Telecommunications in run up to 2020

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Abstract: This contribution highlights some of the conclusions made by Ecorys in two studies that were commissioned by the European Commission: Truly Internal Market for e-communications (2012) and Future electronic communications markets subject to *ex-ante* regulation (2013). This contribution translates these conclusions into challenges ahead for the next Commission as well as for regulators. The first challenge relates to unlocking sources for investment, the second challenge relates to maintaining access regulation in the case of infrastructure competition.

Key words: telecom, Single Market, relevant markets, investments, access regulation, joint dominance.

Within the context of the Digital Agenda and the Regulatory Framework, the Commission has two main issues that it wants to address before the end of its current term: the regulation of the Internal Market for electronic communications, also known as 'Connected Continent', and the revision of the recommendation on relevant markets subject to *ex-ante* regulation. These policy documents shape the European regulatory telecom landscape for the next 7 years and hence form the legacy that Mrs Kroes leaves to her successor responsible for completing the Digital Agenda. Ecorys Netherlands has supported the Commission in its work with two studies, Steps towards a truly Internal Market for e-communications (2012) [1] and Future electronic communications markets subject to *ex-ante* regulation (2013) [2]. Both studies are based on a prospective analysis of developments in the communication markets up to 2020. This contribution to Communication and Strategies summarises these prospective analyses and identifies the challenges ahead for the next Commission as well as for national regulators.

[1] Together with TUDelft and TNO.

[2] Together with Idate and Icri/KULeuven

This contribution first discusses future trends as described by both Ecorys studies; these are broadly categorised as trends of convergence and divergence. It briefly elaborates on the impact of these trends on the business case of operators. Next, it describes how supply of (over-the-top) services drives demand for broadband quality, pushing investments by operators; this in turn drives the development of new services. Following the logic of this virtuous cycle, we make the point that the completion of the Internal Market contributes to the incentives to invest in Next Generation Access (NGA) networks, provided telecom operators do not encounter (other) investment barriers. It has been argued that a notable barrier for investments stems from access regulation. The third section of this contribution takes a closer look at this claim and concludes just the opposite. The fourth section elaborates on this in a wider discussion of the need for access regulation in a situation of two competing infrastructures. We ask: is two enough? This economic discussion has had a long history (almost a century) and we introduce new insights from consumer search theory. The relevance of this becomes clear in the fifth section introducing the suggested revisions of the recommendation on relevant markets and elaborating on what this means for guaranteeing access to networks. The final section summarises the main conclusions.

■ Convergence and divergence: trends that shape the future of telecom

Ecorys *et al.* (2012) describes how innovations in broadband technology have spurred economic growth via the development of new innovative electronic communications services (such as video conferencing, online gaming, video-on-demand, remote health monitoring, etc.) spilling over benefits to all parts of society. Because of the larger variety of services, the willingness to pay for electronic communication services in general has dramatically increased, but network operators have not been able to transform this into higher revenues. The limits to monetisation are partly due to increased competition among network operators that is driven by network convergence (see Box 1 below) as well as by access regulation. At the same time, the divergence of networks and services (see Box 2 below) means that over-the-top (OTT) content aggregators are better positioned to monetise the benefits enjoyed by advertisers and end-users.

Box 1 - Convergence of network technologies

Traditionally there was a clear division between different electronic communications markets due to the vertical integration of network connections and communication services: voice telephony was delivered via copper PSTN-lines and video content was delivered via terrestrial, satellite or cable networks. With the rise of the IP-protocol and the Internet these clear dividing lines no longer exist and all forms of electronic communication are now delivered via Ethernet or IP-based broadband services. In other words, the networks are converging as any service can be delivered via either copper, cable, mobile or fibre

Box 2 - Divergence of networks and services

The traditional vertically integrated business model is further challenged by the rise of so-called over-the-top providers delivering a service without control over the underlying network. The strategies of these over-the-top players are typically focussed on becoming a new natural entry point for advertisers and content providers in order to reach end-users. The ability to do so increases with the number of users and thus with the integration of different communication services; hence the success of operating system (OS) platforms like Apple and Google. OTT services increasingly compete with the communication services traditionally provided by network operators (voice, text and video).

The combination of diverging and converging trends results in commoditisation of the telecom business: i.e. telecom operators are gradually becoming suppliers of stand-alone broadband access services. In an attempt to counter this trend operators do just the opposite by bundling different services like TV, Voice, Internet, and recently also mobile. [3] They have been successful in differentiating the integrated services from the OTT services in terms of quality by using dedicated bandwidth (or managed IP interfaces) for the delivery of VoIP and IP-TV. In reaction, OTT service providers are developing software based network intelligence (using a combination of CDN and P2P technologies) allowing them to deliver higher

[3] Bundling has played an important role in the market analyses by NRA's (BEREC, 2010). Also the recent study by Ecorys *et al*. (2013) on the future relevant markets analysed the consequences of bundling for regulatory market analyses. The conclusion by Ecorys is that it does not have any consequences, provided there is proper access regulation at wholesale level. This conclusion is reached without even taking into consideration the role of OTT players.

quality services via best effort IP. [4] The ability for operators to differentiate in terms of quality will be further reduced if the Commission implements its plans for the standardisation of managed IP interfaces [5] and further pursues its current position towards net neutrality.

