

Arab regional Forum on
"Future Networks: Regulatory and Policy Aspects
in Converged Networks"
(Rabat, Morocco, 19-20 May 2015)

**Networks and applications: a
virtuous circle across the value chain?**

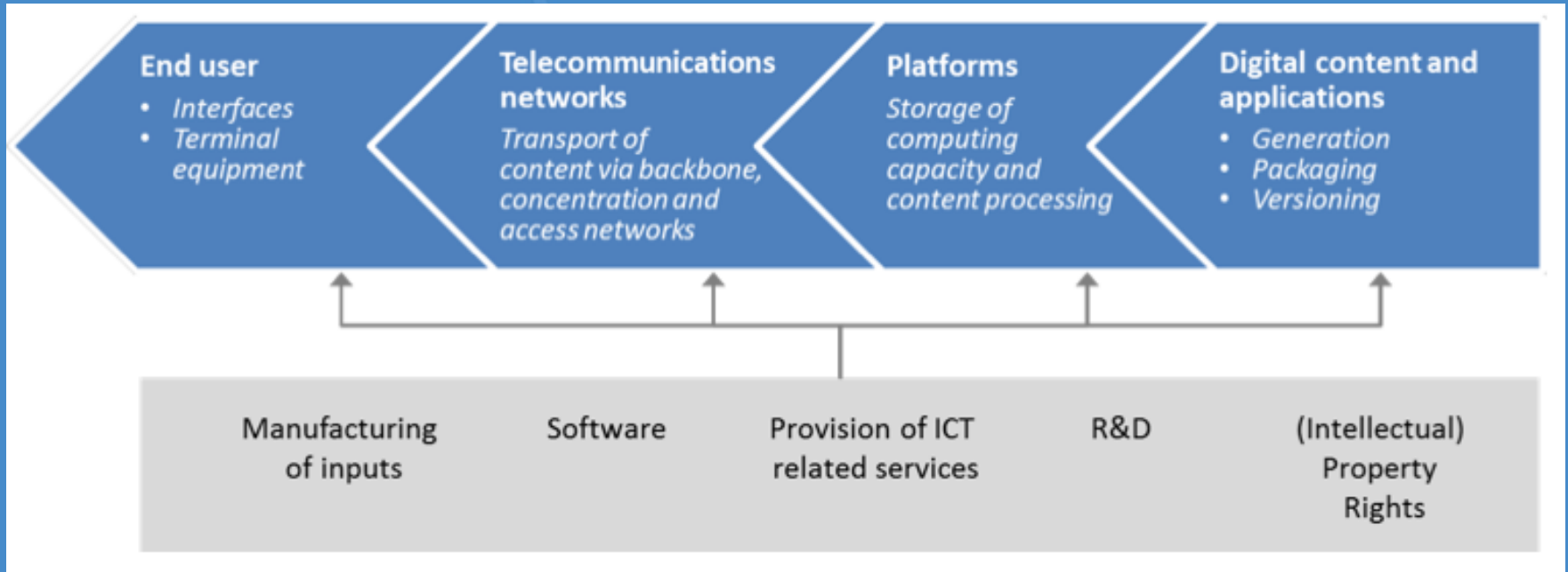
Inês Nolasco
ITU Expert & Senior Regulatory Affairs Manager at ECTA

**The views expressed in this presentation are purely personal*

Outline

- The digital value chain
- Internet traffic growth versus cost reductions
- The challenge of NGA deployment– who bears the cost?
- The digital value chain – do Content and Application Providers (CAPs) invest in infrastructure?
- Light touch regulation on network operators?
- Concluding remarks

