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A study on the deployment of high-speed broadband networks in NUTS3 regions within the framework of digital agenda for Europe

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ABSTRACT

This paper investigates the high-speed broadband situation in the EU and its prospects. It uses a deployment model to estimate the investment required to meet the Digital Agenda for Europe (DAE) broadband targets set by the European Commission in its Europe 2020 strategy at different stages: as of 2016, after expected operators' deployment, after public subsidies and leveraged investment, and as expected in 2020. The model uses data at the NUTS3 level, which is the most granular level that has data available on the status of broadband deployment, to arrive at a coherent and comparable framework. From the different perspectives on the investment to meet DAE targets, the paper concludes on the need for an appropriate combination of incumbent and alternative operators investments, public subsidies and leveraged investments, and new investments, both public and private and non-existing as of 2016, examining their feasibility and the impact of different regulatory, technical, and policy strategies.

1. Background

High-speed broadband as a means to access and use the Internet has become a pervasive and fundamental part of daily life. Its general socio-economic impact[1] and specific relevance in areas such as community, education, employment, environment, equality, finance, healthcare, income, multimodal communications, retail, travel, tourism, well-being, and a long list of other activities have been thoroughly researched.[2] Within this framework, the European Commission presented the Digital Agenda for Europe (DAE)[3] in May 2010 with the objective of a better exploitation of the potential of information and communication technologies (ICTs) to foster innovation, economic growth, and progress (European Commission, 2010). DAE includes several topics and actions, but with regard to the development of broadband infrastructures in the EU, it specified two high-speed broadband targets: to enable access to much higher

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[1] See Gruber et al. (2014) for an evaluation of the net economic benefits from the implementation of the broadband infrastructure deployment targets by 2020 as entailed by the Digital Agenda for Europe. See Van Der Wee et al. (2015) for an example of the calculation of indirect benefits. See Mansell (2011) for an assessment of the influence of policy in society vis-a-vis market interests.

[2] See Analysis Mason & Tech4I2 (2013) for a review. The same authors present an estimation of the benefit–cost ratio of 2.7:1 for the amount of broadband investment presented in this paper.

[3] The digital agenda presented by the European Commission forms one of the seven pillars of the Europe 2020 Strategy, which sets objectives for the growth of the EU by 2020.

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Internet speeds (30 Mbps or above) for all Europeans by 2020 (Target 2, T2) and to ensure that 50% or more of European households subscribe to Internet connections above 100 Mbps by 2020 (Target 3, T3).

Starting with a brief analysis of the situation regarding T3, and according to the EC database on the DAE,[4] by mid-2015 wired broadband adoption (subscriptions as a percentage of population) in EU member states reached 31.6%. From this figure, 30% were high-speed broadband connections, that is, above 30 Mbps. Adoption of broadband data rates of 100 Mbps or above, the so-called ultra-fast–broadband, was a mere 3.4% in the EU on average. In regard to technologies, VDSL share was 29% of the total high-speed broadband connections in the EU. Cable accounted for 45%, FTTB technologies accounted for 11%, and FTTH technologies accounted for 14%. Exhibit 1 below shows the evolution of high-speed adoption in the EU from 2013 to 2015, displaying how it falls very far behind expectations,[5] even though there are still five years left to reach T3.

According to the same DAE database and now looking into coverage, at mid-2015 the wired broadband coverage (percentage of population) in EU member states was 97.4%. High-speed broadband coverage[6] was 70.9%. Coverage of broadband data rates of 100 Mbps or above was 47.6% at the end of 2014. With regard to technologies, VDSL coverage was 41.0%, cable DOCSIS coverage accounted for 43.1%, FTTP[7] technologies reached 20.8% coverage, and LTE accounted for 85.9%. Exhibit 2 below shows the evolution of high-speed broadband coverage in the EU from 2013 to 2015, also displaying how there was still a considerable gap to reach T2 as of 2015 (i.e. 100% coverage of NGA).

In addition, an analysis of the EU broadband situation regarding different geotypes shows that the big challenge for high-speed broadband availability in the EU is mostly in the rural areas of the countries: NGA coverage in urban areas was 68.1% of premises but only 25.1% in rural areas in 2014 (IHS & VVA Consulting, 2015). The latest available figures from mid-2015 display a similar pattern: 70.9% NGA urban coverage vs. 27.8% rural.

Therefore, in many EU countries high-speed broadband deployment and adoption proceed at a much slower pace than expected to meet DAE targets. In fact, according to a 2016 report for the European Parliament (Rivera, Villar, & Gomez-Barroso, 2016), the level of broadband investments from 2004 to 2013 has been substantially lower in the EU compared to other developed economies, and the situation worsened in 2014 and 2015. In 2013 investments per capita in countries such as Australia, the US, and Canada were twice that of the EU. According to the same report, and as is obvious from the exhibits above, the demand for ultra-fast broadband services is growing at a much slower pace than the supply. As a result, Internet access speeds in Europe are, for instance, about three times lower than in Korea and Japan.

Within this framework, it is not surprising that research on the conditions for investment in broadband in general and high-speed broadband in particular has attracted a considerable attention from academicians, industry analysts, and policy-makers for more than a decade. Inside this domain, earlier attempts at introducing models for and making calculations on the cost of NGA deployment were mainly aimed at modelling the deployment situation due to the absence of real-life data (see, for instance, the Euroland approach for the EC in Forge et al., (2005) or the NGA calculations also based on the Euroland approach in De-Antonio et al., 2006), which then could be used to assess different scenarios or be adapted to different country settings. In fact, the lack of long-enough data series and granular-enough models at the start of the high-speed broadband deployments deterred reaching definitive conclusions on the best approaches to encourage investments from the analysis of empirical studies (Cambini & Jiang, 2009). At the time it was already pointed out that this type of analysis requires micro-data, ideally at exchange level, in order to estimate the evolution over time of the investments and also that there was no comprehensive model covering both wired and wireless broadband provision.

The next strand of research tried to come out with more precise figures in specific geographies with the objective of evaluating financial perspectives and ultimately identifying potential sources of funding in an institutional setting (see, for example, the OECD or European Investment Bank studies (EIB, 2011; OECD, 2009) or studies for countries such as the United Kingdom (Analysis Mason, 2008)

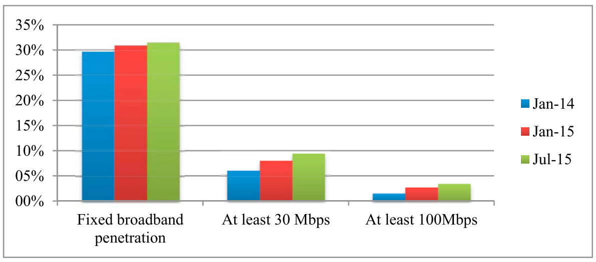

Exhibit 1. Evolution of high-speed broadband adoption in the EU from 2013 to 2015 (subscriptions as percentage of population). Source: DAE database.

[4] https://ec.europa.eu/digital-single-market/en/download-data.

[5] According to Eurostat (see http://ec.europa.eu/eurostat/statistics-explained/index.php/Household_composition_statistics), the average household size was 2.3 members in 2014; therefore, existing ultra-fast broadband penetration would translate to about 7.8% household adoption. Linearly extrapolating past behaviour, the rate of adoption in 2020 would be equivalent to 23.9% household adoption, which is still extraordinarily far from DAE T3.

[6] Also usually termed next-generation access (NGA); see Feijoo (2016) for a detailed definition.

[7] FTTP is either FTTH or FTTB.

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