At the same time Ecorys *et al.* (2012, 2013) observe a trend toward fixed and mobile convergence that is on the one hand, driven by pursuing the bundling strategy to counter commoditisation, and on the other hand by network complementarity in traffic management (see Box 3 below). The trend of fixed and mobile convergence puts pressures on the business case of fixed-only and mobile-only operators. Any barriers for mobile-only parties to access fixed networks, as well as any barriers for fixed-only operators to access mobile networks, will have a consolidating effect on the markets (see Box 3 below).

Box 3 - Fixed and mobile convergence

The roll out of LTE networks will lead to greater economies of scope between fixed and mobile network infrastructures, due to the re-use of fixed backhaul infrastructure. For instance, traffic from LTE devices will be offloaded on the fixed network via femtocells. The cells of the mobile networks will also be smaller than in previous generations of mobile standards, thus integrated operators have benefit from the capillarity of their fixed networks to connect LTE base stations.

Consequently, the incentive for operators to market quadruple play or other forms of fixed/mobile bundles rises. Pure play fixed or mobile operators will therefore find themselves in a disadvantage, particularly if they cannot secure some sort of wholesale access to the infrastructure type they are not operating themselves.

Source: Ecorys et al*. (2013)*

■ Towards an internal market

This section builds further upon the previously discussed trends in conjunction with another trend that Ecorys *et al.* (2012) identify as a major driver of change: the demand for broadband quality. The following discusses

[4] Ecorys *et al.* (2012) give the example of Voddler. Recently, Netflix and also YouTube are experimenting with technologies allowing them to deliver Ultra HD video streams via best effort internet.

[5] See Annex I point 2 of COM(2013) 627.

how this pattern of trends increases the need for an Internal Market policy package and how the completion of the Internal Market can give a boost to investments. We briefly present the results of the analysis by Ecorys *et al.* (2012) on the potential gains from completing of the Internal Market (also known as the costs of non-Europe).

Bandwidth consumption has grown strongly over the years and is expected to grow further [6]. The most important driver is video (streaming, on demand, and gaming) developing from SD to (ultra) HD and 3D. Other drivers are cloud computing, virtual private networks, e-health, e-learning, etc. The latter services will not only drive a greater demand for bandwidth, but also for Quality of Service (QoS). SBS (2010) refers to the combination of demand for more bandwidth at higher quality levels as an increased demand for broadband quality [7].

Ecorys (2012) explains that the relation between online services and demand for broadband quality is not a one-way relationship. The demand for more bandwidth creates congestion on networks and, driven by competition, operators respond with investments in more bandwidth. The temporary availability of abundant bandwidth in turn drives the development of online services. In other words, there is a circular relationship between online services, demand for bandwidth, and investments in bandwidth. Ecorys (2012) explains that:

> [In a stylised model] "it follows that (given a certain minimum scale) the efforts of Member States […] to promote the roll-out of fibre optic networks indirectly pushes the demand for more bandwidth in other Member States [provided that the created content and services are offered in a borderless environment, and provided there is high trust and digital literacy]".

This is what the Commission refers to as the virtuous cycle of the digital economy, which is at the core of the Commission's Digital Agenda. [8]

A central element of the Digital Agenda is addressing barriers for the Internal Market to allow the provision of borderless services. Ecorys *et al.*

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[6] Saïd Business School - Oxford University and Universidad de Oviedo (2010), "third annual broadband study", sponsored by Cisco.

[7] More specifically, they define broadband quality as a combination of download throughput, upload throughput, and latency capabilities of a connection, the key criteria for a connection's ability to handle specific Internet applications, from consumer telepresence to online video and social networking.

[8] http://europa.eu/rapid/press-release_IP-10-581_en.htm

(2012) conclude that the Internal Market for e-communications is based on two pillars: 1) openness (or contestability) of national market; and 2) the interoperability of markets. The first is directly linked to the 'freedom to provide services' and 'the freedom of establishment' [9]. The second pillar is related to the realisation of scale economies. The first pillar is a prerequisite for the second, but the second pillar also requires a certain degree of standardisation in the field of regulation, in the field of technical interfaces, as well as in the institutional domain. In the end, the two pillars promote both static and dynamic efficiency.

This all seems a bit abstract. Let us make it more concrete by looking at what this means for different levels in the communication value chain.