The Digital Value Chain

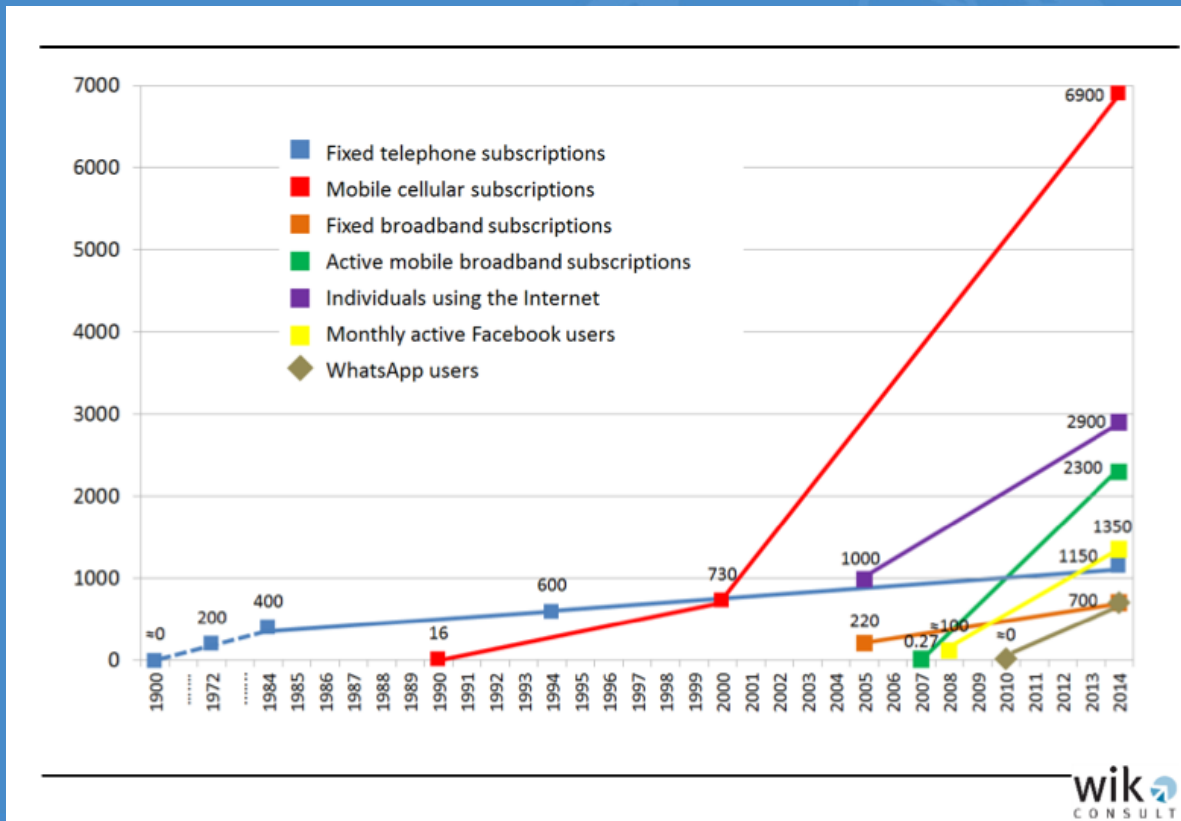


Source: WIK-Consult, *Applications and networks: the chicken or the egg*, 2015

Decoupling of “network” and “service provision”. New digital value chain incorporates many new players. Infrastructure operator is no longer the exclusive provider of services. One broadband connection over which users can access a myriad of services from content and applications providers.

Elements with different characteristics and business models

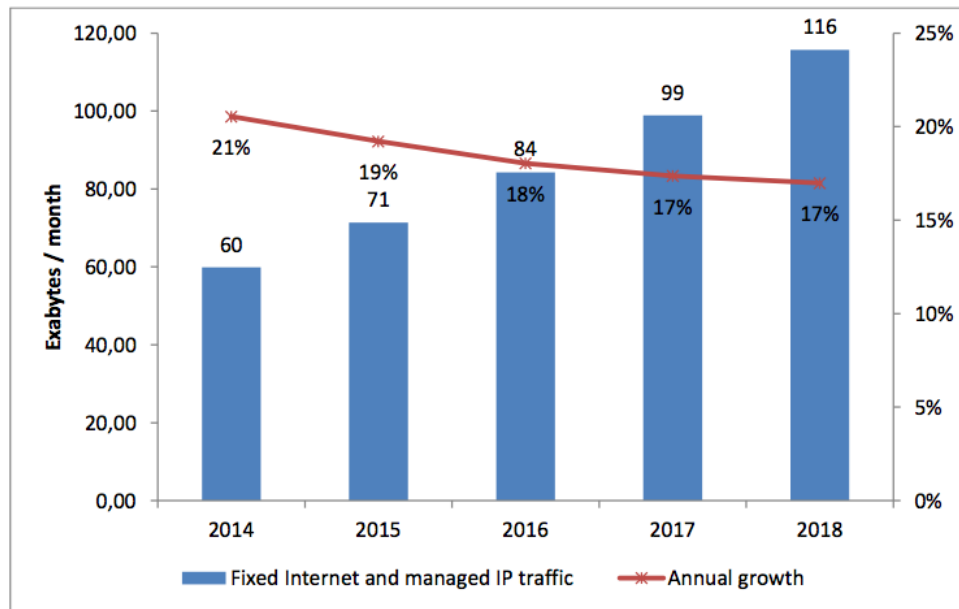
Worldwide diffusion patterns of different telecommunications and Internet based services



