

HOW DO CONSUMERS VALUE NET NEUTRALITY IN AN EVOLVING INTERNET MARKETPLACE?

**A report into ecosystem dynamics and
demand-side forces**

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I. Executive Summary

This report is intended to provide BEREC and National Regulatory Authorities (NRAs) with an understanding of market dynamics relating to net neutrality, in particular from the end-user perspective. It is designed to both inform BEREC's general approach to net neutrality and to support NRAs' future analysis of their national markets, as well as to contribute to the continuing public debate on the complex issue of net neutrality.

To explore these issues, BEREC commissioned two pieces of research in order to gather material required to explore these issues - desk research¹ to gather information already in the public domain, such as how consumers are using the Internet and how the market is developing; and a consumer research study² to gain an understanding of how consumers value net neutrality.

The consumer research was carried out in four countries - Croatia, the Czech Republic, Greece and Sweden - which were selected to represent different typical European country profiles. It was focused on a conjoint analysis in which respondents were asked to choose between pairs of hypothetical Internet access service offers to reveal the relative importance of different attributes. These attributes includes price and speed as well as traffic management attributes, such as whether a package was subject to any restrictions or prioritisations.

Due to time and budget constraints, it was not possible to conduct the conjoint analysis sections of the research for all elements of fixed and mobile technologies, and the chosen focus was on usage at home. As a result, the consumer research focused on fixed Internet access, although other parts of the research did allow for more general insights, thereby taking some account of mobile usage. In addition to the conjoint analysis, respondents to the survey were also asked questions on their socioeconomic backgrounds, Internet usage, and attitudes about the Internet and net neutrality. As a preparatory stage, focus group discussions were also conducted in each of the four countries to provide a basis for how to design the survey, and they also provided some useful insights which are discussed in this report.

Consumer research findings

The consumer research examined to what extent consumers take certain attributes into account when choosing an Internet access service. The results show that price is the most important single attribute of the ones tested, with around 20% of the purchase decision based on this. This is followed by speed, data cap level and level of access to video streaming, with 12% of the decision based on each of these factors.

Of the ten attributes included in the hypothetical offers that respondents were asked to choose between, five were related to traffic management: levels of access to video streaming, to VoIP, to P2P and to online gaming, as well as data cap levels, sometimes with specific data not

¹ This can be found at Annex 1: Desk Research on the Demand-Side of Internet use - PwC

² The summary report can be found at Annex 2 and the full study can be found at Annex 3: Summary Report on the Value of Network Neutrality to European Consumers - WIK-Consult, YouGov and Deloitte and Full Results Report on the Value of Network Neutrality to European Consumers - WIK-Consult, YouGov and Deloitte

counted against the cap. The other five attributes related to criteria known to be important for consumers' choice of Internet access service: quality/stability of the Internet connection, download speed, bundle options, price, and length of the contract.

Attributes of an Internet access service offer that relate to traffic management and net neutrality play a significant role in consumers' purchase choice decisions – of the ten attributes used in this research, half of them were related to traffic management and net neutrality, and up to half of the decisions of respondents were based on these attributes.

The research measured the relative preference for each attribute within the different options given to respondents. It showed that having no data cap is far more attractive than either of the two data cap options of 50 GB and 10 GB. The zero-rating of certain applications³ has a limited effect when coupled with the 50 GB cap, but has more of an impact in increasing the attractiveness of offers when the cap is 10 GB. When there is a data cap, out of all the different application types, the zero-rating of video streaming is seen as most attractive.

The research also measured the preferred levels for each attribute (the “part-worth utilities”) for access to the specific types of applications. It showed that respondents prefer normal access to these applications. The level of attractiveness decreases slightly for prioritised access, before decreasing more significantly for throttled and blocked access. Consumers therefore seem satisfied with the current methods for accessing applications through best effort Internet access.

