

NEUTRALITY AND DIVERSITY IN THE INTERNET ECOSYSTEM

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ABSTRACT

The public policy approach to the Internet has become more and more complex as several markets – including fixed and mobile communications, media and content, IT – converge into one single Internet ecosystem. As in all ecosystems, zones and domains depend on each other, and there is no possibility of touching one layer without affecting all others. This paper reflects on the economics of the Internet and emerging business models, and comments on the current debates in each of the layers of modern all-IP architectures, from the unbundling of network elements to net neutrality and the emerging discussion on search neutrality. The paper concludes that the trend towards ex ante regulation of several Internet services, if not stopped, may extend also to sectors that are still in their infancy, such as cloud computing. Finally, the paper suggests that antitrust laws and current regulatory frameworks for e-communications, in particular in Europe, should reflect the economics of all-IP broadband platforms. This implies, i.a., strengthening the role of countervailing buyer power across layers of the Internet, adopting a layered approach to policymaking and establishing co-regulatory solutions to bridge the informational gap between policymakers and market players.

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TABLE OF CONTENTS

1	THE BASIC ARCHITECTURE AND ECONOMICS OF CYBERSPACE	7
1.1	Exploring the ecosystem.....	8
1.1.1	<i>Next generation access: the gate to the ecosystem</i>	<i>12</i>
1.1.2	<i>Higher layers: where most things happen</i>	<i>16</i>
1.2	Understanding the value chain	21
1.2.1	<i>Two- and multi-sided platforms.....</i>	<i>27</i>
1.2.2	<i>Conclusion: competing for eyeballs in the Internet ecosystem.</i>	<i>30</i>
2	GATEWAYS OF CYBERSPACE.....	33
2.1	The telecoms-IT interface: convergence and collision.....	33
2.1.1	<i>Google's and Verizon's legislative statement.....</i>	<i>37</i>
2.2	Other key interfaces: search as the gateway of cyberspace.....	42
2.3	Future gateways: clouds and cloud computing	46
2.4	Layered competition	50
3	CONCLUSION: AVOIDING THE WINNER'S CURSE	52
3.1	Step 1: a layered, co-regulatory approach to policymaking.....	54
3.2	Step 2: competition rules and policy coherence at all layers.....	56
3.3	Step 3: Reflecting on the goals of competition policy	57
3.4	Conclusion: smart regulation in the Internet ecosystem.....	60
	SELECTED REFERENCES	61

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Traditionally, the debate on telecoms and internet regulation has focused mostly on access policy at the infrastructure layer (since the 1980s), as well as net neutrality on the logical layer (in the past five years). However, despite the huge amount of literature available on these issues, for neither of them the last word has been said on which policy approach is likely to favor consumers and increase consumer welfare². What's more, while economists and policymakers strive to find solutions to existing problems, the world changes so rapidly that new and even more complex policy issues surface. Like Achilles chasing the tortoise in Zeno's famous paradox of motion, attempts to grasp the market dynamics and translate them into policy are doomed to be frustrated by the constant evolution of networks and economic interactions in cyberspace, to the extent that some observers have suggested the "impossibility of public policy" – and hence, the inevitability of *laissez faire* – in cyberspace, whereas others believe in a world of "regulatory pantheism" or "regulated freedom", where every layer of the Internet is subject to strict rules with the aim of forcing openness³.

The increased complexity of the subject matter is evident in the net neutrality debate. Most of the pro-neutrality arguments depend on the fundamental belief that in cyberspace market power can emerge only at the infrastructure layer. The debate features sometimes-apocalyptic scenarios, in which ISPs are seen as potentially dictating the rules of the Internet by discriminating between applications or even blocking apps or content, and thus transforming the Internet into a walled garden. In the United States, this recently culminated in the debate over the FCC's alleged competence over broadband as

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telecommunications services, rather than information services under the 1996 *Telecommunications Act*. The issue – emerged after the FCC ruling against Comcast in 2008⁴ – is far from trivial: only if broadband is considered to belong to services covered by Title II of the 1996 Act, the FCC may claim that common carriage obligations apply, including the prohibition of engaging in “any unjust or unreasonable discrimination”⁵; but the FCC itself – later backed by the Supreme Court – ruled in 2002 that Internet services provided by cable companies should be classified as information services and hence not subject to Title II regulations⁶. The FCC then confirmed this approach for wireless Internet services in 2007⁷; however, today the same authority is trying to affirm its “ancillary competence” over these services based on Title II, in order to be able to control anticompetitive and non-neutral behavior by ISPs. Recent talks with the industry have reportedly failed, as FCC Chairman Genachowsky recently announced that he had called off stakeholder discussions since they have not led to “a robust framework to preserve the openness and freedom of the Internet – one that drives innovation, investment, free speech, and consumer choice”⁸

At the same time, the recent joint legislative proposal filed by Verizon and Google has been interpreted by many commentators as a step towards a two-tiered Internet where fast tracks will be made available to those that can pay for them – and indeed, some commentators think this is not a first-best scenario. In addition, the same proposal hints at the need to treat wireless platforms differently, and this too has already split the public opinion into two, equally aggressive and opinionated groups⁹.

In Europe, the issue is apparently less complex, since the regulatory framework is technology-neutral and the competence of antitrust authorities to scrutinize *ex post* the conduct of ISPs is undisputed. Contrary to the FCC in the US, the

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European Commission and all national competition authorities in the EU27 can intervene in regulated fields to challenge allegedly anticompetitive conduct¹⁰. Still, the debate on net neutrality has permeated also the European debate during the review of the regulatory framework for e-communications, initially linked to the need to provide ISPs with adequate incentives to invest in high-speed telecom networks, and later as a priority for developing a pro-consumer Internet policy in Europe. For example, the new Commissioner for the Digital Agenda Neelie Kroes recently stated that “Open and clear cut net neutrality is needed”, and that “new threats to Net Neutrality which can arise from many sources, and blocking and discrimination against VoIP services by mobile operators in a number of European countries are just one example”. Kroes also stated that “[t]he core issue is whether Internet access providers and broadband providers should be able to exercise control and limit users’ access to any content”, clarifying that this should be possible only “for security reasons or when spam is involved; (if it's for) commercially motivated reasons, that's not net neutrality”¹¹. More recently, however, in launching a wide public consultation on net neutrality, Kroes also stated that “that we should avoid taking unnecessary measures which may hinder new efficient business models from emerging”, and used a road traffic analogy to explain that “creating new rules and crowding the street with signs does not automatically help the traffic to flow. Indeed, putting a police officer at a busy corner can often deliver the slowest traffic of all”¹².

Implicitly, and regardless of the specific content of these statements, all this emphasis suggests that the only gatekeepers of cyberspace are and will always be ISPs. However, the Internet is evolving in a way that generates market power (better, “gate-keeping” power) also at higher layers, including the logical, application and even the content layer. Irrespective of whether the asset controlled by the gatekeeper is tangible (like access to the telecoms network) or intangible (such as a search engine, a dominant application, or a private cloud),

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the layered architecture of cyberspace is such that discrimination and exceptions to the basic Internet freedoms may emerge at all layers. This is why concepts such as “search neutrality”, “application neutrality” or “cloud neutrality” are likely to become more widespread in the years to come, and evolve into a comprehensive “platform neutrality” argument.

Accordingly, the past few months have witnessed an expansion of neutrality claims into previously unknown territories. In some cases, past advocates of access policy and net neutrality are seeing their stances backfiring in the form of regulatory proposals or antitrust investigations. IT companies have filed different accusations against Google for abuse of market power¹³; commentators have argued that search neutrality is becoming at least as important as net neutrality¹⁴; and bloggers around the world anticipate that cloud computing desperately needs neutrality and interoperability regulations¹⁵. All in all, there is enough to conclude that Internet regulation is contagious: as in the Sorcerer’s Apprentice, getting started is easy, controlling is tough, and stopping the whole thing impossible.

This paper attempts to frame these phenomena in economic terms to suggest policy approaches that may prove suitable to help the Internet remain as open, rich, competitive, dynamic and inclusive as possible. Section 1 begins by describing the basic architecture of cyberspace and the emerging business models in the cloud computing era. Section 2 illustrates the main policy challenges related to the gateways of cyberspace, from the telecoms-IT interface to net neutrality, search neutrality and eventually cloud computing. Section 3 concludes by looking at future policy directions and provides hints on how to avoid that the winner take-all game that characterizes several layers of cyberspace ends up leads to a winner’s curse due to an overflow of regulation.

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1 THE BASIC ARCHITECTURE AND ECONOMICS OF CYBERSPACE

The past decade has witnessed a transition in the telecoms and IT fields, which can be described as a multiple convergence scenario, including a blurring of the boundaries (and increased competition) between fixed and mobile communications, but also convergence between the telecommunications and the IT and media domains, and convergence between the infrastructure layer and higher layers of all-IP networks. More in detail:

- *Convergence between fixed and mobile telecommunications is finally becoming a reality.* This is certainly happening, though slowly, in Europe, as confirmed by a recent decision adopted by the European Commission, which authorised the definition of a common fixed-mobile relevant market for retail broadband in Austria¹⁶. The Commission recalled that “[...] fixed and mobile retail broadband services are normally not belonging to the same market. However, on the basis of the following circumstances closely related to the specificity of the Austrian market, the Commission accepts the inclusion of mobile and broadband connections into the retail residential market for the purposes of the present notification.” Further prospects in this direction came from a recent document jointly elaborated by the BEREC and the Radio Spectrum Policy Group, which discusses the main conditions for defining joint fixed-mobile markets¹⁷. The use of femtocells and the remarkable speed of imminent 4G networks suggests that the substitutability between fixed and mobile broadband access will be on the increase in the months to come. Recent reports and academic papers confirms this trend¹⁸.
- *Convergence between telecommunications and IT* is fully realized by the migration towards an all-IP infrastructure, which is bringing new business models, the creation of multi-layered platforms where applications and

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services dominate user experience, and constantly changing competitive dynamics. Not only fixed broadband platforms are increasingly integrated into the Internet, but cloud computing is shifting most of the computing capacity into centralised storage servers, which will be made accessible from both fixed and mobile devices. The success of the App stores created by Apple and Google Android promises to revolutionise also the way in which we use computers, not only smartphones. This form of convergence is triggering also *convergence between the infrastructure layer and higher layers of all-IP architectures*, such as the logical layer, the application layer and the content layer in the (simplified) OSI representation (see Section 1.1 below).

- *Convergence between the media world and the Internet world* is disrupting traditional business models in the content industry, leading to a growing unbundling and re-aggregation of content in different formats and in more online-user-friendly ways. This has led to a significant shift of users' attention from traditional media to Internet-published news, which in turn shifted advertising investment and market power to online content aggregators. As will be explained in Section 2 below, this is particularly important since control of advertising revenues is a key success factor for modern broadband platforms, and is also currently a very concentrated market, which led antitrust. Authorities in some legal systems to start investigating the extent of competition and market openness in this domain.

Below, we explore the consequence of this multiple transition in terms of the emergence of the Internet ecosystem, as well as in economic terms.

1.1 Exploring the ecosystem

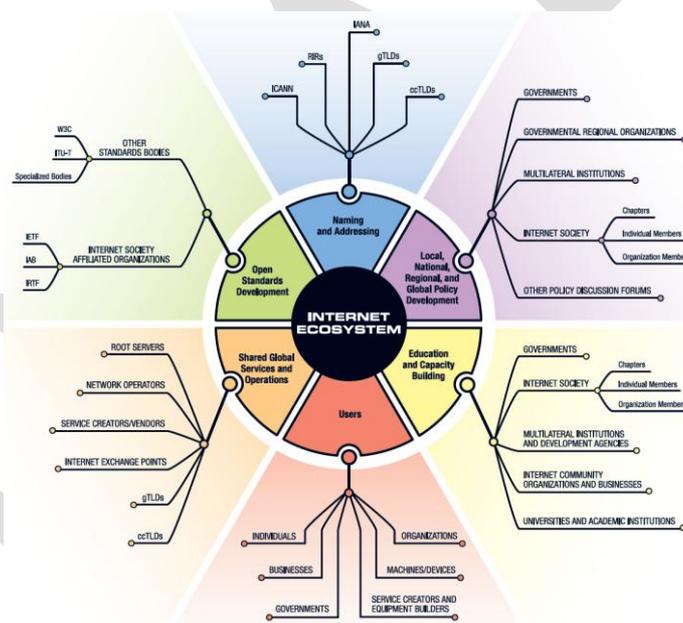
As stated, *i.a.* in OECD (2009), with convergence broadband platforms become much more than simple communications networks, and can be considered as ecosystems that comprise “different elements that use high-speed connectivity to interact in different ways”¹⁹. In these ecosystems, competitive dynamics have

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become way more complex than used to be the case back when the telecoms sector resembled a traditional network industry, mostly posing problems of third-party access and liberalization. The foundations of unbundling policy become even more shaky when we look at the features of emerging markets, for the reasons explained in this section.