- Fast take-up of fixed/mobile broadband
- Fast pace of renewal of applications versus slow pace of replacement of physical network assets

Growth of fixed internet and managed IP traffic

Figure 10: Cisco VNI forecast of global fixed Internet and managed IP traffic in Exabytes per month and associated growth rates (2014-2018)



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Source: Cisco VNI online database (2014), ⁴⁵ WIK calculations

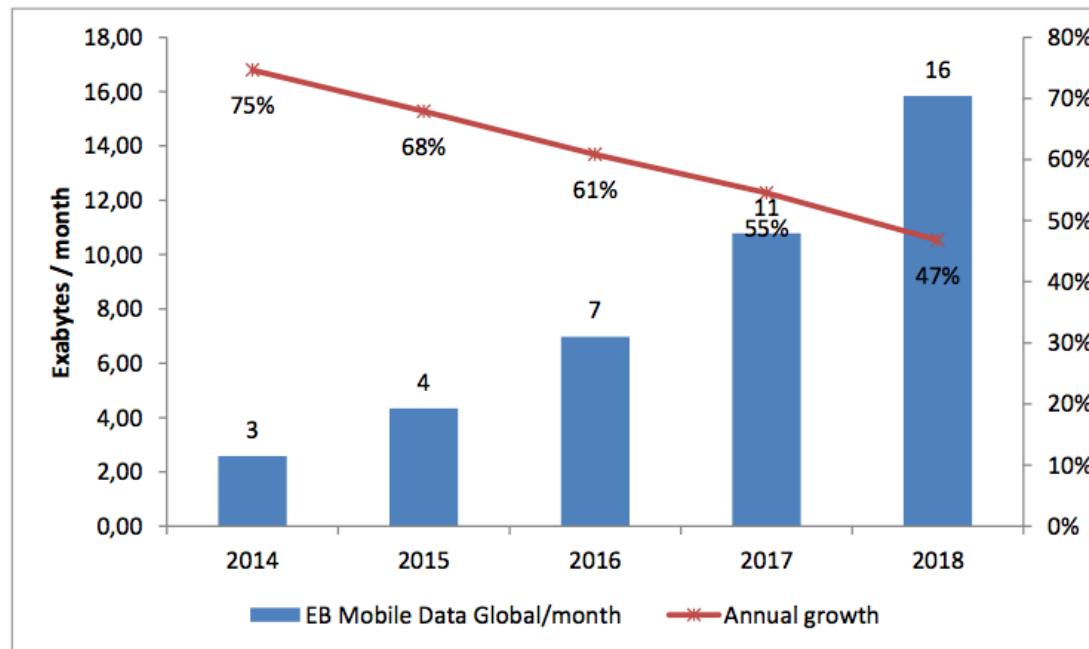
Table 1. The Cisco VNI Forecast Within Historical Context

Year	Global Internet Traffic
1992	100 GB per Day
1997	100 GB per Hour
2002	100 GBps
2007	2000 GBps
2013	28,875 GBps
2018	50,000 GBps

Source: Cisco VNI, 2014

Growth of mobile internet traffic

Figure 13: Cisco VNI forecast of mobile Internet traffic in Exabytes per month and associated growth rates (2014-2018)