At the network level, the first pillar (openness of national markets) is primarily related to the implementation of the Regulatory Framework. The second pillar (interoperability of markets) is typically related to norms and standards that allow for cross border communication in order to realise network effects. Interoperability standards are notably essential in the absence of pan-European operators (with physical access). The Commission regards the absence of true pan-European operators as evidence of a failing Internal Market. Indeed, Ecorys *et al.* (2012) conclude that history has shown that at the level of the access network (both fixed and mobile) there have been little cross border scale economies so far, amongst other factors, due to heterogeneity in regulation. [10] However, Ecorys *et al.* also argued that this is not the only barrier hindering operators in realising pan-European scale economies. Another important barrier stems from the non-tradability of access network services. After all, the minimum efficient scale is at the street level; that is what creates the natural monopoly at the local loop in the first place. In the (near) future this might change because the scale economies might become relevant 'at the backdoor of the operator's business case'. This became clear during a presentation at one of Idate's European Telecom Policy Seminars in December 2013 by the former president of the Belgian regulator BIPT (Mr Hindryckx). Mr Hindryckx explained that while telecom providers are becoming increasingly dependent on global IT players (e.g. Google, Microsoft, IBM, and Cisco) and global OTT

[9] Which should not be regarded as merely an administrative/legal term but as an integral part of competition policy.

[10] "[…] pioneering mobile operators from the 1990s initially believing in the advantages of a 'global scale'. In due course, it became clear that other (semi-) natural barriers to global economies of scale (e.g. the need for local distribution chains, differences in regulation of e-communication, privacy, and security) were too large, even to benefit from European scale."

players (e.g. Apple, Google, and Microsoft), they still control the physical access to end-users. Hence, they increasingly gain from pan-European scale as it strengthens their bargaining position *vis-à-vis* IT and OTT service providers. In order to enable European operators to strengthen their vertical power positions Europe needs to reduce regulatory heterogeneity (pillar 2) and to remain loyal to the Regulatory Framework (pillar 1).

At the service level, the two pillars have a slightly different connotation. Assuming that contestability of wholesale access markets is safeguarded by proper implementation of the Regulatory Framework, the framework is not (no longer) relevant for realising pillar 1 – hence Ecorys *et al.* (2013) suggest not to include any retail service market in the list of predefined relevant markets in the revised recommendation on relevant markets. What remains for the openness of national OTT markets is the net neutrality discussion. [11] For realising pan-European scale economies (pillar 2) at the level of communication services, however, Ecorys *et al.* (2012) identify considerable potential barriers caused by the fact that network operators often choose for customised managed IP solutions while fulfilling the demand for high quality of service. Providers of high quality OTT services that pursue a pan-European strategy may experience a lack of interconnectedness since every operator sets its own technical standards for their managed IP interfaces. As mentioned above, the degree to which this problem materialises depends on the innovativeness of OTT service suppliers in developing software based network intelligence allowing them to deliver higher quality via best effort IP.

The potential problem for OTT players is comparable to the problems currently perceived by pan-European business operators that have to rely on wholesale broadband access for which no single pan-European quality standard applies. Ecorys *et al.* (2013) explain that:

> "The added value to a multinational end-user of having a single pan-European supplier increases with the extent to which the single pan-European supplier is able to offer a uniform service level for all its connectivity products in the various Member States […] It follows that [in the absence of a pan-European reference offer] the pan-European retail operator is hampered in delivering the value added that their clients desire".

Ecorys *et al.* (2012) estimate that the completion of the single market for e-communications results in an annual net gain of 0.5% to 0.9% of GDP.

11 If you believe that proper access regulation is an insufficient safeguard, but there are different views on this issue.

The analysis is based on a 'what if, analysis': 'what if the all markets are equally competitive at the level of the current best practice?' and 'what if the necessary level of standardisation has been realised?' – see box 4 below.

Box 4 Completing the Internal Market: how much does it deliver?

The first question (what if the all markets are equally competitive at the level of the current best practice - related to pillar 1) is answered by Ecorys *et al.* on the basis of an econometric analysis of the relation between market concentration and prices, volumes and investments. Market concentration is used here as a proxy for measuring the openness of markets. On the basis the effect of lower market concentration on prices, volumes and investments Ecorys *et al.* (2012) estimate the static and dynamic welfare improvement in case the competitiveness of all 'national' markets improves towards the 'best in class' within Europe (in terms of market concentration). Static welfare effects are calculated on the basis of price and volume changes which translate into changes of consumer and producer surplus. Dynamic welfare effects are calculated on the basis of changes in investments, which translate through multiplier effects into a higher GDP. (1) The analysis concludes that if Member States are moving towards the best in class, the annual gains amount to 0.2% - 0.45% of GDP. (2) These gains are largely in terms of dynamic efficiency. (3)

Ecorys *et al.* answer the second question (what if the necessary level of standardisation has been realised - related to pillar 2) by comparing the diffusion of 2G mobile technologies in the EU and the USA over time. This historical example illustrates the benefits of harmonization for the internal market by calculating the benefits of having a single standard in mobile communications. Ecorys *et al.* show that penetration of the 2G mobile technology developed much faster in Europe (where there was one single standard) compared to the USA (where three different standards competed for the market). Based on estimates of the impact of mobile penetration on GDP (as found in literature) (4) Ecorys *et al.* calculate that the impact of harmonization and the subsequent improved take-up of mobile services in the EU has been significant: The EU-15 on average enjoyed 0.3% additional GDP each year compared to the USA over the period 1995-2009. (5)

(1) The relationship between investment levels and GDP growth through the ICT-multiplier effect is derived from literature (see e.g.: CRANDALL & SINGER 2009; CZERNICH, FALCK *et al*. 2009).
(2) For a detailed description of the econometric approach see Ecorys *et al*. (2012), pp. 55-75 and Annex 1 pp. 141-152.
(3) Because gains for consumers (due to lower prices) are largely offset by losses experienced by operators (due to lower profits).
(4) Deloite (2006-2007 and 2008), SRIDHAR & SRIDHAR (2007), WAVERMAN *et al*. (2005).
(5) 0.45% during the period 1995 to 2003.