The term “ecosystem” refers to the combined physical and biological components of an environment²⁰. When applied to the Internet, this term refers to all the hardware and software that composes the Internet, plus the various players that populate the Internet environment and the complex web of rules and relations that affect them. This also means that the Internet ecosystem includes both the physical architecture and cyberspace. A recently proposed image of the Internet ecosystem is depicted below.

Figure 1 – An image of the Internet ecosystem



Source: the Internet Society (2010)

In this paper, I deal with a sub-set of the several actors that populate this ecosystem, which indeed forms the core of the economic activities taking place in cyberspace. In this domain, one of the most important features of the

Internet ecosystem is its layered architecture, which exists since the early days of ARPANET, which later evolved into the Internet as we know it today. Figure 2 below shows the various layers of the Internet ecosystem in the classical OSI form. The transition towards the layered environment – something that some experts have informally summarised as the transition from the “spaghetti” to the “lasagna” model of the value chain – triggers a number of interesting developments, which in my opinion have not been fully digested by policy analysts and public decision-makers.

- First, *the emerging substitutability between fixed and mobile has a direct effect on the nature of essential facility often attached to the incumbent’s fixed network*. Even when reasonably substitutable fixed networks are not available, the existence of wireless solutions that fall in the same relevant market clashes with one of the conditions for a finding of essential facilities, *i.e.* the impossibility to technically or economically replicate the service. Absent this lack of replicability, unbundling seems to be way less justified.
- Second, *the assessment of market power is becoming increasingly complex* due to (i) “horizontal” competition coming from players that operate in the same relevant market of the fixed-line incumbents (facilities-based cable or fibre entrants, wireless broadband operators, consortia of municipalities, etc.); (ii) “vertical”, “intra-platform” competitive pressure exerted from players that provide competing services in a nomadic way (*e.g.* Skype of Google voice for VoIP services); and “inter-platform” competition by players that propose themselves as platform operators, even if they come from different relevant markets (*e.g.* Apple’s iPhone or iPad, Google Android, Nokia Ovi, and other nascent platforms). The literature has brilliantly summarised these dynamics of competition – and especially the latter one – by referring to “competition for eyeballs”, which is animated by competing platforms that try to conquer the attention (and the bill) of the end user: cloud computing can do nothing but exacerbate this form of competition, with several private cloud managers offering closed, semi-open or fully open cloud services.

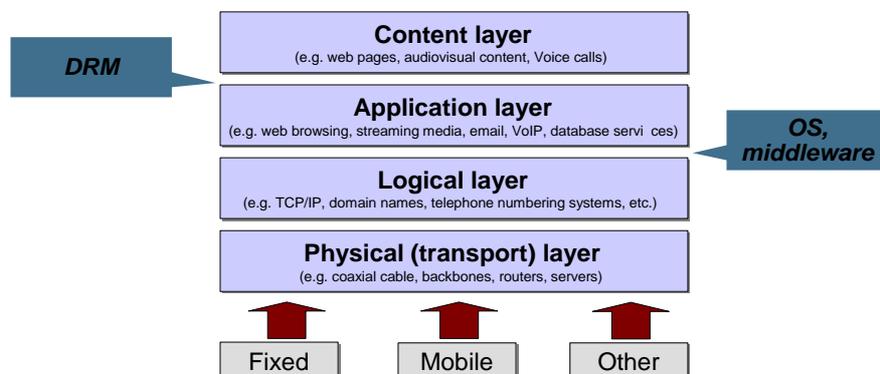
- A related, procedural problem for regulators and competition authorities is *how to define the relevant market*. The links between system layers and the lack of fully interoperable standards creates hidden provinces in cyberspace, where substitutability between platforms or platform “complementors” is indeed limited, warranting narrow market definitions. Antitrust authorities have already had their way into this quagmire. For example, in the US Microsoft case the relevant market for Intel-compatible Operating Systems was considered as separate from the relevant market for Mac-compatible OS. The FTC went even further in a famous case, *Intel v. Intergraph*, by defining Intel as a monopolist for Intel processors, something that should at least have rung a bell. The fact that in the ICT world, “the license is the product”²¹, and “the product can become the market”²² suggests that the notion of relevant market, interpreted the way we have done outside the ICT world, may become completely useless in this field.
- Fourth, it is now widely acknowledged that *modern broadband platforms exhibit the features of two-sided, or better multi-sided markets*. No player can succeed to conquer the attention of new users in those markets without good network connectivity, a large participation of application and content providers, one or more compatible device producers, and of course an established population of users²³. This peculiarity creates, *i.a.* also problems in terms of the selection of appropriate remedies. In particular, cost-based pricing is in most cases inappropriate for these types of markets²⁴, and even asymmetric regulation as a whole can create problems, since behaviours that may be erroneously considered as monopolization strategies are in fact replicated by all players in the market, regardless of their market power.

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Figure 2 – Main layers of an all-IP platform

Source: Renda (2008)

Below, I elaborate on each of those developments in more detail, from a layered, user-centric perspective.

1.1.1 Next generation access: the gate to the ecosystem

The physical access layer of the modern broadband platforms is traditionally dominated by attention towards unbundling of the incumbents' networks as a tool to boost competition in markets where the magnitude of entry barriers and the investment needed to replicate the access infrastructure were considered to be prohibitive for new entrants²⁵. A major difference in international experiences can however be established between countries that could traditionally rely on a legacy cable infrastructure, together with a copper infrastructure gradually upgraded to DSL (*e.g.* the United States, the Netherlands, Belgium, Denmark; and countries that could not rely on alternative infrastructures to the copper one (*e.g.* France, the UK, Italy and many others). In the former group, some countries – most notably, the US – have decided to move to a more lenient regulatory approach by lifting mandatory network sharing obligations for high-speed broadband networks;

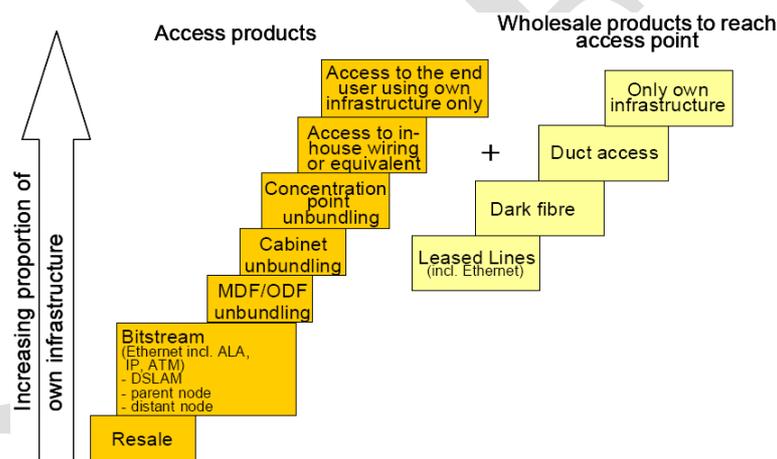
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others have maintained their original focus on network sharing, also due to constraints exerted by the EU regulatory framework in some cases.

Today, the fact that unbundling practices must change substantially in an NGN environment is uncontroversial, and was confirmed by several regulators and field experts in the past years²⁶. The main differences that are likely to emerge for what concerns the application of the ladder of investment are the following.

First, *the ladder of investment is different compared to copper networks*. Access points and conditions of replicability change dramatically from copper to all-IP networks. As explained in a recent note by the EU BEREC, and exemplified in Figure 3 below, both the access products and wholesale products available to reach the access point change significantly.

Figure 3 – The “new” ladder



Source: BEREC (2010)

Moreover, *the functioning of the ladder depends on the type of network and the specific technology used*. For example, in a FTTC network there is much less space to co-locate equipment and far fewer premises connected to each site compared to traditional networks, since passive access can take place at the street cabinet only. An Ofcom study has found that sub-loop unbundling for an FTTC network will increase the cost of provision by a minimum of 34% and

risers to 37% in the case of three additional providers²⁷. On the other hand, physical unbundling for a passive optical network (PON) is hardly practical, though it could theoretically occur at the splitter level. The easiest case for unbundling can be made for the most expensive networks, *i.e.* p2p FTTH networks: however, given that required investments are very substantial, one may end up questioning the opportunity of mandating access to those networks.

Against this background, the emerging approaches in countries that are implementing access policy for NGANs tend to focus mostly on the sharing of passive infrastructure, and in particular duct-sharing, rather than on active infrastructure sharing (such as bitstream or SLU). The scope and conditions for infrastructure sharing, therefore, change significantly, together with the conditions for effective competition between incumbents and new entrants. In other words, whether the investment ladder can be as effective in an NGAN environment, as it has proven to be in traditional copper networks, is unclear at best²⁸.

In addition, and also as a consequence of the array of available technologies, next generation access networks call for geographical segmentation in the identification and application of regulatory remedies. This increases complexity in the regulator's everyday activities, as it calls for customized remedies for every portion of territory. As acknowledged by the European Commission in a recent document,

“The deployment of fibre networks is likely to modify the current network topology and access points (in particular in relation to LLU), thus affecting the investments made. It is necessary that NRAs adopt a proactive regulatory approach which promotes investment by the incumbent and alternative operators, whilst preserving the investments already made by alternative operators in LLU”²⁹.

This also means that the challenge for policymakers has now become essentially fourfold, as they must seek to:

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- *Preserve the incumbent's incentive to invest.* Deployment of high-speed broadband networks is considered to provide a beneficial boost to the economy in terms of growth, jobs and productivity. The goal of stimulating investment has become even more important in recent times, as counter-cyclical investment in broadband networks was evoked in several countries – plus, international competition to rank high in broadband deployment has become hectic.
- *Preserve the incentives of those that have already purchased LLU.* Players that have made their way into the incumbent's copper network by purchasing access to unbundled local loop may find it very difficult to jump to different rungs of a different ladder, given the significant size of the investment already undertaken³⁰.
- *Preserve the incentive and viability of "new new entrants".* Devising pricing policy aimed at providing incentives to current LLU holders to migrate to the next generation access network is not the same thing as providing incentives to brand new entrants to climb the investment ladder from scratch. This may create substantial problems for regulators in the first years of transition towards new all-IP networks.
- *Keep prices down for end consumers.* At the end of the story, policymakers also have to ensure that whatever pricing strategy is in place, end prices for consumers are affordable, so that the demand for NGN subscription remains sufficiently high.

Whether policymakers wishing to embark in this endeavour will be able to strike the balance between these four objectives, is matter for future evaluation. To be sure, the case for mandatory network sharing is likely to become weaker in the age of convergence between fixed and mobile communications, since the advent of 4G wireless networks promises to provide end users with a reasonably substitutable technology to access the Internet at sufficient speed compared to

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xDSL or even fibre: expectations on this upcoming competition have been expressed in several countries³¹.

The consequences of this convergence in regulatory terms are almost devastating for the current regulatory models. For example, fixed-line incumbents, or any fixed-line player that used to have significant market power may not be found to hold SMP anymore. This also means that the essential facilities nature of fixed-line networks may fade away, together with the economic foundations for mandatory network sharing. This is even more likely since the cost of deploying 4G wireless are very competitive compared to the cost of deploying fiber throughout national territories³². Moreover, the remedies that can be imposed by a regulator are not necessarily focused on access to the SMP player's network, given the diversity of the players included in the same market.