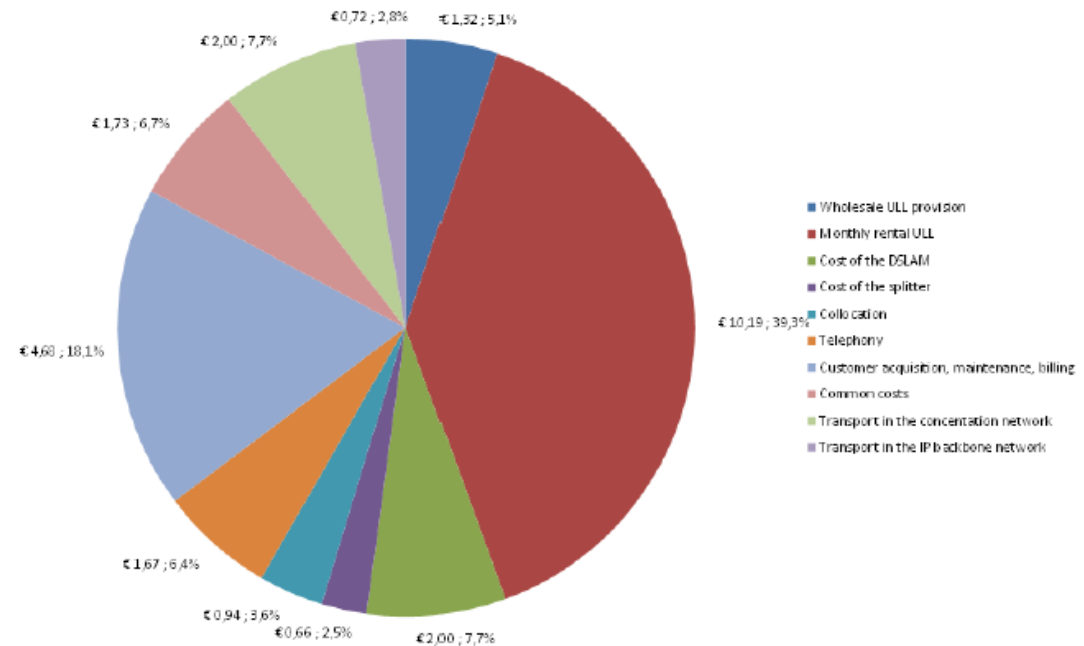
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Source: Cisco VNI online database (2014),⁴⁹ WIK calculations

Traffic growth and underlying costs

Usage-based costs - those that depend on the level of Internet traffic (i.e. transport in the IP backbone and concentration network) - constitute a small proportion of total fixed broadband costs (e.g. 10.3 %).

Figure 2: Monthly cost elements of a bundled DSL broadband/voice service (2013)

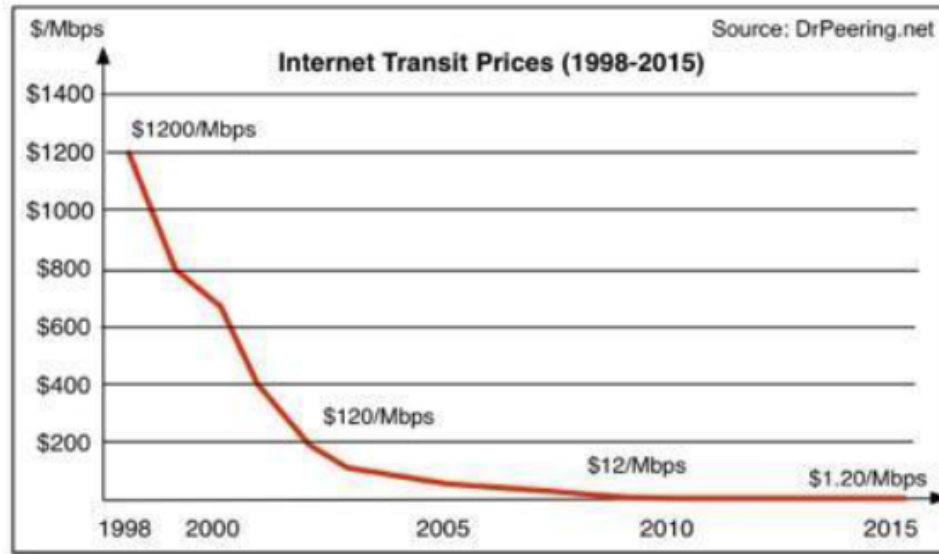


Source: Data from German BNetzA (2013), page 80; WIK calculations ²⁰

Offsetting cost reductions?

Substantial declines in unit costs for relevant network equipment (e.g. high capacity routers, DWDM optoelectronic equipment) leads to a decline in the unit price of Internet transit.