In addition to the conjoint analysis, the survey contained a section on respondents' attitudes towards other aspects of net neutrality. The results from this section reveal that the majority of consumers would not accept the prioritisation of one type of application if this meant that they lost access to another type. The majority also feel that equal and unrestricted access to the Internet is a human right. Between 60% and 80% respondents across the four test areas are happy for Internet Service Providers (ISPs) to manage data traffic in order to keep their Internet experience stable, while between 50% and 70% are happy for applications to be prioritised for users who pay extra for this type of service. There was a certain proportion of non-response to questions about innovation and competition, which suggests that consumers do not know enough to consider these aspects of the debate. In the focus group discussions, participants were more familiar with debates about online privacy and freedom of speech than net neutrality.

The consumer research also gives insights about the effect of different types of consumer information. In order to find out whether a technical understanding of traffic management and how the Internet works has an effect on consumers' purchasing decisions and their opinions about net neutrality, the participants in the survey were split into two groups; one group was shown an information package about how the Internet works, how and why ISPs manage traffic and the possible effects of this on Internet users, while the other group did not see this.

Of those who saw it, this educational information had very little influence on their responses when making purchase decisions. The close similarities between the two groups' responses

³ Zero-rating is a commercial practice by which consumers are able to access certain content, services or applications without it counting towards any monthly data cap.

are likely to be a result of the way that the questions in the conjoint analysis section of the survey were formulated. The description of the offers that both groups were asked to choose between contained a brief, clear and effects-based explanation of the end-users' experience of certain applications, e.g. "slowed-down video streaming" or "prioritised VoIP". Respondents were therefore able to know the potential effects of traffic management practices without having been educated about traffic management itself. These effects were presented to them clearly and transparently, and they were able to choose between the offers on that basis. This suggests that clear, transparent and effects-based information can be effective in helping users to take traffic management practices into account when choosing an Internet access service. It is encouraging that, in the research, it did not prove necessary for consumers to have been educated about the technical nature and operation of traffic management to be able to take account of relevant ISP practices in choosing a service provider.

For transparency to be effective, it is necessary for consumers to be willing to switch, and for the switching process to be straightforward and easy. The research findings provided evidence of consumer willingness to switch in response to the introduction of traffic management. A significant majority of respondents across all countries say that they would switch in response to some significant changes in the traffic management policies of their ISP. For example, between 70% and 86% of respondents agreed with the statement "If my Internet provider decreased the speed for video streaming unless I paid extra, I would switch provider". Likewise, the consumer research also shows consumers pay significant attention to, and assign significant value to, the traffic management features in their choice of Internet access package (although it is price which is the most important individual decision criterion for consumers). However, these hypothetical responses may not translate into actual switching behaviour – that depends on the ease of switching, consumers' general desire to go through the switching process, and the availability of alternative offers.

General readiness to switch underpins effective competition among ISPs, so a finding that consumers feel unable or unwilling to switch provider should be a significant concern for any NRA. The WIK-Consult consumer research found that between 50% (Czech Republic) and 73% (Greece) of respondents had switched at some point. They also found that the majority of consumers in the test areas expressed satisfaction with their current ISP, and that a perception of value-for-money was the most significant reason consumers cited for not switching. However, a smaller but still significant proportion of consumers said they were not considering switching, and over 20% of respondents in both Sweden and Croatia stated that there are no other providers available for their household. The fact that at least half of consumers have switched at some point suggests some degree of effectiveness of the switching process. However, it is a matter of judgement, possibly specific to individual countries, as to which level of switching and other factors would indicate that the market is operating effectively and that barriers to switching are not excessively restricting competition.

If an NRA considers that there are significant barriers to switching and unsatisfactory levels of competition in the market, a net neutrality policy which emphasises transparency and consumer choice is unlikely to be appropriate, whatever general position is held on net neutrality regulation. However, the fact that the consumer research identified that consumers are sensitive to traffic management features that restrict access to popular types of Internet application suggests that an emphasis on transparent, effects-based information and

consumer choice may be appropriate where an NRA considers there is effective competition in the market and consumers are willing and able to switch.

The consumer research attempted to find the economic value that consumers give to the different levels of the attributes tested, by setting different levels of these attributes (e.g. normal access, prioritised access, slowed-down access or blocked access) against different price levels that were used in the conjoint analysis. In relation to data caps, it was found that offers with a 10 GB data cap were valued at around a third of a price level lower than a 50GB cap and one price level lower than non-capped offers. Also, the value of normal access to video streaming is worth around one price level more than an offer with video streaming applications slowed down.