1.1.2 Higher layers: where most things happen

Higher layers of all-IP platforms have traditionally been shielded from heavy *ex ante* regulation, also since the minds that gave birth to the Internet decided to introduce some key rules and standards that guarantee that the network design remains end-to-end and based on open standards³³. The most important public interferences of the public hand into the functioning of market and network forces in cyberspace are represented by competition and privacy cases at the application layer, and by (sometimes heavy) regulation in the content layer. Below, I focus on competition issues, in line with the main focus of this paper.

The peculiar architecture of modern broadband platforms is very similar to (and increasingly merged with) another architecture, that of personal computers. Also in the case of PCs, several layers are essential to enable a quality end user experiences: hardware (architecture), the operating system and middleware (the logical layer), applications and content, plus the ability and effort of the end-user to become familiar with the system (sometimes called “wetware”). Given

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this similarity and the digital nature of these complex system goods, the evolution of public policy and market forces in personal computing is likely to be a more useful benchmark than traditional, copper-based telecoms policy to identify the most appropriate policy approach. In this respect, the main aspects that must be taken into account are the following.

First, *in the personal computing ecosystem, proprietary business models have always interacted with semi-open and completely open models, in a way that stimulated product innovation.* For example, Apple's Macintosh adopted a proprietary model, where almost all complementors were built by Apple; Microsoft succeeded on the PC market thanks to a semi-open architecture, where all layers of the value chain were open to competition but one, the operating system, was under the control of Microsoft. Then, other business models emerged, which predicated full openness at the operating systems layer, but solve the revenues problem by tying the sale (free of charge) of the operating systems with the purchase of (for profit) hardware, software and/or after-sales services in the aftermarket. This is the case of Linux-based platforms launched for the server market by IBM or Novell. A few years later, similar competition between different business models emerged in music downloads, with Apple being able to launch the iTunes-iPod system mostly thanks to vertical integration and control over DRM standards. The evolution of digital media stores and the many alternative business models that are emerging testify that a degree of "proprietary-ness" is needed in some cases to help markets take-off, and to convince all stakeholders involved that the model will be able to guarantee revenues for everybody (in the case of iTunes, the DRM was essential to convince the record companies to license their repertoire to Apple)³⁴. When the market becomes more mature, users normally start demanding more openness and interoperability. This, however, does not mean that skipping directly to an open world is the best possible policy choice: incentives to create new products and services would not be sufficient in the early days of the industry, and the more open world may never materialise in the end without some degree of control of the value chain at the beginning.

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Another important feature of the PC and Internet ecosystem is that *most often, companies that succeed in creating an IP-based platform also generate substantial positive externalities in neighbouring markets*. An oft-neglected feature of the *Microsoft* cases in the US and EU was that several companies that were involved in the facts of the case, such as application providers or OEMs had also enormously profited from the success of Microsoft Windows, as their sales had been boosted by the increase in demand for the PC system due to the standardization and tipping that the OS layer had gone through. The same can be said today for all those companies that gravitate around Apple's, Google's or Nokia's emerging platforms, which necessarily count on indirect network externalities to generate enough consumer demand, and accordingly open new markets to downstream players that can develop compatible applications (think, in particular, about the companies that now thrive thanks to the Apple store or Google Apps).

That said, *platform operators have historically been subject to rather heavy ex post scrutiny by antitrust authorities around the globe*. Practices such as bundling and product integration, discrimination of downstream players and anticompetitive conduct while controlling a *de facto* industry standard have become commonplace in the jargon of antitrust scholars, even more in the IT world than they were in the brick & mortar field. Problems emerged in the application of the traditional antitrust rationale to cyberspace are probably still far from being solved. To be sure, the lessons learned in the first competition and merger cases on companies such as IBM, AOL/Time Warner, Intel, Oracle and, most notably, Microsoft are now likely to backfire on the same companies that promoted those cases in the first place. After the 1980s, when the attention of antitrust authorities focused mostly on the tangible part of computer systems, since the mid-Nineties the “strongest link” in the value chain has constantly been moving upwards (or, in more traditional economic terms, downstream) in the value chain of modern computer systems, hitting less tangible, less geographically located and thus more nomadic components. This was partly due to the coming to maturity of certain technologies, such as mainframes, microprocessors and other IT equipment, which became increasingly

commoditized, and also due to public intervention, which aimed at breaking monopolies to preserve the dynamic nature of the competitive race.

*These antitrust probes have resulted in the imposition of some form of “neutrality” obligations on the side of successful platform operators, as occurred in the US Microsoft case, where the Redmond-based software giant was forced to treat all producers of complementors in a FRAND way after a complex and often tortuous investigation³⁵. During that trial, many of the contradictions related to application of standard antitrust tools to the new IT environment surfaced, giving rise to new theories and partly amended theoretical frameworks in law and economics. As widely known, Judge Penfield Jackson even proposed, in his findings of fact, that Microsoft be split into at least two separate “baby Bills”, something that would have echoed the split-up of AT&T in the early 1980s, with the creation of the “Baby Bells”. Not only this did not happen at the end, but even in the telecoms field the old “Ma’ Bell” has been re-created almost entirely through a series of mammoth mergers during the past decade. And Microsoft ended up being treated as a sort of common carrier in the PC world, with no divestiture but a series of rules that would ensure the absence of discriminatory behaviour in the adjacent layers of the PC system. On the other hand, in Europe the *Microsoft* cases ended *i.a.* with a rather oddly formulated mandatory unbundling rule (in the *Media Player* case), which was later transformed into the current “ballot screen” obligation (after the *Opera* case), under which Microsoft must guide end users through the selection of their browser product, by displaying on the user’s screen all the browsers currently available, and allowing users to freely choose their most preferred ones.*

Now, it is still unclear if and how the ballot screen rule or similar rules will be applied to players other than Microsoft in the years to come. If there will be consistency in the application of EU antitrust rules in the future, the (eventually successful) attempt to break down Microsoft’s quasi-monopoly in its layer of the value chain may well backfire on those that acted as Microsoft’s key rivals in past years. For example, Apple’s refusal to allow Adobe Flash-enabled

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applications on the iPhone, iPod and iPad has already triggered protest and a possible antitrust investigation under Section 2 of the Sherman Act³⁶. The day Microsoft decides to have its revenge, a case on the integration between the iPad and the Mac OS would not come unexpected. And this regardless of the fact that Apple holds only a tiny fraction of the smartphone market (estimated at 15%³⁷): even if this (rather broad) definition of the relevant market will be adopted by antitrust authorities, the problem here is access to Apple's cloud, its very profitable application store that generates a fortune in revenues for both Apple and app developers. As in the famous US *Kodak* case, the fact that Kodak held a miserable 3% market share in the primary market (copiers, dominated at the time by Xerox) did not stop US authorities from condemning Kodak for misconduct in the aftermarket³⁸.

Similarly, antitrust probes are underway vis-à-vis another IT giant, Google, regarding its dominance in both the online advertising and in the search fields³⁹. Antitrust "enthusiasm" has led, for example, a US consumer association to advocate for the "structural separation" of Google to break down the link between search and advertising, along the lines of the "baby Bills" rationale⁴⁰. The logic behind these calls is that, by controlling a large share of both the online ad and search markets, Google would be able to discriminate against rivals, influence consumer behaviour and collect personal data in a way that makes its position impossible to match for any rival, and stifles competition and innovation in neighbouring markets. The revolt against Google recently exploded in France is just another sign of the centrality that the Mountain View-based software giant has gained in this environment; also, it is a sign of *how contagious ex ante regulation and structural remedies can be in the digital arena*. I will come back to this issue later on, in Section 2 of this paper.

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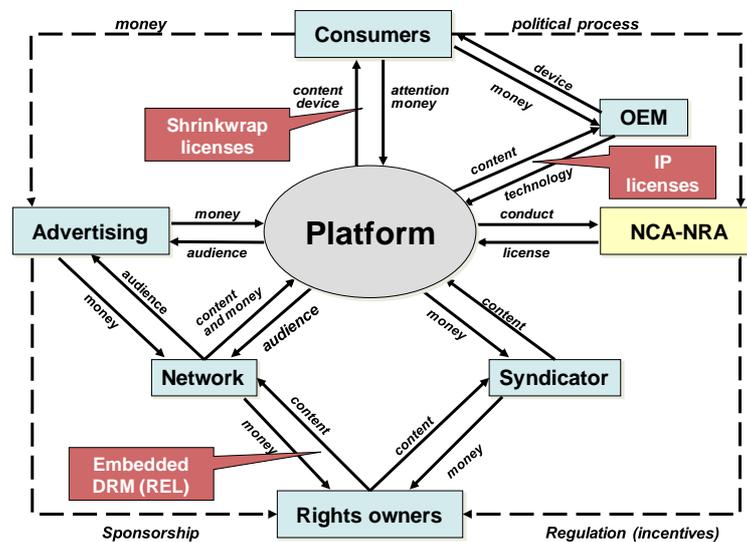
1.2 Understanding the value chain

The previous section has shown the various claims that have emerged over time as the development of modern IP-based platforms have led to the emergence of competition problems – from the regulatory holidays debate to the *Microsoft* cases, to the net neutrality debate and to the current calls for search and cloud neutrality. As noted in the previous pages, one interesting feature of this evolution is that those debates feature very similar economics and a common trend, from the infrastructure layer through to higher, less tangible layers. To some extent, this is similar to the learning process of human beings: as we learn how to use the letters and then the words, we forget about the technicalities and concentrate on gradually more sophisticated concepts⁴¹. Likewise, the development of IT markets is leading to an increased commoditization of lower layers, which become increasingly standardized and/or interoperable, and a shift of end users' attention and – consequently – of market players on higher layers, especially applications and content.

The delivery of interactive content over a digital platform requires the participation of a number of different players situated along the value chain. Figure 4 below sketches the main links amongst industry players.⁴² Of course, the Figure reports generic denominations that, depending on the specific sector, may be replaced with more specific definitions. For example, consumers can be renamed as “users” in communication technologies and Web-based environments, while it is often defined as “audience” in the case of TV channels and radio stations, and “reader” in the case of press. Similarly, the role of platform is attributed to entities defined as “channel”, “station”, “newspaper”, “portal” or “website”.

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Figure 4 – The platform operator’s game

What emerges from Figure 4 is a context dominated by a plurality of markets and a large number of different operators. Each of the players faces specific challenges in operating on each of the markets.

- *Copyright owners* can deliver content and applications on a number of alternative platforms. This can be done both by the original creator of a copyrighted work or by a content/application aggregator, such as a publisher or a collective rights organisation. In the latter case, such activity will require an initial investment for the creation of a broad repertoire of attractive content or apps. These operators can deliver content through the many available channels of distribution of their content, by choosing: the number and type of channels through which content will be made available; the type of license agreement with platform operators; whether to version their content amongst different platforms; whether to embody technological measures of protection (DRM) in their content etc. As will be explained below, convergence has made all these choices more complex. And platform operators also have to choose which content and which applications to allow on its platforms, unless it keeps the platform entirely open to third-party

content and applications. As an example, Apple's App Store for iPhone has evolved from a managed system into a more open system, where third parties can develop their own compatible apps. Openness is triggered by independent application aggregators, such as, *i.a.* GetJar, reportedly the world's largest independent app store, with over 50 million mobile application downloads per month, and supporting more than 1,800 phones⁴³.

