

ΟΙΚΟΝΟΜΙΚΑ ΤΩΝ ΘΗΛΕΠΙΚΟΙΝΩΝΙΩΝ ΚΑΙ ΤΩΝ ΔΙΚΤΥΩΝ



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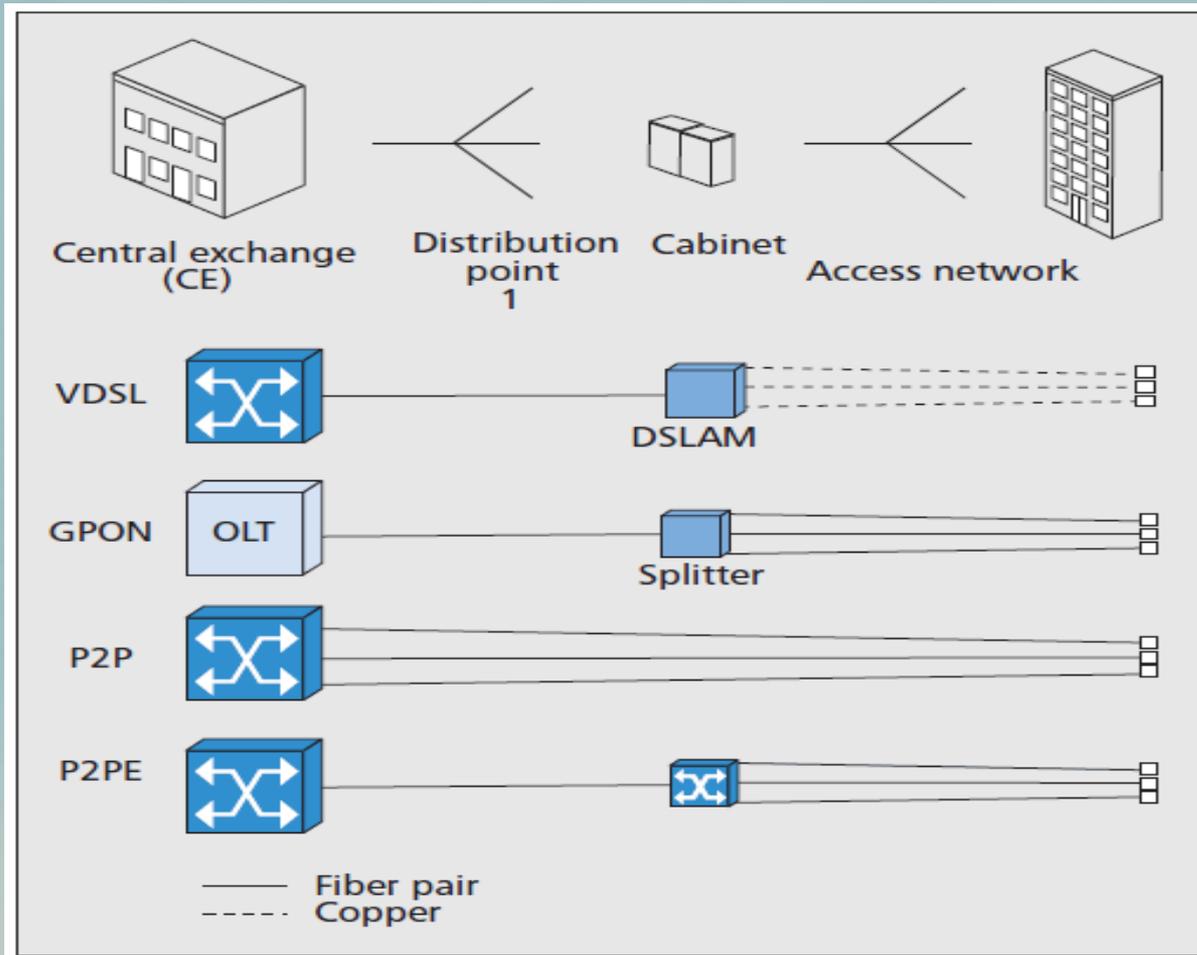
NEXT GENERATION ACCESS NETWORKS

