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Session 4: The 5G Funding Conundrum – Towards fair and sustainable investment models

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Since the first launches in 2018, 5G has been widely adopted in advanced markets where it becomes mainstream while its adoption is increasing in less advanced markets. The telecoms industry is under pressure and continues to make large investments to deliver high quality 5G connectivity (the 5G capex to revenue ratio remains at a relatively high level). At the same time even if telecom operators are more focused on 5G monetisation, early 6G research has started.

The last two years we have seen a lot of discussion around the investment challenges on telecommunication networks infrastructure in Europe in relation to the Digital Decade Policy Programme connectivity targets of 2030 which call for 1 Gbps fixed connections for all users in Europe and 100% coverage of all populated areas with wireless technology 5G or equivalent. It must be emphasized that 5G contributes both to the mobile and fixed connectivity targets given the fact that these targets are technology neutral and 5G fixed wireless access can address the fixed connectivity objective (in a cost-efficient way in less densely populated areas).

According to the European Commission State of the Digital Decade report published in October 2023, 5G population coverage is 81% (51% in rural areas) but mostly using 4G and lower band spectrum. 5G coverage with C-band that allows for more advanced applications is only 41% (and only 10% in rural areas).

In other regions of the world (data from the EC 5G Observatory of October 2023),

- In US 96% of the population is already covered by 5G.
- South Korea has the highest number of 5G base stations per 100,000 inhabitants: around five times more than the EU and nearly 14 times more than the US with China having the second most 5G base stations per 100,000 inhabitants.
- The United States has awarded the largest amount of high-band spectrum in the mmWave range (28 GHz), with a total of 4950 MHz assigned to operators. South Korea meanwhile has assigned 2400 MHz of mmWave spectrum to operators. The average spectrum assignment in the EU27 is 365 MHz out of 3250 MHz of harmonised spectrum in the 26 GHz frequency band.
- On the 5G demand side, again South Korea is the world leader with the highest number of indicative 5G subscribers per 100,000 inhabitants (54K) with China being second with 48K indicative 5G subscribers per 100,000 inhabitants. In Europe, the number of indicative 5G subscribers per 100,000 inhabitants is about 32K.

Given this status, Europe needs to get improved in several aspects as regards 5G networks.

- We need to take advantage of the real potential of 5G technology through the deployment of more C-band base stations and improve 5G coverage as regards end-users' expectations and industry needs.
- We need to accelerate the deployment of 5G stand-alone networks that allow higher throughput, lower latency and improved coverage and enable data- and bandwidth-intensive services (video streaming, AR/VR, immersive media).
- We need to shift to mmWave enabled Microcells/Picocells (supporting smaller number of users) architecture that will be deployed densely within residential areas and will enable operating very low power RANs (thus avoiding saturation of cells servicing many users that leads to degraded performance and poor user experience).
- We need to improve coverage of rural areas with 5G to address digital divide.
- We need to address indoor 5G coverage - 80% of mobile data is exchanged indoors –as higher frequencies have difficulty in penetrating buildings and also require the installation of many indoor cells.

The deployment of high quality telecom networks infrastructure is capital intensive. Several studies estimate the investment needs for 5G deployment in Europe. WIK in its report in 2023 (for the European Commission) concludes that investments of around 33.5 billion euros are still required for European citizens and businesses to benefit from the full capabilities of 5G (to install additional base stations and small cells which can support the deployment of mobile services through mid-band and millimetre wave frequencies in cities along with the associated fibre backhaul). The investment requirements can be reduced through the FTTP and FTT-5G codesign (which would allow sharing fibre costs). These estimates do not include investments required for the full coverage of transport paths (roads, railways). It must be noted that according to the same study the use of 5G Fixed Wireless Access in areas with low population density would allow the reduction of fixed connectivity investment needs.

To address the investments challenges we need policy and regulatory interventions that would create an investment friendly environment and would also allow optimization of development efforts and costs (including administrative overheads).

In this context the possibility to introduce direct remunerations from Content Application Providers (CAPs)/Over The Top (OTTs) service providers has been proposed as one solution to address investment challenges. A similar scheme has been established in South Korea, where an OTT (including a CDN) is a purchaser who pays a fee to a telecommunications service provider (ISP) and purchases a public internet network connection service, because its legal status is a user under the Telecommunications Business Act. This is an access fee and not a termination fee. The dispute arises when the OTT service provider refuses to pay this connectivity fee.

However other policy options can be considered to address investment challenges. Active and passive network sharing, spectrum sharing or leasing (the trend is growing globally following the US example – we see it also in Europe in Germany, France and Italy), co-building/co-sharing, the set up of joint ventures to share risks and costs and selling towers to tower companies (to turn CapEx into OpEx) are some interesting options we see applied today.

When considering policies to address investment challenges for telecom operators two other issues come to the discussion. A) Spectrum assignment and how the capex required affects networks deployment (or the design

of development friendly spectrum auctions) and B) Market structure and the trade-off between creating scale for investments and negatively affecting competition (and the benefits for the consumers).

As a last point I would like to note that additionally, and equally importantly to the 5G infrastructure, we also need to address the demand side (which traditionally attracts less attention). The European Union Strategy defines infrastructures as a means to the goals of promoting citizens digital skills, digital business and digital governance and not as a goal of its own. We also need real 5G applications. We need 5G in transportations, in logistics, in tourism, in industrial applications. We need 'revenues' from 5G in our economies. We need 5G to enable the manufacturing and offering of more competitive products and services. We need the 'economically contributing part' of the technology in our economies and not only the consumption related one. If we wanted a KPI for that, we could say that for every GB subscribers consume watching their favorite TV series on mobile, there must be (at least) one/another GB that produces value, that is eventually integrated in a product or a service. One GB on a 5G corridor, one GB that communicates the history, culture and artistic wealth of a country to its visitors. One GB for 'smart city' lighting and parking management applications that save energy, fuel, working-hours.