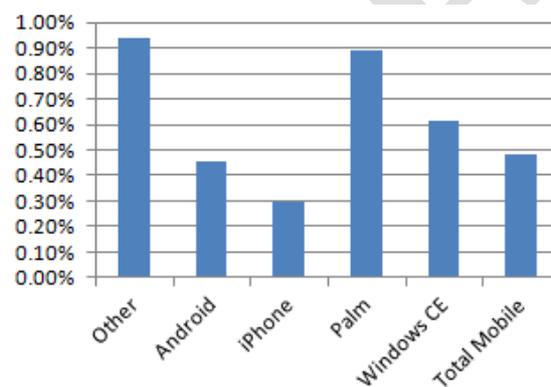
- *Network operators*, on the other hand, possess the technology for data transmission. They face high sunk investment costs for the purpose of developing such enabling technology and can support more than one platform, as is the case for TV broadcasting, where a single infrastructure supports a number of different TV channels, or in the case of telecom services, in which the “essential facility” owner must allow the transmission of content over a number of different platforms. As will be explained in what follows, convergence leads most network operators to integrate vertically along the value chain, becoming triple-play service providers. At the same time, they face competition from players originally active in other domains, who aim at becoming platform operators and “commoditize” the use of the network as one of the ingredients of modern platforms.
- *Consumers* (end-users) choose to use the platform based on a number of different variables. First, they seek valuable (*premium*) content and killer apps. Secondly, they base their choice on the overall cost of system use, which includes the need to face additional costs to adopt a new technology and try to minimise the hassle of having to install a new hardware device (PC, decoder, console, smartphone etc.) and get familiar with its software and overall functioning. Thirdly, in an increasing number of cases consumers choose platforms that enable interactivity with both the content and application provider and other consumers, and as such allow for the exploitation of direct network effects. This occurs in the case of end-to-end networks, not in one-way, broadcast networks. Only the former, as a matter

43

of fact, obey to the so-called Metcalfe’s law, according to which the value of a network increases exponentially as the number of users increase linearly⁴⁴.

- *Advertisers* provide a crucial input for most platforms, depending on the revenue mix model of the platform operator, that normally includes both revenues from subscriptions and revenues from advertising. In their attempt to allocate resources to maximise the “click-through” ratio, advertisers choose those platforms by exploiting the indirect network effects, *i.e.* increasing their willingness to invest in those platforms with a large user installed base, a valuable repertoire of content, high-speed, reliable communication technologies etc.

Figure 5 – Click-through rate by mobile OS, 2009



Statistics based on 93,832,911 impressions across the Chitika network. Sept. 2009



- *OEMs – Original Equipment Manufacturers* – are those players that produce hardware complementors necessary to enable access to interactive content by final users. Examples include PC manufacturers, firms producing decoders for receiving the signal from digital terrestrial and satellite TV, mobile phone manufacturers etc. These players acquire the technology from platform operators or network operators and develop their own devices, often competing with rival OEMs. In some other sectors, OEMs and platform operators can coincide, as is the case for proprietary architectures adopted

by Apple for its *iTunes-iPod* system or for Nokia's Ovi. More open architectures have proven successful in many markets, as they enable co-competition and collaboration between players along the value chain. A good example is that of the *i-Mode* platform developed by Japanese NTT DoCoMo, based on carefully conceived revenue-mix models and billing systems. The *i-mode* platform has then been adopted by a number of national OEMs in the first half of this decade.

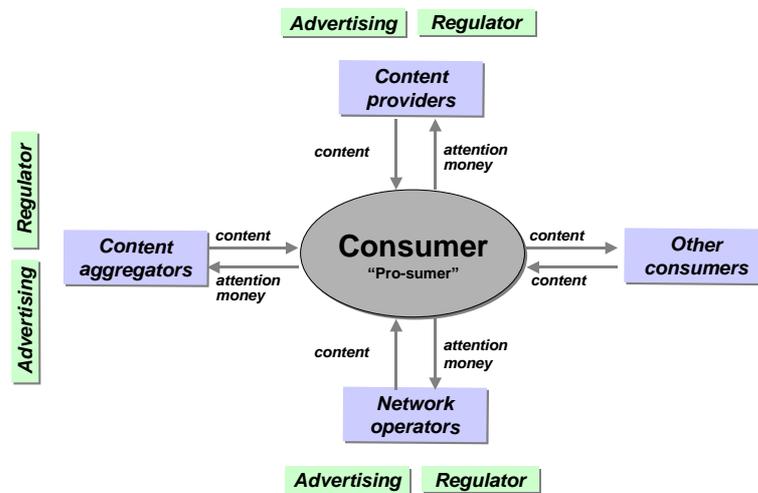
- *NRAs – National Regulatory Authorities* issue licenses and authorizations to operate in single national markets, and are in charge of issues such as spectrum management and frequency allocation. They also monitor the conduct of market players by applying sector-specific regulations and legal rules and imposing sanctions. Of course, their approach to industry regulation affects the ability of platform operators to engage in horizontal collaboration with rivals and vertical collaboration with complementor producers, as well as in many other conducts such as price setting and price discrimination strategies.
- *NCAAs – National Competition Authorities* also affect incentives of the industry players and the viability of business models based on proprietary architectures. An example is the application of national competition rules on refusal to grant interoperability to rivals (at the EU level, Article 102 TFEU), which was the subject of recent cases at EU level (*e.g. Microsoft*) and national level (*e.g. VirginMega v. Apple* in France). Certainty in the application of competition rules at the intersection between IP and antitrust is key for players in this industry.
- Finally, *Platform operators* are the players that provide interactive multimedia content to final users. Given the position they hold, they are called to balance the interests of different players involved in the value chain. Platform success crucially depends on the operator's ability to secure adequate access to dominant infrastructures, access to premium content, competition in the production of hardware devices, and a large customer installed base, such as to attract advertising investment. It is worth reminding that in the Internet ecosystem, everybody can become a platform

operator, and this is the most aggressive form of competition seen today. For example, Nokia – a mobile phone manufacturer (OEM) – has launched its Ovi platform, which competes on the market with Apple’s and Google’s as well as, potentially, platforms developed by fixed-line network operators and mobile operators (e.g. Vodafone).⁴⁵

Figure 6 sketches the emerging competition between different players operating in different markets. This emerging inter-market competition creates a number of teething problems for NCAs and NRAs, which often have to cope with industry practices in which the concept of market is blurred, some apparently anti-competitive practices are efficiency-enhancing, and viceversa. As a general remark, the main challenge such authorities have to face in dealing with convergence is how to create a level playing field, enabling technological neutrality and entry of new players in different (but competing) markets. This also implies removing asymmetric regulation and a careful approach to interoperability. In addition, inter-market competition creates a number of challenges for policymakers when it comes to defining the boundaries of IP rights. Examples are the right to deny interoperability, the right to impose DRM protection, whether to allow for transmission of IPR-protected content on more than one platform (for example, rights on football league matches already acquired by sat TV broadcasters but then licensed also to digital terrestrial TV operators and triple-play mobile service providers), and finally whether and to what extent to allow self-protection against p2p file sharing.

Finally, Figure 6 also implies that regulatory symmetry is essential in order to ensure the level-playing field between different firms competing to become successful platform operators. Currently, as already explained above in this section, it makes a huge difference whether a firm wishing to engage in platform competition is originally a facilities-based operator, an OS giant, a search champion or a vertically integrated player that couples the physical device with an attractive app cloud. Removing this source of asymmetry is one of the key challenges of policymaking in the near future.

45

Figure 6 – Digital convergence and platform competition

Source: Author's elaboration

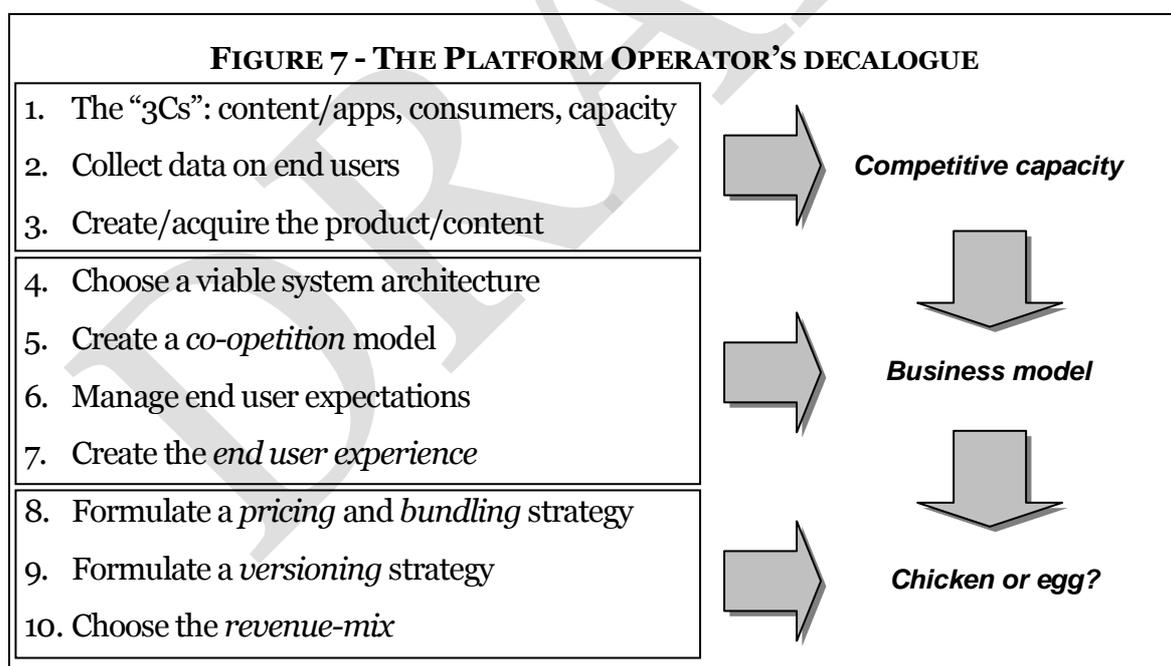
1.2.1 Two- and multi-sided platforms

The emerging competition between platform operators in the Internet ecosystem is a very complex battlefield that exhibits the typical features of a multi-sided market⁴⁶. The successful platform operator will be the one that strikes the most optimal balance between the interests of all the players involved, including of course end users. The key steps of the development of a business strategy to become a successful platform operator in the Internet ecosystem are summarised in Figure 7 below. As shown in the picture, the first series of steps is the development of the operator's competitive capacity, including the content and applications that will be available on the platform, the needs of target end users and the overall assembling and marketing features of the product itself. Related steps are also the choice of a system architecture, and in particular the degree of openness that the market allows for – end users always call for more openness, all other things being equal; but end users may also require more safety and less malware, as well as more speed and quality of service when using certain applications and services. This is why managing users' expectations is a very important part of the process.

46

Due to the complex system-good nature of emerging platforms, it is very unlikely that a platform operator will be able to adopt a purely proprietary and close architecture⁴⁷. This is why platform operators also have to define an effective co-opetition strategy, and choose the markets in which cooperation with competitors will lead to standardization, and those where keeping one's own competitive advantage through proprietary choices will be the best choice. All this depends on the specific features of the sub-market at hand.

All these steps contribute to the quality of the user's experience. But the task of the platform operator is not finished yet. In order to build a viable platform, the operator needs to devise a smart pricing and revenue policy to keep everybody on board. The literature on multi-sided platforms has gone a long way in analysing the economics of revenue and pricing policies. Past examples such as the i-Mode launched by NTT DoCoMo were very important in understanding the role of all system participants in the development of a successful platform.



Source: author's own elaboration

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As regards the pricing and revenue policy, the following issues must be highlighted.