INTRODUCTION

- Definition (EC, 2010)
 - NGA networks means wired access networks which consist wholly or in part of optical elements and which are capable of delivering broadband access services with enhanced characteristics (such as higher throughput) as compared to those provided over already existing copper networks.
- NGA technologies
 - Depending on the part of the copper wire being replaced, there are certain NGA architectures, the most common of which are:
 - Fiber-to-the-Curb (FTTC)
 - Fiber-to-the-Building (FTTB)
 - Fiber-to-the-Home (FTTH)
 - Gigabit Passive Optical Network (GPON)
 - Point-to-Point (P2P)
 - Point-to-Point Ethernet (P2PE)

NGA NETWORKS

TECHNOLOGICAL SOLUTIONS



DIGITAL AGENDA FOR EUROPE 2020

NGA GOALS

- Fast and ultra fast internet access
 - We need very fast Internet for the economy to grow strongly and to create jobs and prosperity, and to ensure citizens can access the content and services they want
- The Europe 2020 Strategy has underlined the importance of broadband deployment to promote social inclusion and competitiveness in the EU
- It restated the objective to bring basic broadband to all Europeans by 2013 and seeks to ensure that, by 2020,
 - i. All Europeans have access to much higher internet speeds of above 30 Mbps and
 - ii. 50% or more of European households subscribe to internet connections above 100 Mbps

DIGITAL AGENDA FOR EUROPE 2030

EUROPEAN GIGABIT SOCIETY

- The ambition for the “Secure and sustainable digital infrastructures” area is that by 2030:
 - All European households are covered by a Gigabit network
 - All populated areas are covered by 5G
- The three main strategic objectives for 2025 are:
 - Access to 1 Gbps for all schools, transport hubs and main providers of public services and digitally intensive enterprises
 - Access to download speeds of at least 100 Mbps to be upgraded to 1 Gbps for all European households
 - Uninterrupted 5G wireless broadband coverage for all urban areas and major roads and railways

DIGITAL AGENDA FOR EUROPE

IMPLICATIONS

- NGA networks are very important for the society and the economy as a whole
- The goals are related with the three-dimensional NGA investment decision
 - When to invest (date goal)
 - Where to invest (coverage goal)
 - Which technology to deploy in each covered area (speed goal)

NGA DEPLOYMENT

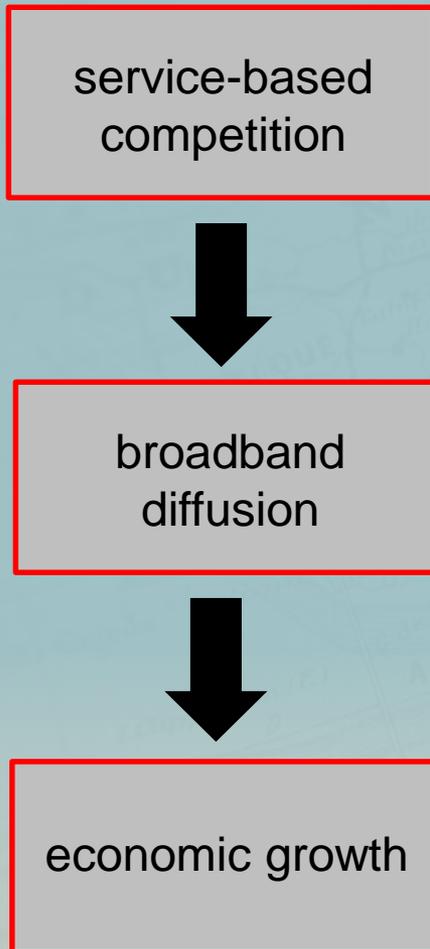
SOCIAL AND ECONOMIC IMPACT

“The EU single market for electronic communications services, and in particular the development of very high-speed broadband services, is key to creating economic growth and achieving the goals of the Europe 2020 strategy”

“The fundamental role of telecommunications and broadband deployment in terms of EU investment, job creation and overall economic recovery was notably highlighted by the Council”