Figure 6: Estimated IP transit prices in USD / Mbps (1998 - 2015)



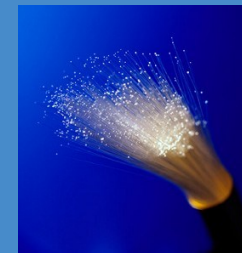
Source: William B. Norton (Dr. Peering)³²

Traffic growth versus cost reduction?

Interesting conclusions from the J. Scott Marcus report:

- *Traffic is growing but not exploding. The rate of growth is declining over time, both for fixed and mobile traffic.*
- *Increased traffic per user does not necessarily result in significant increased usage-cost per user due to the reduction of the underlying costs of carrying traffic. Different impact on fixed and mobile networks.*
- *In both fixed and mobile markets, price responds to changes in the underlying costs (as they should in competitive markets). No market failure identified.*
- *Traffic growth is not a root cause of the challenges that network operators face. If traffic were not growing, revenue would be declining even faster.*

NGA investments – who bears the cost?



- Recent debate in EU about whether applications are creating unsustainable burdens on broadband infrastructure which require reevaluating the economic relationships between ISPs & CAPs.
- Substantial investments in fibre are needed but consumer willingness to pay for ultra-fast broadband is limited.
- Should providers of bandwidth hungry content providers pay for the investment in telecoms infrastructure? (e.g. CERRE study, 2014) Or should we focus on stimulating the demand side and finding alternative funding?
- Is there a trade-off between increased usage of applications and content and investment in telecoms infrastructure?

Do CAPs invest in infrastructure?

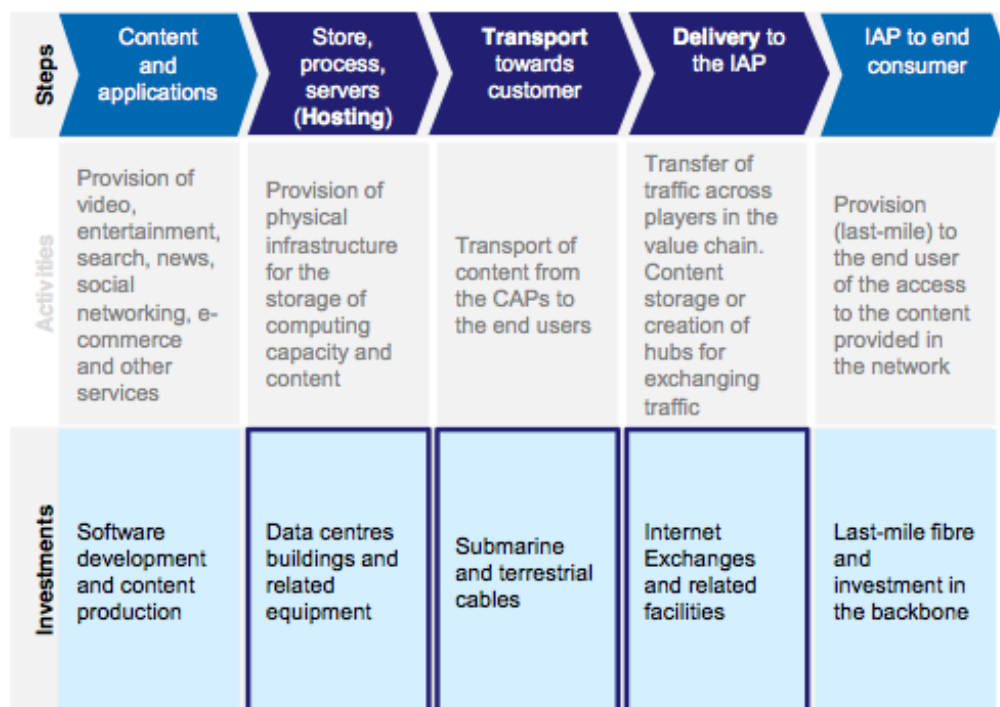
Figure 3.5: Overview of the categories of company active in Internet investments [Source: Analysys Mason, 2014]