- First, *IT platform operators often depart from standard cost-based pricing rules when setting the price of their multiple services*. As highlighted by the economics literature, regardless of market power, a platform operator has, first and foremost, to balance the interests of the various platform users involves, and confront with competition and with the various users' willingness to pay. Accordingly, mobile operators use forms of metering by reducing the upfront payment for smartphones through handset subsidies, and then charging flat fees for phone usage that allow for reaching the break-even. Similarly, Google does not charge users but organises auctions for placing ad spots in the paid advertising part of its search page. Examples are virtually endless, and echo earlier strategies adopted in more traditional markets, e.g. Gillette's pricing policy of bundling razors with blades, or selling razors for free to charge slightly more for the blades. The economic justification for metering has been explored by several authors, also in the case of handset subsidies⁴⁸. The tendency towards adopting a non-cost-based, carefully designed combination of flat fees and usage-based or app-based micropayments seems to become stronger for many fixed-line and mobile platforms.
- More generally, *a viable pricing strategy for multi-sided platforms under competitive conditions may well include both price discrimination and versioning, i.e. differential pricing*. Price discrimination, in this respect, entails charging different prices for similar services to different groups in order to extract users' willingness to pay – this is the well-known case of Ramsey pricing in economics. At the same time, differential pricing implies the provision of different services at different prices, with the aim to better match the heterogeneous preference of end users when it comes to specific characteristics of the service. For example, some consumers wishing to purchase an internet subscription may be more interested in high-QoS services and willing to pay more for them, whereas other users – perhaps

48

more oriented towards simpler uses, *e.g.* email and surfing to read the news – may be more interested in having a low-cost, low-QoS broadband connection. As in all markets, competition and the erosion of margins in the Internet ecosystem is expected to lead to more tailoring of platform offers for different types of end users⁴⁹. For example, Google offers different conditions to advertisers wishing to appear in different places of the search page; pay-TV channels offer different pricing packages for different content packages; etc.

- Finally, *the role of advertising is key, and control of ads is essential* in order to reap sufficient revenues and avoid charging excessive prices to end users or other platform users. This argument has recently been used to support the view that Google has an inherent advantage on competitors such as Apple in the development of a viable platform, due to control of mobile advertising revenues in the value chain⁵⁰. The US FTC in any event cleared the acquisition of mobile advertising firm AdMob by Google exactly because Apple's recent announcement of its own iAd mobile ad service and the dynamic nature of the market still ensures a degree of competition in this region of the ecosystem. The FTC stated that “[a]s a result of Apple's entry, AdMob's success to date on the iPhone platform is unlikely to be an accurate predictor of AdMob's competitive significance going forward, whether AdMob is owned by Google or not”⁵¹.

1.2.2 Conclusion: competing for eyeballs in the Internet ecosystem

In the Internet ecosystem, just as Herbert Simon wrote a few decades ago, a wealth of information creates a poverty of attention. Likewise, the convergence between previously separated market has created a common arena where players of the most disparate origin end up competing. Those that manage to capture the attention of end users eventually have a better chance to win the race. This is why some layers of the Internet ecosystem have become more

49

50

51

important than others, meaning that control of those layers is key to the control of user behavior and, ultimately, achievement of some degree of market power in the ecosystem. In the early days of personal computing, the operating system used to perform that function, as it was the first thing users saw when they switched on their PC. Today, users base their experience on different types of OS and demand the ability to navigate through the complexity of cyberspace with the help of someone that guides their choices. This is why the billing function and the search function have become so important. Typically, a platform operator will manage the full customer experience by controlling most of the end user's bill through flat pricing; alternatively, indirect network externalities can be exploited even more powerfully by providing a gateway product for free, attracting a critical mass of customers, and then reaping revenues through additional services, or by charging advertisers.

Several variants of these business models have emerged in cyberspace, but all of them are aimed at conquering the most scarce resource of the Internet ecosystem: users' attention. This is why some commentators have used the term "competition for eyeballs" in the past few years: once the attention of end users has been conquered, several services, applications and content can be offered on the web. This is why even social networking platforms such as Facebook or Twitter embed the germ of market power: they are already being used as fabulous platforms for advertising⁵². And this is also why the Internet ecosystem, much more than an entirely "neutral" network, is a "neural" network, *i.e.* an ecosystem in which the main economics are dictated by the ability of our brain to process information, and by the modularity and path-dependency that our brains exhibit.

Accordingly, to conclude this brief exposition of the emerging competitive strategies in the Internet ecosystem, it bears observing that the degree of market power held by each would-be platform operator strongly depends on the bargaining power of players located along the value chain, which represent inevitable counter-parties for the platform operator. The strongest link in the value chain may change depending on the platform and on the business model

52

adopted, as well as on the degree of competition at any given layer. Predicting which layer will end up being the most important in the years to come would fall outside the scope of this brief illustration: the main purpose of this section, to the contrary, was to highlight that (i) competition in the Internet ecosystem may warrant a more careful, dynamic and forward-looking treatment compared to traditional sectors of the economy; and (ii) asymmetries in the regulatory treatment of players located at different layers of the value chain may result in distortions of platform competition, and should thus be avoided unless they are justified by the need to remove sources of egregious, irreversible market power, or refusals to supply truly indispensable assets.

In section 2 below, we focus more directly on past, present and future gateways to the ecosystem.

DRAFT

2 GATEWAYS OF CYBERSPACE

Where the confrontation between “old-style” *ex ante* regulation and the economics of the IT ecosystem has reached a peak is, obviously, in those areas where the two worlds overlap. This typically occurs for all those services that become the “gateway to cyberspace” for end users, *i.e.* the key passages towards applications and content that end users have to go through in order to fully enjoy the cyberspace experience. Landmark examples of these gates of the ecosystem are Internet access services, search and content aggregation platforms and intermediation services to provide access to application clouds. Below, we explore them in logical (and chronological) order.

2.1 The telecoms-IT interface: convergence and collision

The telecoms-IT interface became key for end users with the emergence of the World Wide Web in the mid-nineties. It is the most straightforward example of an area where the physical infrastructure – the telecommunications network – sublimates into the intangible Internet. As telecommunications networks developed the capacity to carry digitized data at high speed – the core network in most industrialized countries is already made of fibre – retail broadband access has also become the key toll to enter the ecosystem. Inevitably, this has potentially left telecom network operators – especially fixed-line ones at the outset – with some degree of control over users’ bill and behaviour.

Convergence became collision in 2005, when a small telecom operator named Madison River decided to use this degree of control to avoid that its subscribers could choose a competing VoIP provider (Vonage) once on the Internet. The famous *Madison River* case, ended with a negligible fine on the ISP, gave rise to the most furious debate ever seen in the telecoms world, especially in the US, where after half a decade it is still far from its final word.

Arguments in favour of regulatory intervention to mandate full net neutrality and keeping telecom networks as “dump pipes” developed with exclusive reference to the infrastructure and logical layers of the value chain, not with any

of the other gateways that we will be touching on in the next sections. On the one hand, telecom operators claimed that the impossibility to manage traffic on their networks would have jeopardised the quality of the user experience, denied the possibility of a more efficient and effective provision of the Internet service, and leave the whole Web prey of spam and illegal p2p file sharing, which – despite its illegality – continued for a long time to represent roughly half of the whole Internet traffic. On the other hand, “neutralists” challenged this view by stating that the end-to-end nature of the Internet should not be contaminated by intelligence at the core of the network, which would reduce the value of the network due to filtering of content and speech and the narrowing down of spaces for creativity at the edges.

Today, the debate seems to evolve towards the recognition of the importance of traffic management for certain, specific purposes (*e.g.* spam filtering), coupled with the definition of those traffic management practices that can be considered as reasonable, and under what circumstances. Most notably, there was a strong reaction by academics to the notice of proposed rulemaking (NPRM) published by the FCC in late 2009, announcing the intention to regulate ISP’s behaviour to ensure the neutrality of the network, with the exception of yet-to-be-defined reasonable traffic management practices. As already mention in the introduction to this paper, the debate has also mounted in the European Union, both in the Commission and in the European Parliament.

Several academics have gone back to the theory of regulation and the peculiar economics of the Internet ecosystem to assess the soundness of policies at study around the world. For example, a numerous group of academics from several parts of the world filed a submission with the FCC to state that, in their opinion, the NPRM is not grounded in economics since it fails to demonstrate the existence of a market failure⁵³. At the same time, Nicholas Economides and Joacim Tåg (2010) analyze stylized models of two-sided markets in an attempt to assess the welfare effects of net neutrality, and conclude that consumers are unambiguously worse off under net neutrality, while the effect on platform

53

operators is ambiguous⁵⁴. Also, Florian Scheutt (2010) provides an interesting survey of the economic literature related to net neutrality, which focuses on the incentive of market players to engage in the conducts that allegedly would compromise the viability of the Internet⁵⁵. An analysis of the main economic features underlying the net neutrality debate is also available in Renda (2008).

Based on existing literature, it is fair to state that the set of conditions that must be met in order for the net neutrality problem to emerge in the Internet ecosystem is much narrower than what many neutralists have argued in the aftermath of *Madison River*. More in detail, in order for ISPs to really have an incentive to contemplate restrictive rules to stakeholders active at higher layers, and for a mandatory net neutrality rule to be reasonably grounded in economics, the following, cumulative market outcomes would have to be observed:

- *ISPs must have market power in the provision of Internet access to end users.* This is the typical problem that regulatory frameworks around the world have tried to solve in the past two decades through liberalization policies. It is also a constantly changing problem due to increased competition between fixed and mobile players, as already highlighted above.
- *ISPs must also hold market power along the value chain.* This means that they have control of their users, and can dictate conditions to players located at all higher layers. For example, this condition would be satisfied if a regulator concluded that, in the famous agreements between AT&T and Apple, it is AT&T, not Apple, that has the greater bargaining power.
- *ISPs must be dominant platform operators,* meaning that no other platform governed by any other player can exert competitive pressure on the ISP's behaviour.
- *Users must be homogeneous and must not demand different quality of service for different prices.* This means that ISPs do not increase consumer welfare by engaging in product differentiation and differential pricing.

54

55

- *There are no congestion problems and all applications can easily co-exist on the same network.* If this is the case, any traffic prioritization would simply be aimed at extracting more surplus from users, application providers or content providers.

If all these conditions are satisfied at the same time, and for a reasonable amount of time in the future, then net neutrality legislation may be justified in economic terms. In all other cases, market failure would have to be carefully detailed, and in addition, governments should also show that any regulatory measure would perform better than what the market is already doing. It does not merely take a market failure (if any) to justify regulation: the absence of a worse regulatory failure should also be demonstrated with facts, or at least a credible argument. Thus, the statement of several economists, according to which “While the markets at issue in this proceeding are characterized by product differentiation, high fixed costs and other deviations from the textbook model of ‘perfect competition,’ the evidence provides no support for the existence of market failure sufficient to warrant *ex ante* regulation of the type proposed by the Commission”⁵⁶.

What is worse from the standpoint of economists is that regulating *ex ante* to flatten ISP practices would deprive society of an array of potentially welfare-enhancing transactions, in which players would reach different agreement based on their specific needs, and would meet at different levels of quality of service on the Internet. As clarified by Tim Berners-Lee a few years ago, “Net Neutrality is NOT saying that one shouldn’t pay more money for high quality of service. We always have, and we always will.”²⁷ Brito et al. (2010) concur with this view – expressed also in Renda (2008), when they state that “the practices that would be banned under the NPRM are likely, in most circumstances, to be welfare-enhancing. While it is possible to construct theoretical models in which economic welfare might be harmed, there is virtually no empirical evidence that such harm has occurred or is likely to occur in the future. Thus, it is extremely

56

likely that the regulations proposed in the NRPM would harm consumers and competition and reduce economic welfare”⁵⁷.

More in detail, the economic literature is almost unanimous in considering second-degree price discrimination – including the sale of a fast lane on the Internet – as welfare-enhancing under reasonable assumptions. Papers such as Lee and Wu (2009) and Kramer and Wiewiorra (2009) provide useful guidance in this respect. At the same time, the ISP’s incentive to degrade the quality of competing products is more controversial: but this is exactly what competition laws are there for. In a previous paper (Renda 2008), I already explained that under most circumstances antitrust law is already well equipped to tackle the problems that may emerge in this and other markets. Regulating *ex ante* to fix a problem that is common to several markets does not seem different from throwing the baby with the bath water. Again, the collective submission of several economists to the FCC confirms this view⁵⁸.

To be sure, the debate over the need to keep the telecom pipes as dumb as possible is not over: many commentators, however, are starting to realize that the debate should be either stopped, or enlarged to all those players that play the role of platform operators, hold a share of the users’ attention and, consequently, can affect users’ decisions and alter competition in all complementary markets. It is to those players that we turn in the next sections.