“The cost savings in just four sectors of economy (transport, health, electricity and education) would justify the construction of a national FTTH network”

BROADBAND INTERNET SOCIAL AND ECONOMIC IMPACT



Διάγραμμα 1.87: Εξέλιξη της ευρυζωνικής διείσδυσης σε Ελλάδα και ΕΕ



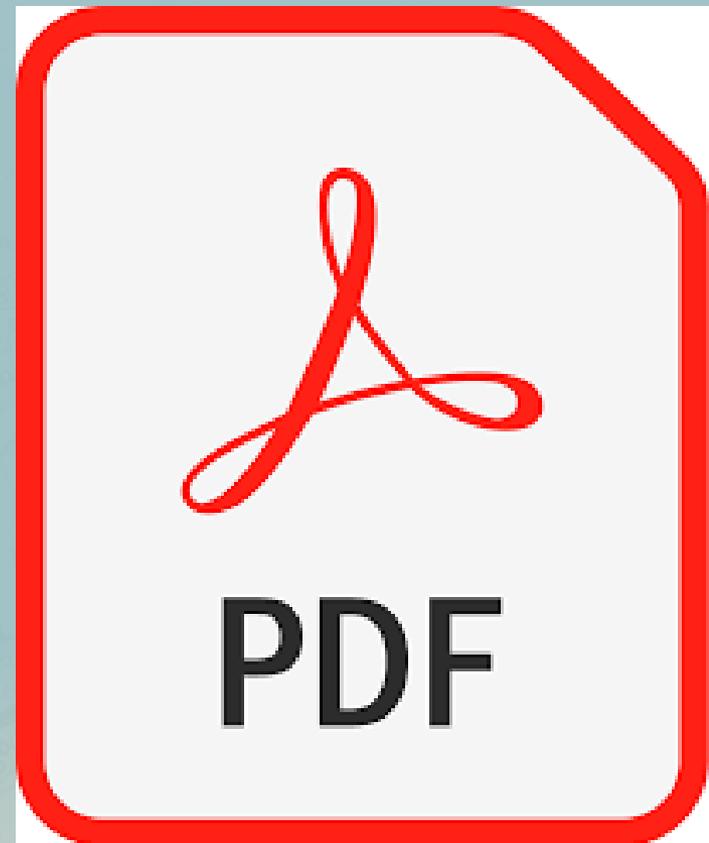
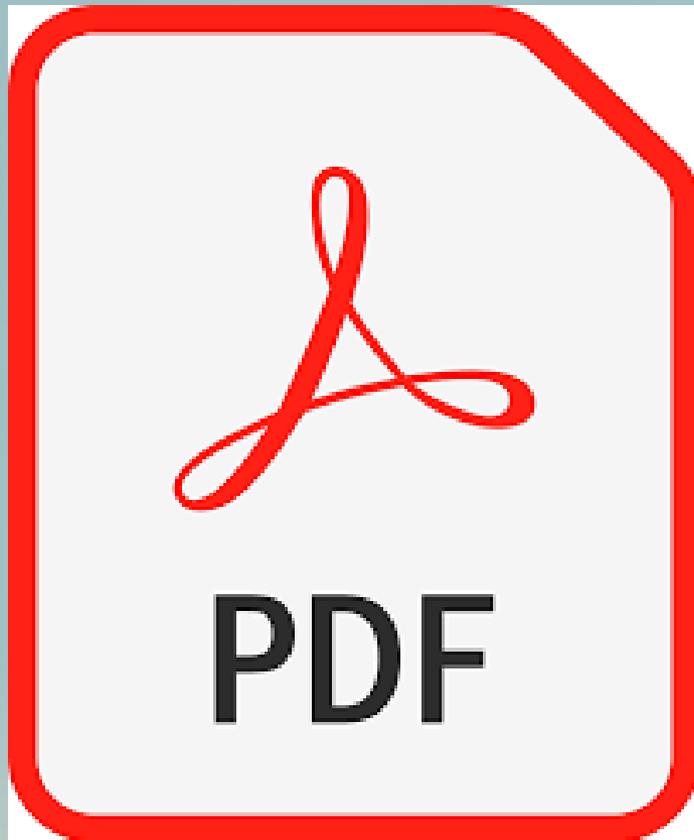
Πηγή: EETT (βάσει στοιχείων του Digital Economy & Society Index)

MAIN QUESTION

Is this relationship multiplied when the broadband speed increases?