	Type of companies	Examples
Content Application Provider (CAP)	Companies that provide end users with Internet content and applications	Google, Facebook, Yahoo!, Microsoft, Amazon, eBay, Netflix, BCC, Spotify, Dailymotion, Axel Springer
Service provider (SP)	Companies that help delivering Internet content, including data centre and backbone providers, IXPs, CDNs	Level 3, Cogent, XO Comms, Tata, Equinix, Akamai, CenturyLink, SunGard, Amazon (AWS), AMS-IX, DE-CIX, LINX
Internet Access provider (IAP)	Companies that provide Internet connectivity for consumers and businesses	NTT, Comcast, AT&T, Deutsche Telekom, Time Warner Cable, Verizon, Orange, KT

Source: Analysis Mason, *Investment in Networks, Facilities, and Equipment by Content and Application Providers*, September 2014

Investments required at each stage of the Internet value chain

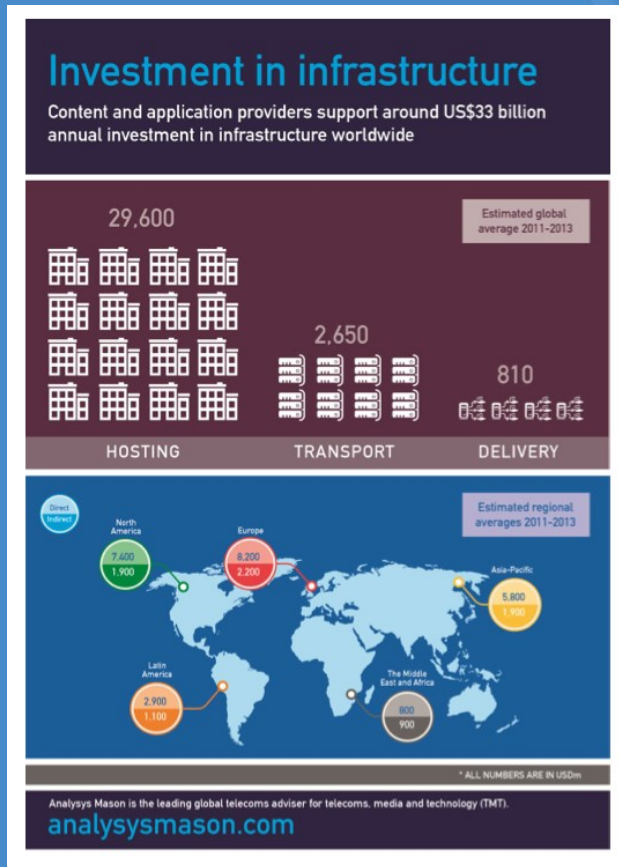
Figure 4.1: Investments in networks, facilities, and equipment required at each stage of the Internet value chain [Source: Analysys Mason, 2014]



Direct and Indirect investment

Source: Analysys Mason, *Investment in Networks, Facilities, and Equipment by Content and Application Providers*, September 2014

CAPs investment in infrastructure (\$33b annually)