2.1.1 Google’s and Verizon’s legislative statement

Co-regulation may happen anyway, in the shadow of the law – or, better, in the absence of legal certainty on what the law is. First signs of agreements along the value chain are coming from Google’s and Verizon’s joint work on net neutrality, which started from a shared statement of principles in October 2009 and evolved into a joint filing to the FCC, and was eventually translated into a concrete legislative proposal on August 9, 2010 (hereinafter, “the VG proposal”). The main pillars of this agreement “across layers” are: (i) preserving the

57

58

freedom, for end users, to choose what content, applications, or devices they use, since “openness has been central to the explosive innovation that has made the Internet a transformative medium”; and (ii) the need to encourage both investment and innovation to support the underlying broadband infrastructure, as “an imperative for ... global competitiveness”.

The statement is articulated along seven main proposals, which can be summarised as follows⁵⁹:

1. Users’ rights. Consumers should have the right to

- Send and receive all lawful content of their choice;
- Run all lawful applications and use lawful services of their choice;
- Connect their choice of legal devices that do not harm the network or service, facilitate theft of service, or harm other users of the service.

This also means that broadband Internet Access Providers (BIAPs) would be prohibited from preventing users to engage in these activities and exercise their freedom.

2. Non-discrimination. A BIAP would be prohibited from engaging in undue discrimination against any lawful Internet content, application, or service in a manner that causes meaningful harm to competition or to users. Prioritization of Internet traffic would be presumed inconsistent with the non-discrimination standard, but the presumption could be rebutted.

3. Transparency. BIAPs should inform end users of any traffic management practice they engage in on their networks, in order to enable an informed user choice.

4. Network management. BIAPs are permitted to engage in reasonable network management, including technically sound practices to

- Reduce or mitigate the effects of congestion on its network;
- Ensure network security or integrity;

59

- Address traffic that is unwanted by or harmful to users, the provider's network, or the Internet;
 - Ensure service quality to a subscriber;
 - Provide services or capabilities consistent with a consumer's choices; that is consistent with the technical requirements, standards, or best practices adopted by an independent, widely-recognized Internet community governance initiative or standard-setting organization;
 - Prioritize general classes or types of Internet traffic, based on latency;
 - To manage the daily operation of its network.
- 5. Freedom to launch additional online services.** BIAPs that comply with the above obligations and guarantee basic user rights can offer also any additional or differentiated services, separate from broadband Internet access, which can also make use of or access Internet content, applications or services and could include traffic prioritization. The FCC will monitor to assess whether these (arguably more innovative and less open) services threaten the meaningful availability of broadband Internet access services or have been devised or promoted in a manner designed to evade these consumer protections.
- 6. “No wireless *Carterfone*”.** Wireless Broadband should not be subject to all these rules, with the exception of the transparency principle. The U.S. Government Accountability Office would report to Congress annually on the continued development and robustness of wireless broadband Internet access services.
- 7. Enforcement:** The FCC would enforce the consumer protection and non-discrimination requirements through case-by-case adjudication, but would have no rulemaking authority with respect to those provisions. Parties would be encouraged to use alternative dispute resolution processes established by independent, widely-recognized Internet community governance initiatives, and the FCC would be directed to give appropriate deference to decisions or advisory opinions of such groups. The FCC could grant injunctive relief for violations of the consumer protection and non-discrimination provisions, by

imposing a fine up to \$2,000,000 for knowing violations of the consumer-protection or non-discrimination provisions. To the contrary, the FCC would not have any authority over Internet software applications, content or services. Regulatory authorities would not be permitted to regulate broadband Internet access service.

A first look at the joint proposal reveal similarities, but also very significant differences compared to the latest policy proposals of the FCC and other public policymakers in other countries. While the user rights echo the Internet freedoms endorsed by the Federal Communications Commission already in 2005, during Powell's chairmanship, the general non-discrimination obligation is perhaps the strongest contribution of the proposal towards an open Internet, and adds to the widely agreed proposal on transparency of business practices, which helps a more informed decision by end user when deciding about their Internet subscriptions.

However, the “open” provisions in the VG proposals end here: the long list of reasonable network management practices (including the last residual category where BIAP are allowed to “manage the daily operation of their network”) will have to be interpreted as an identification of the types of practices that could potentially lead to rebut the adverse presumption established under item 2) above, and not more than that – otherwise, the proposal will be considered as impractical by the US authorities due to an overly broad interpretation of what is a “reasonable” traffic management practice. Also, the possibility of qualifying the prioritization of “types” of internet traffic based on latency, although reasonable and very consistent with technical problems currently featured by broadband networks (including “jitter” and micro-congestion storms) is certainly far from what net neutrality advocates would like to see in an FCC policy decision. Needless to say, also the provisions on additional online services and –even more – the exemption of wireless broadband are likely to trigger a hectic debate in the weeks to come.

Some innovative ideas in the VG proposal are on the enforcement side. The proposal calls for ADR mechanisms and a swift reaction capacity of the FCC through the adoption of injunctive measures. At the same time, however, the

proposal denies the extension of FCC competence over broadband internet access and higher layers. Overall, the proposal restricts the FCC competence to overseeing compliance with (and *ex post* enforcement of) the non-discrimination obligations and on the additional online services, whereas the GAO will oversee the development of wireless broadband platforms.

Overall, the VG proposal seems to strike a balance between all the interests, but is unlikely to put an end to the debate, especially for what concerns wireless broadband and the additional online services. In addition, the proposal leaves room for interpretation as regards the types of practices that will be considered as “reasonable”, and can easily be coupled with a co-regulatory agreement on technical criteria to be followed for assessing whether a given practice will be considered as reasonable.

In addition, the proposal will have to overcome the mounting criticism on the VG agreement, which has been thought to aim at the creation of a “fast lane” for Google over Verizon’s networks – something that has been voiced since 2008⁶⁰. In principle, the key issue to be clarified would be: (i) whether the VG “fast lane” would belong to the additional online services mentioned in the VG proposal; and (ii) whether such services would fall entirely outside the scope of non-discrimination obligations that can be enforced *ex post* by the FCC. If this were not the case, then the debate over the emergence of a two-tier Internet with a premium track and a “dirt track” may rise again from the ashes, and become even more hectic than it has been so far. And the issue of whether and to what extent antitrust authorities would be able to step in to monitor market developments would come back as a key issue to be solved (see below, Section 3.2).

As a final remark, it must be observed that the VG proposal only addresses net neutrality, not neutrality versus diversity at all layers of the value chain. It seems, to a certain extent, still the result of a sense of urgency – *i.e.* reaching adequate legal certainty on what can constitute reasonable traffic management, the possibility of engaging in product differentiation between BIAPs and the

60

need to clarify that wireless is another story. Even if this is understandable after years of debate on net neutrality, an ideal policy initiative on those practices that can be considered as reasonable on the Net should embrace all players, including wireless players (subject to the obviously different technical features and congestion problems of their networks) and players active at higher layers: as explained in the previous sections, the neutrality v. diversity problem affects them just as it touches on BIAPs.

2.2 Other key interfaces: search as the gateway of cyberspace

Just as the provision of access to the Internet service has been considered for many years as the key gateway to cyberspace for end users, the increased size and complexity of cyberspace has led to the emergence of the search function as another, essential gate to the discovery of information and the realization of a quality end-user experience in cyberspace⁶¹. Given the over-abundance of information and the size of search costs for end users, a very tiny fraction of possible Internet uses would be possible without an adequate, effective search function. The need for a “facilitator” that mediates between the ocean of information available on the Internet and the limited resources of the end user has materialized already in the 1990s. Think, for example, of the enormous success obtained by Napster, a service that was mostly limited to facilitating the exchange of information between peers (on “who has what music” in his or her own hard drive)⁶². The issue with Napster’s alleged vicarious liability became so difficult to solve under traditional copyright laws (including the Supreme Court precedent, *Sony v. Universal studios*), that in the following *Grokster* case the final Supreme Court decision had to stretch its previous interpretation of the law, by creating an almost brand new “inducement theory” to match the features of the increasingly complex software programmes aimed at helping end users share multimedia files on the Net⁶³.

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The literature existing on the economics of search engines includes Fallow (2005) and Varian (2006), who define search as one of the key activities in which end users engage once they switch on their devices and start surfing. In particular, Varian (2006) defines search engines as two-sided markets, in which the revenue mix depends on the relative strength of indirect network effects between end users and advertisers. The higher the number of end users, the more profitable the sale of ad space becomes. This, to some extent, leads the search market to tend towards “tipping”, *i.e.* the emergence of a single dominant product. This is what has happened with Google in the past few years, although the absence of lock-in effects and learning effects may lead Google’s position to be contestable. The extent of contestability depends on a number of factors, including the degree of multi-homing (which makes the calculation of market shares difficult), as well as the existence of any obstacle to the replicability of Google’s offer in terms of search results and ad space.

Moreover, competition problems may surface in case the dominant search engine leverages its position into adjacent markets in a way that makes its strategy impossible to replicate for competitors. This conduct would be very similar to the one attributed to Microsoft during the competition investigations that hit the Redmond giant during the past two decades in several regions of the world, and which culminated with a sort of “neutrality obligation” vis-à-vis all complementor producers.

In the search market, both types of problems are emerging. First, the European Commission has started its investigation on alleged discriminatory practices by Google when retrieving its search results; on the other hand, a more consolidated stream of investigation in the US and EU hit Google on its alleged dominance in the online advertising market, which – combined with its paramount position as a search engine – may confer the Mountain View company an unmatched advantage over its competitors in both markets. The new Head of the US DoJ Antitrust Division Christine Varney has been quite

explicit already in its intention to carefully look over Google, by defining Microsoft as “the past”, and Google as the present concern of US trustbusters.⁶⁴

Judging whether Google is indeed guilty of infringing antitrust laws would fall outside the scope of this paper. Here, I just wish to discuss some of the economics behind the claims that are hitting Google these days. As a matter of fact, in order to access cyberspace an end user needs much more than an Internet subscription: in an increasingly populated cyberspace, users also need someone to take them by the hand to navigate the conundrum of information available on the Net. If one player really happens to become the “must have” search engine, then its power to steer end users’ choices and behaviour becomes enormous. At the same time, players at higher layers – including vendors of any kind, as well as content providers – would become extraordinarily dependent on the dominant search engine in terms of market access, *i.e.* to really get close to end users in offering their products. That’s why the search engine has gradually become an important shop window, a place to advertise and reach customers that has no matches in contemporary cyberspace⁶⁵. According to a recent article appeared in the New York Times, “Google handles nearly two-thirds of Internet search queries worldwide ... when Google engineers tweak its supersecret algorithm – as they do hundreds of times a year – they can break the business of a Web site that is pushed down the rankings”⁶⁶.

Recent contributions in the literature and in the policy debate have taken a similar stance on the need to keep an eye on search and other functions alongside with the infrastructure layer. For example, Odlyzko (2009) and Pasquale (2008) – the latter in a Congressional testimony – concurred that “Just as search engines worry that cable and telecommunications carriers may deliberately impair quality of service in order to force application providers to pay for a ‘fast lane’, content providers may legitimately worry that dominant search engines ‘churn’ organic results in order to make paid ads the only guaranteed method of reaching customers”. Wharton law professor Eric

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Clemons even got as far as stating that “Google is abusing its monopoly position by overcharging corporations for access to consumers [through advertisements]”⁶⁷.

In a nutshell, just as monopolists in the provision of Internet access would have an enormous bargaining power over all players in the value chain, dominant firms in the provision of search services have market power vis-à-vis all other players if they manage to become indispensable. At the same time, application providers that manage to develop killer apps have a great degree of market power vis-à-vis other players located in the value chain: for example, the recent protest against Google in France, which saw major newspapers announcing the creation of an alternative portal where their content will be made available in order to avoid that Google cannibalizes their ad revenues, is telling in this respect, and a very open-ended story. This is why judging whether Google is really indispensable – and opinions, of course, widely diverge today – has become a central matter of current antitrust investigations⁶⁸. If it is found to be indispensable, then it may have to behave in a perfectly neutral way (not discriminating between content, not prioritizing any result over others); at the same time, it may have to refrain from vertically integrating into other layers of the emerging value chain, such as applications, operating systems, and any other middleware, unless it provides at least equal opportunities to its rivals in each of the markets.