The investment problem

The Commission's plans for the Connected Continent suggest a broad package of measures aimed at promoting the provision of borderless services. The Commission proposes, amongst others, measures to harmonise regulation (pillar 1) and to develop standards (pillar 2). These plans may be of little use in realising the broadband targets set by the Digital Agenda [12] if operators are lacking the financial means to invest. In relation to this, European incumbent operators have for a while now argued that one of the biggest hurdles keeping them from investing in NGA networks is regulation. A recent ETNO study by the Boston Consulting Group (BCG, 2013) claims that the current situation is largely caused (amongst others) by regulatory distortion of competition, hindering network operators in capturing the fair returns needed to fund investments. They illustrate this point by showing that "Many European telcos have seen negative total shareholder returns [13], in contrast to global peers".

The above claim by BCG is however not straightforward. The investment problem in telecoms boils down to the Arrow/Schumpeter discussion: do we need to maintain/increase regulation such that competition leads to more innovations (as argued by ARROW, 1962) or do we need to ease regulation because competition actually lessens innovation (as argued by SCHUMPETER, 1934, 1942). Indeed the Commission is aware of this and struggles with this dilemma, as illustrated by the following description of events. In 2009 the German regulator (BNetzA) intended to follow Schumpeter in an attempt to exempt fibre networks from access regulation (regulatory holiday). This measure was not permitted by (at the time) Commissioner Reding (and also later by the Court) as it did not do justice to the technology neutrality principle set by law. However, Mrs Reding's successor (Mrs Kroes) implicitly suggested in October 2011 that she was willing to let go of this principle and (in the spirit of Arrow) regulate down copper prices in order to persuade the former monopolies to migrate to fibre. [14] One year later, in July 2012, Mrs Kroes revealed a different view. She had come to the conclusion that (in the spirit of Schumpeter) lower copper prices would lead to lower profits and therefore fewer resources for

[12] 50% of households at 100Mbs and 100% of households at 30Mbs by 2020.

[13] Total Shareholder Return: combines share price appreciation and dividends paid to show the total return to the shareholder expressed as an annualised percentage.

[14] http://www.ft.com/cms/s/0/5596fe08-eac7-11e0-ac18-00144feab49a.html#axzz2HNYImN8T

former incumbents to invest. The financial times' heading was: "Big carriers win an EU victory on land line charges". [15]

The question we ask is: how valid is the point that ETNO and BCG make? The above mentioned study by BCG presents the Dutch incumbent KPN as being the worst performing operator with a total shareholder return of -29%. However, considering that 1) practically all European incumbents (including KPN) inherited a huge amount of assets from the public when they were privatised during the 1990s and 2) that many of these assets have long been depreciated but are still in use, this stands at odds with the findings of Ecorys (2014) that the Dutch fixed network operators realise EBITDA margins of 50% to 60%. [16] This indicates that the negative shareholder returns are the result of exaggerated profitability expectations by shareholders in the past (which has also boosted the price of take-overs). These overly optimistic forecasts have likely resulted from (amongst others) underestimating the role of OTT players and (possibly) from underestimating the impact of the Regulatory Framework. This has nothing to do with a 'fair return to investments' as BCG states, but with the market correcting for wrong expectations.

Nevertheless, the fact is that Europe is stuck with incumbents finding it difficult to attract the necessary capital. But does this mean that governments need to bail out the former state monopolies by restoring monopoly powers? [17] In the spirit of Schumpeter, the answer would be "yes": what would be the incentive of the entrepreneur to invest in new technologies if it would not be allowed to properly profit from its

15 http://www.nytimes.com/2012/07/23/technology/big-carriers-win-an-eu-victory-on-land-line-charges.html?_r=0

16 An analysis by Ecorys (2014) of profitability of the Dutch fixed and mobile telecom networks shows that the Dutch cable and copper networks realised EBITDA margins of 50% to 60% (or revenues) in the period 2008 to 2012. To a considerable extent these high margins are outweighed by high CAPEX levels (20% of revenues), which still leaves a net margin of around 30% to 40%. Correcting for WACC and depreciations, fixed networks are quite profitable.
The Ecorys study also shows that EBITDA margins by mobile operators are considerably lower. This is confirmed by data from wireless intelligence showing that in the Netherlands, Germany, France, Spain and Italy the mobile operators realise EBITDA margins of 30% to 40% of revenues between 2008 and 2010. In the UK this was around 20%. On average mobile operators invested around 10% to 15% of revenues, leaving a net margin of around 20% to 25%.

