wireline networks is not a scarce resource, and very few applications other than voice need more than best-efforts. This will also be true for 5G networks. It is useful to remember that, as the 5G era dawns, the average busy-hour usage per mobile subscriber in South Korea is about 35kbps, and that the average 4G macrocell bandwidth utilisation in modern economies such as Germany is less than 10Mbps.

Overprovisioning is a feature of wireline networks, and is often commented on disparagingly as if gigabit connectivity is wasteful or unnecessary for any application. However, the demand for bandwidth has little real connection to the use of real-time services. Customers buy gigabit connections because they enable instantaneous downloads and because they deliver the low latency that some applications require.

Some commentators follow many vendors in asserting that reliability and/or low latency (URLLC) will be the main revenue drivers for 5G new radio (5G NR). Very few wireline subscribers or retail service providers have ever signed up for equivalent services even though they have long been available. Or, to be more accurate, they have signed up, but only as a result of taking faster basic access speeds. The mobile industry often proceeds as if it exists in a vacuum, ignoring the many, often superior, substitutes for 5G for non-mobility-related use cases. There is nothing particularly new about sub-10ms latency; GPON has been delivering it for years as standard (see Figure 2).

Figure 2: Local server round trip time (RTT) on wireline access, by downlink speed



Source: ARCEP, CRTC, FCC and IMDA, 2014–2016

Price discrimination based on access speed rather than quality of service (QoS) or service level agreements (SLAs) tends itself to break down over time, [as has been seen recently in Italy](#), for example. In a competitive market, operators are incentivised to gain and keep subscribers far more than they are incentivised to maximise ARPL through smart pricing.

Businesses turn to B2B and B2B2X when there is overproduction

Standalone 5G will enable service- and application-based slices of network resources. These are intended to be used not only for managing differentiated downstream retail services but also for B2B and as a service to third parties (B2B2X). One could discriminate – so the argument goes – in the B2B(2X) market, where industrial verticals with different, more stringent, requirements could rent access to heterogeneous sets of differently priced network resources, even if it is difficult to price-discriminate in the consumer market with a broadly homogeneous set of requirements.

There is already a vigorous debate (in Germany, for example) as to whether verticals should prefer the owner-economics of buying local spectrum allocations (in the 3.7–3.8GHz band) for private networks over the tenant-economics of renting virtual slices. Perhaps there are concerns about the effect of unbridled price discrimination in what will probably be a lightly regulated area. Perhaps MNOs are not trusted to deliver networks that are sufficiently robust for verticals' needs.

It could be, though, that this is a false dichotomy insofar as some of the higher-price features that verticals think they need will become standard features, commanding no additional value. In this case, the longed-for insertion of the MNO into the digital services value chain fails. It turns out that some, perhaps most, 'special' use cases can rely on best-efforts networks, that smartness can be applied on top and the current OTT model with no digital service provider (DSP)-to-MNO transaction is preserved.

This brings us to the bigger question of what slicing is really for. Its purpose is certainly not efficiency or capex avoidance. That may be what network engineers say, believing that future core or access networks will become overloaded, but what really drives slicing is the lure of price discrimination.¹ This has always been the operators' dream, and it always fails to deliver on commercial promise.

It is not just the 5G mobile industry that is ignoring the contradiction

5G is front-of-mind right now, but other parts of the industry are not immune to the above-mentioned contradiction either.

Wi-Fi

Wi-Fi 6 has started to appear in devices at the same time as 5G network are being launched. Conceptually, Wi-Fi 6 pushes in the same two directions as 5G: increased peak data rates and capacity (both of which are higher than those for 5G), and at the same time, reduced spectral wastefulness, the ability to connect a greater density of devices and better performance in terms of SLAs and QoS. Moreover, the commercial dream is the same: better monetisation through price discrimination.

Fixed networks

Fixed access network sharing/slicing (FANS) is already being commercialised by some vendors such as Nokia. It is early days, but like future 5G slicing, it is being touted primarily as means to attract diverse service providers with orthogonal requirements. However, FANS pushes against historical trends. Historically, wholesale customers have tended (over time and with scale) to migrate to simpler, lower-layer access solutions because this allows them greater flexibility and lower TCO. Even where the wholesale customer is looking to the FTTP network to deliver something as demanding as mobile x-haul, it is likely that it will prefer the owner-economics flexibility of dark fibre to a managed, and in this case software-defined, service where flexibility is an operating expense.

In favour of wastefulness

It is therefore perhaps better for MNOs to embrace 5G as a high-capacity dumb pipe, and to use it for low-yield but bandwidth-hungry services such as fixed–wireless access. 5G makes mobile a more effective fixed

¹ For a deeper dive, see Andrew Odlyzko (University of Minnesota, 2013), Will smart pricing finally take off? Available at <http://www.dtc.umn.edu/~odlyzko/doc/smart.pricing.pdf>.

broadband substitute, so there are real organic revenue growth opportunities for mobile services. This is neither smart nor 'efficient', but rather wasteful in a positive way, and likely to end [in less commercial disappointment than trying, once again, to make smart monetisation work](#).