When this happens, based on US and – even more convincingly – EU antitrust rules, the one in Microsoft Windows might not be the last “ballot screen” we see mandated by trustbusters in cyberspace. Google and – as will be explained below – other players such as Apple – would have to always offer their users a choice of alternative complementors when selling a system good. This would mean, in turn, the triumph of neutrality over diversity and product differentiation. Whether this would help consumers at all, as well as contribute to social welfare, is something that will be discussed in Section 2 below.

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In conclusion, when looking at the economics of complex and interconnected system goods, there seems to be very little room to differentiate between ISPs and gateway players located at higher layers. In both cases, players have an incentive to secure a share of the value created by the system by engaging in some form of differential pricing or price discrimination from their supply side, and in preferential agreements on the demand side. Against this background, players in the search market have behaved far from neutrally in the past years, confirming that competition for eyeballs necessarily entails attempts to establish links between different layers and applications to capitalise on users' attention. Google has paid a fortune to become YouTube's and Firefox's preferential search engine, and contributes, together with Comcast and other players, to the Clearwire 4G project, where all searches will be filtered primarily by Google itself as preferential search partner. At the same time, Google sells ad space through auctions that reflect advertisers' "position preference", as explained by the software giant itself and by its chief economist Hal Varian in recent papers⁶⁹.

Like it or not, the life of a thriving, aggressively competing player in the Internet ecosystem is made of this. If such behavior ends up altering the competitive process and the level-playing field between some of the players in a way that creates harmful foreclosure effects in the ecosystem, this is certainly matter for antitrust authorities. But regulating to impose zero pricing and full non-discrimination on the Internet is a solution in search of a problem, and a harmful one for the future development of the Internet ecosystem.

2.3 Future gateways: clouds and cloud computing

Understanding the economics of cyberspace is made more difficult by the fact that the architecture and business models that prevail in this fluid world change constantly. And, as the attention of end users shifts upwards towards less tangible uses, the sources of market power also shift upward in the value chain, with the creation of more filters and gateways that help end users reach the

69

application and content they want in the cheapest and most effective way they can. All this, together with the development of communication technologies and broadband platforms, has led to the emergence of clouds of applications, which anticipate what will soon become the dominant paradigm of cloud computing⁷⁰. The key examples of application clouds that can be observed in today's mobile communications are certainly Apple and, again, Google. Apple has managed to develop an Application store based on its successful series of devices, such as the iPod touch, iPhone and iPad, and by vertical integration, which leads to bundling the device with the DRM, the operating system and the service layer – applications are developed by several other operators, but must be certified by Apple on its App store. All this has led to the emergence of a system in which Apple effectively decides who can belong to the cloud, and who cannot. As the system is so peculiar that even defining a relevant market other than the system itself may prove difficult, it is very likely that any unjustified refusal by Apple to allow access to its App store may trigger antitrust complaints. A notable example is the complaints filed by Adobe against Apple, centred on the latter's refusal to implement Adobe Flash on its products⁷¹.

Similar developments can be observed as regards other attempts to create successful platforms, such as Google's Android or Nokia's Ovi. From a more forward-looking perspective, a similar development is seen in the broader domain of cloud computing, where cloud managers will have the possibility to ship software as a service to end users wishing to use IT resources without hosting them on their servers or PCs. The fact that Google recently acquired DocVerse and is making its Chrome a cloud-based browser, and Microsoft is reportedly moving portions of its Office 2010 to a free-cloud based productivity platform provides some hints on where competition is headed⁷².

Again, papers such as Odlyzko (2009) and others have started to assert that cloud computing, as an extreme form of vertical integration, may end up creating even stronger forms of discrimination and similarly strong calls for

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neutrality and regulation⁷³. Cloud providers could either exclude some rival applications or undesired products from their clouds, or degrade their ranking in the menu of available products that can be retrieved by cloud users. Whether this will eventually trigger the need for mandatory interoperability and neutrality of cloud computing, is still debated⁷⁴. In any event, anticipating a problem like this is far from mere science-fiction: suffice it to quote Ms Varney again, as she said that Google’s gathering market power in cloud computing could lead to a “repeat of Microsoft”⁷⁵. Also, rumours that the upcoming netbooks based on Google Chrome OS reportedly will not be allowed to use hard drives, and Google will specify which Wi-Fi cards they support are equally relevant in terms of where industry architectures and openness restrictions are moving⁷⁶. Hh+

Compared to the layered architecture shown in figure 3 above, cloud computing proposes a system design that shifts computing resources and software applications to the network and data storage centres, and organises delivery along different modalities, which entail different degrees of control by the customer. The provision of platform as a service (PaaS), for example, leaves more control of the configuration to the client than mere application as a service (AaaS) or software as a service (SaaS) modes⁷⁷. At the same time, private clouds are certainly more customized to the client’s needs than hybrid or public clouds, which however enjoy clear economies of scale.

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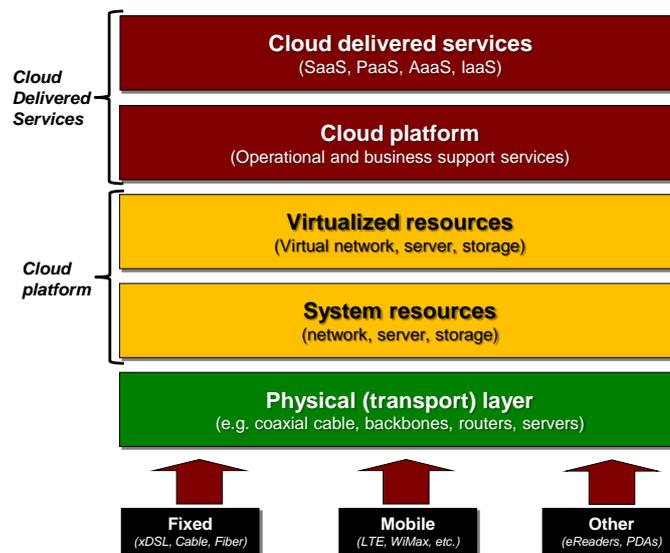
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Figure 8 – Layers of a cloud delivery platform



Source: author's elaboration based on Renda (2009) and IBM (2009)

A look at current market developments shows that some degree of differentiation in cloud-related business models is already taking place. In the domain of public clouds, commentators have been distinguishing between Internet clouds (e.g. Amazon), Application Clouds (Microsoft, Apple) and Search Clouds (Google). Other players like IBM, Oracle and Cisco are relying more on the hardware infrastructure as a competitive advantage in the provision of their cloud services.

Overall, it is likely that the move towards cloud computing, almost universally acknowledged as holding an egregious welfare-enhancing potential – will exacerbate the convergence and system competition features that the Internet ecosystem already features. For example, recent antitrust investigations related to all layers of the value chain are all related to companies' competitive strategy towards the monetization of investment in cloud computing. These include the European Commission's investigation on IBM's behaviour in the mainframe market, the war between Adobe and Apple, and the lawsuits against Google for alleged discriminatory behaviour in the search domain. As big market players try to differentiate their products and avoid that rivals can free ride on their

investment, episodes of refusal to grant interoperability or other exclusionary conduct are likely to become even more frequent in the years to come.

Does this warrant any *ex ante* intervention to ensure cloud interoperability and openness? The economics behind cloud computing suggest to wait and see, as the two-sided nature of the clouds, the very dynamic nature of those markets and the sophistication of part of the demand side are likely to represent significant forces that push in favour of the maximum openness of the clouds in the long run. As often happened in the past few years, the need to create successful business models and to ensure security will initially call for some degree of proprietary-ness (as in the case of the App store), and later give leeway to a significant degree of commoditization of lower platform layers. In other words, market forces, rather than a regulator, are likely to solve the problem by pushing for interoperability once the market becomes more mature.

2.4 Layered competition

One may wonder the difficulty of an antitrust authority in having to deal with competition between layers. The Internet ecosystem is indeed evolving towards a competitive arena in which some big players, having reached a strong position in the provision of a key gateway service, try to extend their control over the value chain to secure a bigger share of the value that is created by the whole system architecture. This is how powerful search engines, OS vendors, mainframe champions, mobile operators, fixed-line broadband providers, microprocessor manufacturers and conglomerate producers of proprietary goods ended up challenging themselves on countless battlefields and with a mix of open, semi-open and proprietary standards. Plus, all this is happening in a constantly changing environment, and – even if one should resist the temptation to predict the future based exclusively on past experience – there is clear evidence that markets have been able to fix in the medium term most of the short-term concerns voiced by industry stakeholders. And there is also sufficient evidence that market developments have been quicker and more effective than antitrust decisions – let alone sectoral regulation – in fixing those problems.

Some of the emerging lessons for future policymaking are summarised below, and dealt with in more detail in the next section.

- Convergence is leading to aggressive competition between players originally dominant in different relevant markets.
- Market definition and the assessment of market power must increasingly take into account the whole ecosystem, and in particular countervailing buyer power along the value chain.
- Multi-sidedness, multi-homing and externalities must be taken even more seriously when assessing the competitive effects of market developments.
- The players that are most likely to evolve into key platform operators are those that, holding a gateway product, can conquer the attention of end users and establish a direct relationship with them.
- Sectoral regulation that alters the level-playing field between platform operators is likely to stifle competition, rather than encouraging it. Countries that have reached a technologically neutral policy framework for modern broadband platforms should not allow regulatory asymmetries to persist in the Internet ecosystem.
- Creating a neutral and efficient policy framework is essential for all the layers of the ecosystem, including the emerging cloud computing architecture.

3 CONCLUSION: AVOIDING THE WINNER’S CURSE

Faced with the magmatic evolution of cyberspace, policymakers have shown to be at least awkward in their response. First, they have maintained the policy approach to the infrastructure layer as rigidly separated from the treatment of other layers, in clear contradiction with the mounting evidence that market power, in modern broadband platforms, can and does emerge at all layer of the value chain, posing clear constraints on the behavior of telecom network operators. This is clearly visible in the US “silos approach” to telecommunications regulation, as well as in the rigid EU approach to unbundling in fixed-line telecommunications. As a result, being a dominant network operator and internet service provider today means being clearly handicapped in the race to become a dominant IP-based platform, since it entails being subject to a series of open access obligations that other players in the value chain do not have. Calls for mandatory net neutrality do nothing but exacerbate this handicap by depriving ISPs – already challenged in their ability to derive revenues from Internet subscription – of the possibility to engage in product differentiation and extract some surplus from all the economic agents that will profit from the existence of its own platform.

Second, there seems to be a hidden property in regulation, which leads it to spread under all circumstances. This does not necessarily mean, as Szoka and Thierer (2009) state, that “regulation *always* spreads”. Even without going so far, it is clear that, once the logic of neutrality *sic et simpliciter* enters the stage at the infrastructure layer, there seems to be no reason to confine such goal to the infrastructure layer only, without incurring in serious policy incoherence. The consequences of mandatory net neutrality, thus, are not only a likely delay in investment in NGNs and the prevention of welfare-enhancing transactions between ISPs and other players along the value chain, as demonstrated in Renda (2008): in addition, net neutrality at the infrastructure layer would lead either to an unlevelled playing field (because only ISPs are forced to implement neutrality); or to a chilling effect on competition and innovation, due to the

impossibility to engage in product differentiation and launch proprietary or even semi-open platforms.

Third, while the rhetoric of neutrality and compulsory licensing has focused mostly on externalities as a form of market failure, the economic significance of positive externalities has been significantly overlooked so far in the literature as well as in policy. Not only positive externalities are embedded in the design of the Internet – through the end-to-end design: for many of the stories of exclusionary abuses perpetrated by competitors in downstream markets – be they Netscape, Sun, Adobe, Skype or others – there is also a story of market opportunities that emerged thanks to markets that have tipped. For example, how much did the browser market owe to the standardization – and later commoditization – of the OS market? How much does the server market owe to the client market that developed thanks to the successful product differentiation of leading players? To what extent the success of nomadic players like Google depend on the evolution of modern broadband communications that support its extensive suite of products? This chain of positive externalities, which can flow both in a bottom-up or in a top-down way, is intimately linked to the idea of two- and multi-sided markets, and must always be taken into account before a static vision of the antitrust (or worse, regulatory) problem is adopted.