17 The term "bail out" is appropriate here since operators have in the past chosen to pay high dividends and failed to make the necessary reservations for future investments. See also *The Financial Times* (November 2013), "The dividend yield on the sector has been among the highest with an average forward looking yield of 5.1 per cent even after the cuts" http://www.ft.com/intl/cms/s/0/258ad6a0-4e19-11e3-8fa5-00144feabdc0.html#axzz2qfX3R1zB

entrepreneurial activities? In the spirit of Arrow, however, the answer would be "no": what would be the incentive for a monopolist to invest in the transition towards fibre if it already enjoys monopoly rents on a fully depreciated access network? Recognising the current dominant positions in the market for local loop and wholesale broadband access, the argument in the spirit of Arrow seems valid because investments in fibre cannibalise current copper profits. This raises the question: can we truly rely on the incumbents to invest in fibre?

Recognising that incumbents are hampered in means and incentives to initiate the transition towards fibre, LEMSTRA & VAN GORP (2012) [18] also say "no" to bailing out former monopolists: what would be the incentives of the entrepreneur to challenge the incumbent's position (by rolling out of fibre to the home - FttH) if it cannot bundle demand? With entrepreneurs they mean third parties that do not have to worry about cannibalising a legacy network. Moreover, outsiders can better provide long term investors (like pension funds) with proper returns to capital employed simply because their balance sheets and stock prices are not boosted by overly optimistic expectations from the past. LEMSTRA & VAN GORP (2012) [19] therefore argue in the spirit of Martin Cave's ladder of investment that NRAs must uphold the access regulation regime. Yet, so far there has been little evidence that the ladder of investments really works all the way; i.e. that Altnets actually will climb the final rung of the ladder (DISTASO, 2009). This has caused a debate about the effectiveness of the investment ladder to actually achieve dynamic efficiency (BIJLSMA & VAN DIJK, 2007; HUIGEN & CAVE, 2008; CAVE, 2009; BOUCKAERT *et al*., 2010; BOURREAU *et al*., 2010). LEMSTRA & VAN GORP (2012), however, present a few examples illustrating that Altnets can and do take the final step. They give the example of the German city carrier Netcologne that positioned itself locally as a strong DSL competitor and bundled demand for FttH from its own locally concentrated client base. They also present the example of Reggefibre in the Netherlands that entered the market as an outsider [20], bundling demand by pursuing an open access strategy and inviting multiple Altnets to migrate their clients from the incumbent's network to the rival fibre network.

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18 Referred to by Ecorys (2013), and VAN GORP, MAASLAND & ROSENSTOCK (2013).

19 The argument is repeated by Ecorys (2013), and VAN GORP, MAASLAND & ROSENSTOCK (2013).

20 The founder of Reggefibre was a construction company (the Wessels Group) with some experience in building fibre networks.

Summarising: the financial business case of challengers to invest in fibre seems stronger than the business case of incumbents. They do not cannibalise current assets and they do not need to live up to overly optimistic expectations from the past. Furthermore, as demand for broadband quality grows, also the financial business case for stepping up the final rung grows. Access regulation is a prerequisite for these business models to bundle demand (and thus to succeed).

■ Is two enough?

A draft of the regulation of the Internal Market of 11 September 2013 contained the following statement:

> "In the presence of two NGA networks, the market conditions are generally considered competitive enough to be able to evolve towards the provision of ultra-fast services" (paragraph 17).

There has been some debate about this sentence as one could conclude that the Commission is of the opinion that access regulation can be abolished. In the final version of the regulation, the wording of the Commission is less strong (in terms of "…NRAs may conclude that…."). Apparently abolishing access regulation is in the minds of the Commission staff. This latent objective may be inspired by the Arrow/Schumpeter discussion above, but also by the underlying vision on telecom regulation. This vision assumes a gradual transition from *ex-ante* sector specific regulation to *ex-post* general competition policy, while closely following the progress of telecom markets as they transform from monopolistic markets to more competitive markets. The question we raise is therefore: is two enough for the Regulatory Framework to step down?

From a dynamic perspective, we have already answered the question above. VAN GORP, MAASLAND & ROSENSTOCK (2013) show that two is also not enough from the perspective of static efficiency. They conclude that telecom providers in essence compete a la Bertrand: they set a price from which a quantity follows. At the same time, they conclude that the framework conditions for the pure Bertrand model do not fully apply and hence in the competitive game between only two competitors it is unlikely to drive prices down to the level of marginal costs. A key insight that VAN GORP *et al.* (2013) introduce in relation to telecom markets is based on consumer search theory – as elaborately discussed by VOOGT (2012). The presence of

search and switching costs results in a violation of one of the key conditions for pure Bertrand, namely: that all consumers will indeed switch to another supplier in case of a minimal price difference. Elaborating on the work of VOOGT (2012), they argue that because end users of electronic communication services experience search and switching costs, they can roughly be divided into shoppers and captives; the first group being relatively small. As a consequence, in the case of only two competitors, the market players will easily 'understand' each other and refrain from competing for each other's captive end-users. Prices are set at monopolistic level and shoppers are allocated by chance to incumbent 1 or incumbent 2. It might be that incumbent 1 and 2 do compete for the shoppers, but this will then be through temporary discounts, maintaining monopolistic prices for captives.