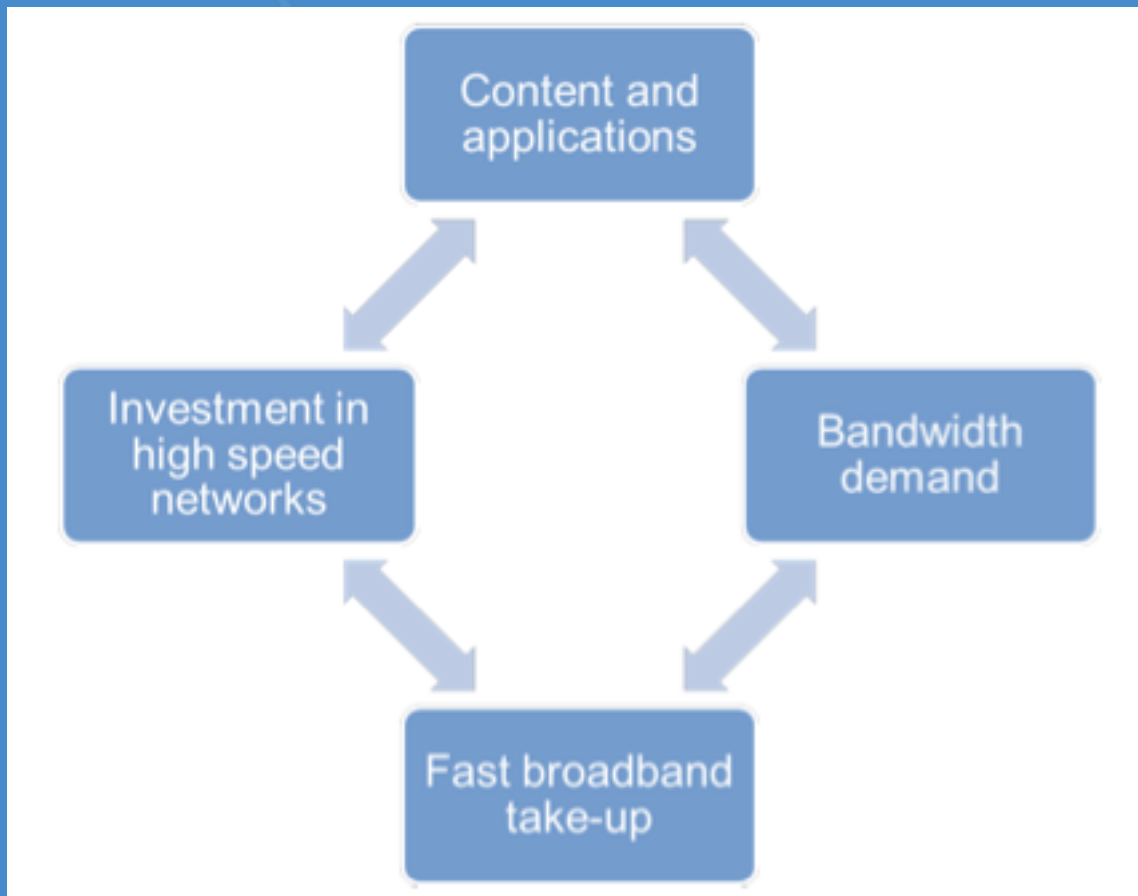
On average the 3 largest CAPs – Google, Facebook and Yahoo – have invested 9% of their 2011-2013 revenues in networks, facilities and equipment.

(other investments e.g. R&D, content development and licensing, software development and engineering not included in this estimation).

Source: Analysis Mason, *Investment in Networks, Facilities, and Equipment by Content and Application Providers*, September 2014

Virtuous circle of networks and applications?

Applications and content generate user demand – offer services that make connectivity desirable – thereby boosting broadband take-up and leads to new network investment.



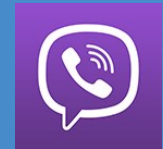
CAPs help push for an alternative revenue model based on data rather than voice services

Both sides of the value chain – networks and applications providers – offer value to each other.

Source: WIK-Consult, *Applications and networks: the chicken and the egg*, 2015

Time for 'light touch' regulation on network operators?

- Incumbent network operators claim that the sector is today more competitive than ever and that sector specific access regulation should be removed.
- Despite increased choice in terms of services, the network/connectivity layer remains rather uncompetitive and the last mile an economic bottleneck. Network duplication is a challenge. There is limited scope for applications to exert competitive constraints on broadband connectivity.
- Regulators in Europe consistently find SMP (~dominance) in the wholesale broadband markets. Access regulation is warranted.
- Levelling the playing field may be appropriate when it comes to rules other than *ex ante* access regulation (e.g. consumer protection, data protection).



Concluding remarks

- WIK report indicates that traffic continues to grow but the rate of growth is declining. The reduction of the costs of carrying traffic impacts on level of usage-based cost per user. Different impact on fixed and mobile networks. In the EU prices respond to changes in underlying costs.
- There is no evidence that CAPs are ‘free riding’. CAPs investment in network connectivity (payment to transit providers or investment in network infrastructure) and drive customer demand for fast-speed broadband and bandwidth usage. Part of a ‘virtuous circle’.
- Network operators face considerable investment challenges while customer willingness to pay remains low. The answer may lie in alternative funding or demand stimulation (rather than cross-subsidization between market sectors?).
- There is limited scope for applications to exert competitive constraints on broadband connectivity. *Ex ante* sector specific regulation is warranted.





Key bibliography

- **WIK-Consult, *The economic impact of Internet traffic growth on network operators*, October 2014**
- **WIK-Consult, *Applications and networks: the chicken or the egg*, March 2015**
- **Analysis Mason, *Investment in Networks, Facilities, and Equipment by Content and Application Providers*, September 2014**
- **CERRE study, *Market Definition, Market Power and Regulatory Interaction in Electronic Communications Markets*, October 2014**