NGA NETWORKS

THE CURRENT SITUATION IN EUROPE AND GREECE



DIGITAL AGENDA

FEASIBILITY & FUTURE GOALS

- Based on the actual data, do you believe that the goals of the Digital Agenda for Europe were feasible?
- What about the Commission's strategy on Connectivity for a European Gigabit Society, which was adopted in September 2016?

NGA INVESTMENTS IMPEDIMENTS

- High investment cost
 - 180-260 billions for providing 100Mbps to 50% of EU households
- Demand uncertainty
 - Penetration of the customer base
 - Consumers' willingness to pay for the new fibre-based services
 - Market dynamics and the evolving competitive situation
 - Market shares of the investor and the access seekers
- Regulatory uncertainty
 - It is socially not optimal for the regulator to make *ex ante* commitments for an unreasonably long regulatory period
 - Positive effects of greater certainty on investment incentives VS possible negative effects of erroneous intervention on welfare

NGA DEPLOYMENT

SOCIAL AND ECONOMIC IMPACT

“The social benefits from investment in digital infrastructures by far exceed the private incentive for investment”

“Like many infrastructure investments, NGA networks may create positive spillover effects that are not captured in any individual user’s willingness to pay. This implies a clear public policy case for governments to facilitate the roll out of NGA networks by reducing the risk for the investor ”

NGA REGULATION

COMPETITION AND INVESTMENTS

- Impact of cost-based access prices on investment incentives (theoretical works)
 - Incumbents are adversely affected to upgrade existing facilities or to invest in new ones, whereas the entrants are encouraged to deviate from the socially optimal level of investment and entry (Jorde, Sidak and Teece, 2000)
 - When firms invest under regulatory certainty (i.e. access price is set prior to the investment decisions), cost-based access prices achieve static efficiency, but fail to promote dynamic efficiency (Jorde, Sidak and Teece, 2000)
 - Under regulatory uncertainty, the regulator will set the welfare-maximizing policy (i.e. cost-based access prices) once the NGA network has been in place. Thus, the incumbent underinvests in relation to the socially optimal level (Kotakorpi, 2004)
 - Potential entrants, who can free-ride on the incumbent's network, will wait for the incumbent to invest in access infrastructures and then seek access (Valletti, 2003)

NGA REGULATION

COMPETITION AND INVESTMENTS

- Impact of cost-based access prices on investment incentives (empirical works)
 - ✓ Significant negative effect (Grajek and Röller, 2012)
 - ✓ Reduces the incumbent's incentives to invest unless a certain degree of rivalry has already emerged in the markets (Garrone and Zaccagnino, 2013)
 - ✓ It is uncertain whether competition spurred by mandatory unbundling encourages investments in new infrastructures by the incumbents (Jung, Gayle and Lehman, 2008)
 - ✓ However, the impact of such unbundling policy on the entrants' incentives to invest in alternative access infrastructures in order to be facilities-based competitors is unambiguously negative (Jung, Gayle and Lehman, 2008)
 - ✓ Entrants would more than double their infrastructure over 5 years if they had no regulated access to the incumbents' local loops (Friederiszick, Grajek and Röller, 2008)

NGA REGULATION

COMPETITION AND INVESTMENTS

- Cost-based access prices
 - Boost efficient entry and promotes service-based competition within one network
 - Discourage incumbents and, especially, entrants to invest in new facilities
 - Results in a substantial deviation from the socially desirable outcomes in terms of network deployment and timing of investments
 - Imply significant losses in dynamic efficiency
 - Cannot serve as a stepping stone from service-based to facilities-based competition