Entrants play a crucial role for the functioning of the market. While competing amongst each other for shoppers (a la Bertrand), they drive down the price. The difference between the price of the two incumbents and the price of the entrants increase, which will not be unnoticed by end users with higher search and switching costs (the captives). As the observed difference in price increases, the observed gains from switching soon outweigh the experienced costs. Captives may now consider switching as well, thereby setting the whole market in motion. As such, the presence of entrants undermines the ability to (tacitly) coordinate. Note that this requires the presence of at least two entrants. If there is only one entrant, it will simply attract all shoppers by setting a price just below the monopolistic price level and leave it at that. In other words, to be competitive a market should have at least four players. Ofcom (the regulator in the UK) seems to have reached the same conclusion as it regards regions with fewer than three competitors (with local access) as potentially problematic and regions with more than three competitors as not problematic (see Ecorys *et al.,* 2013).

The question, is two enough, directly relates to the fixed market, however, indirectly it is just as important for the functioning of the mobile market. As explained above, any barriers for mobile-only parties to access fixed networks will have a consolidating effect on the mobile market as fixed network operators can leverage their market power into the mobile market.

■ Challenges for assuring access to networks

This section introduces the suggested revisions of the recommendation on relevant markets and concludes that (in conjunction with technological and market trends) these potentially result in the challenge for regulators of having to deal with joint dominance. The insights gained from the literature on search and switching costs (as briefly presented above, but elaborately discussed by VOOGT, 2012) may give some guidance for dealing with this challenge, but this is a point for further research.

Revision of the recommendation on relevant markets

Next to making the Internal Market an urgent policy issue, and next to driving the need for investments, the trends identified in the first section of this contribution also demand a critical review of the regulatory framework; and notably the list of markets subject to *ex-ante* regulation in the recommendation on relevant markets. NRAs are required to analyse the markets on this list and, in case they find Significant Market Power (SMP), they should regulate these markets. [21] In function of the objective to gradually develop from *ex-ante* sector specific regulation to *ex-post* general competition policy it is essential that this list is (from time to time) updated against technological and market developments. In order to provide the European Commission with inputs for this update, Ecorys *et al.* (2013) have analysed 15 potential markets and subjected these to the so-called Three Criteria Test [22]. The main conclusions are that:

- The markets for fixed voice (1/2007 and 2/2007) do not pass the Three Criteria Test as the market seems to head towards effective

[21] For NRAs to regulate a market that is not on the list (or to not regulate a market that is on the list) the NRAs should present additional evidence that the problems identified do (not) pass the so-called Three Criteria Test: (i) the market is characterised by high and non-transitory barriers to entry; (ii) the market structure does not tend towards effective competition within the relevant time horizon; and (iii) competition law alone is insufficient to adequately address the market failure(s) concerned.

[22] Ecorys *et al*. (2013) analyse Markets 1/2007 and 2/2007 (Fixed voice retail and wholesale), Markets 3/2007 and 7/2007 (mobile and fixed termination), Market 4/2007 (physical network access), market 5/2007 (mass market WBA and high quality WBA analysed separately), and market 6/2007 (leased lines). Ecorys *et al*. also anlaysed whether old markets 15/2003 (MVNO access) and 18/2003 (Broadcasting) should be put back on the list. Finally Ecorys *et al*. also analysed whether new markets should be introduces: Access to physical infrastructure, 'Over the top' (OTT) services, Access to 'special rate' services, Access to international calls, and SMS termination.

competition in most Member States. The main driver behind this conclusion is the convergence of network technologies. [23] [24] [25]

- The markets for call termination (markets 3/2007 and 7/2007) pass each of the Three Criteria and remain on the list.

- The wholesale markets for local loop unbundling (market 4/2007); wholesale broadband access (market 5/2007) and leased lines terminating segments (market 6/2007) remain on the list. Although network convergence has resulted (or may result) in infrastructure based competition (notably between copper and cable [26]), Ecorys *et al.* (2013) conclude, that this trend is not representative for the EU as a whole. (And even if this were the case, it is doubtful whether 'two is enough'). Ecorys *et al.* do suggest some modifications to markets 4, 5, and 6, however:
  - first, the study suggests redefining market 4/2007 and 5/2007 as the market for Wholesale Local Access (WLA) and the market for Wholesale Central Access (WCA); [27]
  - second, following the observation that there are separate retail markets for mass-market (residential) broadband services and high quality bespoke (non-residential) broadband services, Ecorys *et al*. distinguish separate markets at the WCA-level (respectively mass market and business grade WCA). This distinction reflects the limits for substituting underlying wholesale products; [28]
  - finally, following the observation that the ability to replicate infrastructure distinguishes wholesale local from wholesale central

[23] DSL and broadband based services competing with PSTN based services.

[24] The divergence of networks and services adds to the arguments for dropping the regulation of voice services, but the evidence to support this claim was not clear.