Finally, an even more evolutionary approach to modern, layered IP architectures suggests that players wishing to enter the market at all layers may soon develop an expectation of future regulation in case they win the race to become dominant. This equates to stating that, in sectors with strong network externalities and where competition “for” the market takes the form of a winner-take-all game, winners will be “cursed”, as they would have to share their prize with losers and with everybody who wants to share. Suffice it to go back to Judge Learned Hand’s famous statement in *Alcoa*, “the successful competitor, having been urged to compete, must not be turned upon when he wins”: there’s no reason to conclude differently for cyberspace.

As a result, there is reason to believe that calls for *ex ante* regulation imposing neutrality at any of the layers of modern IP-based platforms are very unfortunate and should be carefully avoided. To the contrary, protecting users

in cyberspace means being so brave to reflect carefully on how antitrust rules should be adapted to new markets, and possibly made more effective and timely. At the same time, it means understanding that whatever policy approach is adopted, it must be a layered approach, as well as a co-regulatory one: public policymakers, being less informed than market players, should limit themselves to facilitate the respect of given outcomes on the Internet, without engaging in the regulation of technical aspects that are likely to become obsolete in just a few weeks.

Below, I reflect on a specific set of issues that may warrant the attention of policymakers in the years to come. These include the layered approach to policymaking, co-regulatory solutions, antitrust aspects, and the importance of countervailing buyer power. I conclude by advocating for changes in the current regulatory framework for e-communications regulation in the US and in the European Union.

3.1 Step 1: a layered, co-regulatory approach to policymaking

The concept of Internet ecosystem embeds the existence of several inter-dependencies in the different zones and layers of what constitutes the modern cyberspace. These layers and inter-dependencies are also doomed to change over time, and certainly as cloud computing becomes more widespread.

The main feature of a layered approach to policymakers is the attention for preserving the business case for investing in new platforms and engaging in product differentiation without stifling other players' incentives to invest. In this respect, a layered approach to policymaking postulates that any policy approach adopted at a given layer of the value chain – besides being firmly grounded in competition economics – should take into account the existing policies adopted at other layers of the IP-based architecture. For example:

- If regulatory holidays are implemented at the infrastructure layer, allowing for a degree of concentration in that layer and (absent competitive pressure from wireless platforms) more limited choice of broadband subscriptions for end users, then a greater degree of openness can be required at higher layers,

in order to give all operators active at higher layers effective access to end users.

- At the other extreme, if national policymakers decide to move towards the functional separation of the telecoms network (as, for example, in the UK, Sweden, Italy and other European countries), imposing full net neutrality obligations also at the higher layers simply means killing the market. In such a situation, no player will invest in NGNs, as there will be no possibility of monetizing such investment by asking any price to any player. The only consequence of such an approach will be an attempt to recover all costs by raising the price of internet subscriptions for end users – something that may even lead to calls for retail regulation at the very end.
- In most circumstances, the role of the policymaker will be to strike a reasonable balance at each of the layers, by deciding on the most appropriate policy at the infrastructure layer (based on established competition policy rules) and then fine-tuning policy at higher layers in order to preserve a reasonable balance between sustainable long-run competition and incentives to invest. For example, when competitive pressure exerted from alternative DSL operators, cable operators and/or 4G wireless platforms is not considered significant, it may be reasonable to impose open access obligations on a fixed-line incumbent, provided that access charges reasonably remunerate the incumbent for its risky investment and uncertain demand conditions. At the same time, a risk premium on NGN access charges may not be sufficient if net neutrality is mandated at the higher layers, and is likely to lead to significant delays in the migration towards all-IP broadband platforms.

A similar rationale applies to players at higher layers of the value chain. Whatever obligation is imposed *ex ante* or – better – *ex post* on any dominant player along the value chain, it should be adequately justified in terms of efficiency and proportionality – meaning that no less intrusive regulatory or antitrust remedy would prove as effective. In all circumstances, adopting structural remedies such as the separation of business operations and any form of divestiture should represent the exception rather than the norm, especially in

a domain in which policymakers can hardly predict the consequences of their regulatory intervention.

The latter observation leads to identifying another desirable trend in the policy approach to cyberspace: the adoption – where possible and appropriate – of co-regulatory solutions by all players on the value chain. In particular, some commentators have argued in favour of co-regulation as a way to solve the never-ending net neutrality debate.⁷⁸ This solution may be viable especially if coupled with the definition of users' rights at a higher policy level. This way, the regulation of cyberspace may become increasingly similar to the so-called “new approach” to standardization policy at the EU level, which combines a definition of *outcomes* by policymakers, as well as a definition of *means and standards* by market players.

3.2 Step 2: competition rules and policy coherence at all layers

One of the hot issues surrounding the international debate on neutrality and diversity in the internet ecosystem is whether the general principles that will be adopted to govern the behaviour of all players on the value chain should originate in the antitrust laws, and whether competition authorities should be allowed to monitor those markets and intervene where needed. In this respect, the VG proposal is very US-centric, as it empowers the FCC to monitor compliance with the non-discrimination obligations, but says nothing about the FTC and the Department of Justice. As a matter of fact, established Supreme Court jurisprudence in the US denies the possibility of *ex post* antitrust scrutiny where there are overlaps with the competence of sectoral regulatory authorities⁷⁹. This means that there would still be a split competence over the Internet ecosystem, with the FCC monitoring ISP behaviour at the infrastructure and logical layer, antitrust authorities being in charge of overseeing business conduct at the application and content layer, and the GAO in charge of reporting what type of control should be performed on wireless

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operators. This might create, in the long run, problems of policy coherence, and may hamper attempts to create a unique set of principles to be followed throughout the ecosystem, as well as technology neutrality and the long-term sustainability of the policy in place.

At the same time, in the EU the application of antitrust rules is always possible at all layers of the value chain, whereas the telecoms package applies only to network operators, and currently bears a bias in favour of a separation between fixed and mobile markets. The recent Guidance document issued by the European Commission on the treatment of exclusionary abuses under article 102 TFEU provides some guidance on how behaviours by players at all layers of the value chain will be treated. In particular, the definition of anti-competitive foreclosure given in the Guidance is based on two main pillars: in order for a conduct to be considered as exclusionary under Article 102 TFEU: (i) there must be evidence of actual or likely foreclosure of as-efficient competitors from a given relevant market; and (ii) the conduct should be harmful for consumers. Absent any of these two requirements, the conduct will be found lawful. In principle, the telecoms package (as recently updated in 2009) should embed these principles: in reality, this is not the case, since national regulatory authorities can and do intervene *ex ante* in a much broader set of circumstances, which applies only to network operators and not to players that belong to other layers of the value chain.

In summary, both in the US and the EU there seems to be a problem of policy coherence and equal treatment of platform operators in the Internet ecosystem.

3.3 Step 3: Reflecting on the goals of competition policy

In addition, antitrust enforcement carries the following, structural problems when applied to the various layers of the Internet ecosystem:

- *Market definition is increasingly difficult*, due to technology convergence, fixed-mobile substitution, platform competition, competition “for” the market, network externalities and tipping, which lead to equating the market with the *de facto* industry standard in some parts of the value chain.

- *The definition of market power depends on the countervailing power of players located at other layers, more than in traditional “brick & mortar” sectors, where buyer power is less frequently considered as a key variable in the assessment of market power⁸⁰. Even in those markets, specific attention has been given in some legal systems to big multi-product distributors such as supermarket chains, as warranting special attention in the assessment of market power of even big players in the upstream markets⁸¹.*
- *Some of the tools used to detect the abuse of market power, such as the Lerner index, become meaningless in large areas of the Internet ecosystem, both due to the fact that marginal costs are negligible in higher layer, and because the multi-sided nature of these markets call for a departure from cost-based pricing regardless of the extent of market power.*
- *Some of the standards used to define anti-competitive conduct need to be clarified. This is, in particular, the case of the “new product screen” and, more generally, the cumulative conditions for a refusal to supply to be considered abusive under EU competition law.⁸² At the same time, the treatment of vertical agreements (under Art 101 TFEU when applied in the EU) must be clarified when applied to this field, especially when it comes to possible neutrality problems⁸³. Finally, the role of tying and bundling in the Internet ecosystem must be subject to a careful rethink, due to the role of these tools in the competition for eyeballs.*
- *Antitrust enforcement is too slow. Given its ex post nature, as well as the various degrees of judgment before a decision ultimately becomes effective, antitrust enforcement often comes too late, giving market players the opportunity to prefer infringement over compliance, and then face antitrust scrutiny as an inevitable “tax”. This form of gambling with the regulator has become more widespread in markets where the first-mover advantage is essential, as is typically the case in the IT world.*

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Even more generally, there seems to be a general need to reaffirm that openness, even if undoubtedly a fascinating and attractive word, cannot be a goal of public policy in and of itself, let alone antitrust law. Openness should be pursued to the extent that it proves beneficial to consumers and thus contributes to social welfare in the long run compared to any other alternative. For example, in a recent article Rosston and Topper (2010) provide an antitrust analysis of the wireless net neutrality obligation (but a similar rationale could be replicated for fixed-line), and find that imposing net neutrality would amount to a *per se* rule on vertical agreements in mobile platforms, something that has long been discarded in antitrust laws, given the welfare-enhancing nature of many vertical agreements in most markets⁸⁴.

So, if openness is not a good guiding principle for policymaking, what can such principle be? While the protection of long-run consumer welfare as a proxy for total welfare is an established principle in antitrust enforcement worldwide, the intermediate goals that help the maximization of consumer welfare are way less clear in the Internet ecosystem. The following principles will likely become increasingly relevant in the years to come:

- *The protection of the end-to-end design of the Internet has been evoked as a way to preserve its long-term sustainability.* This does not amount to mandating net neutrality: a network can be end-to-end and still entail QoS differentiation to allow for a suitable customer experience;
- *Competition as a process*, rather than as a pluralistic outcome, has been considered as more appropriate for a dynamic environment with high fixed costs (in some of the layers) and strong network externalities⁸⁵.
- *Dynamic competition as the preservation of incentives to invest in new platforms* is a different standard than the preservation of incentives to invest in new products or services that belong to existing platforms. In other words, antitrust authorities may have to reflect on whether the role of antitrust is forcing intra-platform competition (and thus decisions on the system

84

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architecture), rather than preserving the possibility for entry of new platforms in the market.

3.4 Conclusion: smart regulation in the Internet ecosystem

Whatever policy framework is chosen to ensure the preservation of competition in the Internet ecosystem, the standards followed must comply with better regulation criteria. This means, *i.a.*, that public intervention should be:

- *Efficient.* This means that remedies must address a clear market failure, and must be justified in terms of net benefits for consumers and society as a whole. This, in turn, means proving that there would be no government failure that is worse than the market failure it is supposed to address (“the cure is not worse than the disease”).
- *Proportionate.* This means that remedies must be proportionate to the goals, and avoid the creation of unnecessary constraints or costs on the Internet ecosystem. It also means that authorities prove that no less intrusive alternative may achieve the same result.
- *Coordinated.* The core of the technical information in the Internet ecosystem rests with private players that animate this environment. Once public goals have been established, wide co-regulatory solutions may be the best way to solve the policy problem technically. As explained above, cooperation between public and private players should become the norm in the authorities’ everyday monitoring of the ecosystem.
- *Layered.* The effects of the policy in the medium to long-term must be shown with respect to all the players that operate in the various layers of the Internet ecosystem, from a dynamic and forward-looking perspective.
- *Coherent.* Whatever policy remedy is considered by public authorities, the level-playing field between platform operators competing across the value chain should not be altered by asymmetric regulatory treatment.

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