NGA REGULATION POLICY CHALLENGES

- The most challenging task for academics, governments and policy makers is to design a regulatory policy that encourages investments in NGA networks and promotes sustainable competition
- In other words, the current regulatory policy focuses on establishing sustainable service-based competition over NGA networks, thus improving both static and dynamic efficiency
- This implies that regulators aim at facilitating the migration from service-based competition over copper access networks to service-based competition over NGA networks

ALTERNATIVE REGULATORY APPROACHES COMPETITION AND INVESTMENTS

- Deviation from cost-based access prices
- Deviation from the permanent regulation of access
- Deviation from usage access prices

EC RECOMMENDATION 2013

COMPETITION AND INVESTMENTS

- NRAs should adopt a bottom-up long-run incremental costs-plus (BU LRIC +) costing methodology
 - Includes a mark-up for the recovery of common costs
- Estimates the current cost that a hypothetical efficient operator would incur to build a modern efficient network
 - Capable of delivering the Digital Agenda for Europe targets set out in terms of bandwidth, coverage and take-up
- NRAs should ensure stability without significant fluctuations when setting cost-oriented access prices
- NRAs can decide not to impose or maintain regulated wholesale access prices when certain criteria are met
- NRAs can geographic access price discriminate

ALTERNATIVE APPROACHES DEVIATION FROM COST-BASED RULE

- Inclusion of mark-up as in EC Recommendation (2013)
- Investment-contingent access prices
 - Such prices are dependent on the level of the investment, and hence, higher NGA deployment results in higher access prices
 - The investor is compensated for the higher uncertainty of an NGA deployment in more rural areas and/or a fibre deployment closer to the consumers' premises
 - Under regulatory certainty, an access fee that is contingent on firms' (non-overlapping) investments can implement the socially efficient investment level
 - This outcome holds either if the access charge depends on the investments of both the incumbent and the entrant (Henriques, 2011) or on each operator's own investment level (Sauer, 2011)

ALTERNATIVE APPROACHES DEVIATION FROM COST-BASED RULE

- Regulatory uncertainty
 - The regulator has significant incentives to deviate from an investment-contingent access price (once the investments are in place) by setting the access price at the marginal cost of providing the access in order to maximize social welfare
 - This means that firms invest prior to the regulation of the access
- No certainty, no uncertainty
 - NRAs are encouraged (in order to provide greater certainty) to clarify to the greatest extent possible (i.e. not to fully commit) how foreseeable changes in market circumstances might affect remedies
 - It is uncertain whether the regulator will set an investment-contingent or a welfare-maximizing access price after the NGA deployment

ALTERNATIVE APPROACHES DEVIATION FROM PERMANENT REGULATION

- Permanent regulation
 - The ex ante imposed remedies hold for the whole lifecycle of the NGA investment
- Regulatory forbearance
 - There is no ex ante regulation on NGA networks
- Regulatory holidays
 - The investor is not imposed to any regulatory constraints for a pre-determined period of time
- Sunset clauses
 - The regulator commits that access obligations will be withdrawn after a pre-determined date

ALTERNATIVE APPROACHES DEVIATION FROM USAGE ACCES PRICES

- Two-part tariffs
 - Access prices (as well as retail prices) can consist of one-off fees and periodic fees (e.g. monthly rentals)
 - By giving the investor the choice to recoup fixed costs via a one-off fee, the investor can affect his own investment risk and the entry risk resting on the buyers of unbundled fibre access
 - The early recoupment of parts of the investment leads to a lower capital requirement over time, a decrease in the investment risk and an increase in the investor's willingness to invest
 - If relatively many costs are charged as one-off tariffs, this raises the barrier for purchasing services, because a buyer is confronted with higher start-up costs
 - May not solve the dynamic consistency problem even when the regulator can commit *ex ante* to a particular access pricing policy

NGA INVESTMENTS

STATE INITIATIVES

“The existence of network effects and the often small incentives for broadband providers to supply rural areas due to high costs and low revenues suggest that public initiatives and financial aid should be considered as instruments to achieve increased broadband development, particularly in countries with a large share of the population living outside of urban area”

Examples from the Greek telecom market

Rural Broadband

Ultra Fast Broadband

Superfast Broadband

Q & A



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