[25] A major issue in the analysis of the fixed voice market is whether dropping regulation would expose a select group of captive PSTN users to monopolistic pricing behavior by incumbents. Captive PSTN-users cannot / will not switch to Voice over Broadband services because search and switching costs are experienced as too high. As long as the majority of PSTN users do not experience these excessive switching costs, they 'protect' the captive end-users from being expoited by the incumbent – see Ecorys et al. (2013) chapter 5.

[26] And in some parts of Europe between fixed and mobile broadband.

[27] WLA comprises "wholesale (physical) network infrastructure access or functionally similar wholesale local virtual network access". WCA comprises wholesale bitstream access or other forms of central virtual network access. The change in definition is based on the observation that certain Next Generation Access Networks do not allow for physical local access, but do allow for virtual unbundled local access (or VULA), which blurs the distinction between physical and non-physical access. However, the ability to replicate infrastructure still distinguishes local from central access.

[28] Furthermore, business grade Wholesale Central Access may form one market with leased lines, but this is best analysed at the country level.

access, Ecorys *et al.* (2013) argue the case for defining subnational geographical markets at the WCA-level. [29]

The conclusions from Ecorys *et al.* (2013) are reflected in the latest draft recommendation on relevant markets (and the accompanying explanatory note). [30] The Commission follows Ecorys' advice distinguishing WLA and WCA markets and distinguishing mass market and business grade products. Furthermore, in the explanatory note, the Commission recognises the point made by Ecorys that NRAs may need to define sub-national geographical markets; a notable distinguishing factor will be the network reach of alternative operators. [31] The idea of defining sub-national markets is not new. However, the existence of common pricing constraints at a national level is often taken as a reason by NRAs to define a national market despite recognising local areas with competitive conditions that are distinctly different. CAVE *et al.* (2006) argue that this is not necessarily full proof (see box 5 below), and the Commission seems to recognise this point in its latest draft of the recommendation.

Box 5 - CAVE *et al*. (2006) about common pricing constraints (*)

The conventional arguments that licensing is generally national and that mandated or de facto uniform pricing causes regional markets to converge provide insufficient support for a general conclusion that markets are national in scope. Universal service obligations (USO) impose uniform pricing over a geographical area, often taken as a "linking condition" that imposes homogeneous conditions of competition at retail level. This is incorrect; it only leads to uniformity at the retail level, but not at the wholesale level for the reasons described below.

Uniform retail prices can discourage competition in high cost areas and encourage it in low cost areas, distorting geographical market entry incentives and creating regulation-driven heterogeneity in wholesale competitive conditions. A firm with SMP faced with a USO chooses a profit maximising price based on both the profitable and non-profitable market segments. Pricing therefore becomes an average of competitive and non-competitive conditions. This will make it harder for rivals to compete in the USO areas but easier to compete outside those areas (i.e. differing competitive conditions). Even if uniform

29 As well as at the level of leased lines.

30 http://ec.europa.eu/digital-agenda/en/news/draft-revised-recommendation-relevant-markets

31 Ecorys et al. (2013) argue that this is notably the case in regions "where entrants have rolled out their own networks to some, but not all, local loop access points or where local cable networks have been upgraded to be able to offer a full triple-play product, thus able to fully compete (at a local level) with the national incumbent operator".

national pricing is not the result of USO, it may still hide significant regional pricing differences through regional special offers.

In order to correctly define relevant geographic markets, the analysis should focus on supply-side substitution, addressing the question of whether an increase in price in more sparsely populated areas will attract further investments from firms operating in more densely populated areas or from other firms, possibly using different technologies such as wireless.

(*) As summarised by Ecorys *et al*. (2013)

Implications for access regulation in the Member States

Driven by network convergence, incumbents in Member States with a ubiquitous cable network argue that it is hard to maintain the view that only the copper incumbent has Significant Market Power (SMP) while 50% of the households are subscribed to cable. [32] Driven by the revised view on geographical markets, incumbents in other Member States may start arguing the same. The strategic objective of arguing this point is not to enforce regulation of cable access – this would only lower entry barriers and increase overall competition in the market. The strategic purpose is rather to force NRAs to build a case for (or against) joint dominance. Most regulators share the view that having only two suppliers (cable and copper) is potentially problematic. However, both regulators and commentators are of the opinion that the burden of proof for joint dominance (that has been expected in previous case law) has been too high (Ecorys *et al*., 2013). NRAs in Member States with ubiquitous cable networks have so-far successfully evaded the issue, but the question is whether they can pursue this strategy or will they eventually have to face the challenge. Below we illustrate this by describing two cases: the Netherlands and Belgium.

The Dutch regulator ACM has regulated access to the copper local loop despite the fact that cable operators have a joint market share of nearly 45%. [33] ACM has so far successfully evaded the challenge of proving joint dominance by defining the geographical market having a national scope. Hence market shares of cable operators are not considered jointly. With the Commission's revised view on sub-national markets, this strategy may

32 See e.g. Eelco Blok's speech during the presentation of KPN's annual report on 4 February 2014.

33 https://www.acm.nl/nl/download/bijlage/?id=11651

become more difficult to pursue. However, further discussions on the relevant geographical market in the Netherlands become obsolete now that the two largest cable operators (Ziggo and UPC) are merging. From a regulatory perspective this merger has (amongst others) strategic motives: It will be hard for the regulator to argue that only KPN has SMP, yet it will be quite a challenge to prove that KPN and the new cable combination have joint SMP. As such, the merger between UPC and Ziggo threatens to push the Dutch regulator off side and to undermine the business case of other competitors that rely on LLU access.

In Belgium, where wholesale access to copper has never been a successful model for challengers (VAN GORP *et al.* 2013), the regulator apparently did not feel comfortable with cable being the incumbent's only competitor. Hence it pursued the strategy of opening up cable by arguing it has SMP in the market for broadcasting (old market 18/2003). [34] The regulator succeeded and while it forced cable operators to provide access to analogue and digital TV, the regulator also required cable operators to offer wholesale access for broadband Internet. The strategy of the Belgian regulator does not seem sustainable in the (near) future. In the most recent draft revision of the recommendation on relevant markets the Commission follows the advice of Ecorys *et al.* (2013) not to reinstate market 18 on the list of relevant markets. Obviously, due to network convergence the market is characterised by infrastructure competition between cable, copper, terrestrial and satellite. Furthermore, competition increases with the rise of OTT broadcasting. In other words, broadcasting has become just another electronic communication service for which consumer detriment is unlikely when the underlying wholesale market (wholesale broadband access) is competitive. Hence, if the Belgian regulator intends to keep cable networks open for entrants, it needs to face the challenge of proving joint dominance in the market for broadband Internet access. Moreover, it will need to argue that the market for broadband access is sub-national, and thereby contradict earlier conclusions. [35]

Regulators in Member States where cable is only locally deployed may in the future need to face similar challenges of proving joint dominance in the case of fixed communication networks. Let us conclude that this is an area

34 A similar attempt was made by the Dutch regulator in 2010, but that attempt failed because the Court (and the Commission) found that the case was not substantiated.

35. Decision of the regulators of the electronic communication sector (CRC) of 1st July, in relation to the analysis of the broadband market.

for further research. Possibly taking the recent insights on search and switching costs (see the previous section 'is two enough') as a new starting point.

■ Summarising conclusions

The business case of the traditional vertically integrated telecom operator is challenged by an increase of competition at the service level, pushing telecom operators to consider specialising in providing broadband connectivity services only. At the same time, they experience increased competitive pressures at the network level due to a combination of access regulation and the convergence between network technologies (cable, copper, and fibre). The trend towards quadruple play may catalyse or inhibit competitiveness, depending on the ease of wholesale access to fixed networks.

At the same time, demand for broadband quality is growing as a result of the booming OTT market. Barriers for a borderless provision of services may inhibit this development. A borderless Europe requires markets to be open and interconnected. The notion of open markets (pillar 1) directly links to the 'freedom to provide services' and 'the freedom of establishment'. As such it has a close relation with the implementation of the regulatory framework (notably at the network level). The notion of interconnected markets (pillar 2) is related to the realisation of scale economies. Open markets are a prerequisite for the interconnected markets, but the second pillar also requires a certain degree of standardisation in the field of regulation, in the field of technical interfaces, as well as in the institutional domain. In the end, the two pillars promote both static and dynamic efficiency.

Realising the Internal Market for e-communications drives demand for broadband quality, which drives investments in broadband quality. This in turn drives the development of (borderless) services, etc. As such the Commission's Digital Agenda reflects a holistic approach towards electronic communication policy. However, these plans may be of little use in realising the broadband targets set by the Digital Agenda if operators are lacking the financial means to invest. European incumbent operators have for a while now argued that one of the biggest hurdles keeping them from investing in NGANs is regulation. This claim directly relates to the Arrow/Schumpeter discussion: do we need to maintain/increase regulation such that

competition leads to more innovation or do we need to ease regulation because competition actually lessens innovation. This contribution concludes that the financial business case of challengers to invest in fibre seems stronger than the business case of incumbents. They do not cannibalise current assets and they do not need to live up to overly optimistic expectations from the past. Furthermore, as demand for broadband quality grows, the financial business case for stepping up the final rung also grows. Access regulation is a prerequisite for these business models to bundle demand (and thus to succeed).

Related to the discussion of the investment problem is the underlying vision of the Regulatory Framework. This vision assumes a gradual transition from *ex-ante* sector specific regulation to *ex-post* general competition policy, while closely following the progress of telecom markets as they transform from monopolistic markets to more competitive markets. The question is therefore: is two enough for the Regulatory Framework to step down? And can regulators maintain access regulation within the context of the revised recommendation on relevant markets in a situation where two NGA's are equally strong? This contribution concludes that indeed two is not enough as entrants play a crucial role in the functioning of the market. They undermine the ability for two networks to tacitly collude by competing intensely amongst each other for end-users with low search and switching costs, thereby setting other end-users in motion as well. Finally, this paper identifies that, as cable's competitive position vis-à-vis copper grows and while the arguments to define national geographical markets become less convincing, NRA's in practically all EU Member States may soon be challenged to prove the case of collective dominance or to withdraw access regulation all together.

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