Developments in the market

BEREC and the European Commission's 2012 Traffic Management Investigation found that 80% of consumers do not suffer from any non-neutral restrictions in fixed networks. The current offers in the market still appear to be predominantly "neutral" (i.e. exempt from differentiation practices), although there are exceptions to this, more often in the mobile environment than for fixed networks. A number of differentiation practices have been reported as worth monitoring, including zero-rating.

It is interesting to consider why the market seems to be largely consistent with net neutrality principles. In the consumer research on fixed Internet access, consumers' higher valuations of non-capped services with normal access to applications provide an incentive for ISPs to offer these services. The incremental cost of offering unlimited access as opposed to capped access is low for fixed Internet, unlike mobile where the cost is more substantial. It is possible that an ISP could combine data caps with zero-rating, or the threat of blocking, to incentivise payment from the supplier of content, as zero-rating has a certain value for the content provider. It is hard to predict how high this level of income could become, but it seems unlikely that the revenues from a popular video streaming content provider could approach the significant levels⁴ that would be required to compensate the consumer for the introduction of a 10 GB data cap. Therefore, in the context of the research findings, it would seem to be sensible for ISPs to offer neutral, uncapped services, even if they may also offer some differentiated services.

The research does not examine the value that consumers give to application types that are not yet widely popular. It would be fair to assume that the decrease in consumers' valuations of offers that do not allow normal access to these types of application would be lower than the levels mentioned above for video streaming. However, it is also likely that the payments that could be made by the providers of these types of applications to ISPs would also be lower, as a result of their lack of popularity. From these insights, the market for fixed Internet access would appear to be efficient.

⁴ As explained in more detail in section V.2.a, this was calculated as being roughly €14 per month in Greece, roughly 200 kr per month in Sweden, roughly 200 Kč per month in the Czech Republic, and roughly 80 Kn per month in Croatia

There are many possible reasons for the instances of non-neutral offers, where these do appear in the market. It is possible that ISPs underestimate the value that consumers give to unrestricted access to the Internet. ISPs might not yet know what services are profit-maximising and would not want to apply restrictions that could possibly damage their business. It could also be that ISPs have a more individualised approach that allows them to identify more differentiated segments of the population, some of whom may be more attracted to cheaper, non-neutral offers, where this is permitted under national rules. It is also a viable option for ISPs to provide cheaper offers based on differentiation of access speed and/or data volume, which would not raise concerns regarding net neutrality.

The Internet access ecosystem has already partly responded to the issue of increasing traffic and the increased use of applications that require more bandwidth with the emergence of CDNs. Technological progress and competition have led to an ongoing decline of transit prices, as well as prices for CDN services, all of which has enabled the Internet to cope with the increase in traffic. Large content providers are increasingly investing in their own infrastructures and CDN services, thereby trying to exploit economies of scale. It seems plausible that direct interconnection agreements between content providers and terminating ISPs might gain in significance.

Conclusions

In the broad net neutrality debate, the overall goal is the continued operation of the Internet as an open environment, enabling innovation and competition among service providers and enabling choice and freedom to communicate for consumers. The debate about net neutrality regulation is about the necessity for, and the form of, regulation to secure this outcome. The longer-term implications of the choices made by consumers, and of the broader societal implications of restrictions to Internet access, such as the possible impact on network effects of future applications, are important elements of the debate, and ones which regulators must take into account.

Another essential consideration in this regulatory debate is the extent to which consumer behaviour, and the economic incentives and behaviour of ISPs, can be relied upon to maintain an open, innovative Internet. The research commissioned for this report sought to explore this question, primarily for fixed Internet access.

This report, and the underlying research, does not help determine whether the broad benefits of open Internet access require that all ISP services are neutral or unrestricted. Nor does it help determine whether it is merely necessary for such neutral services to predominate in the market, even if some providers offer – and some consumers choose – Internet access services which are in some way restricted. The evidence from the research suggests that consumers tend to prefer Internet access packages with normal access to popular applications, and that these are likely to be economically attractive for ISPs to offer. As long as there is transparency, and consumers are able easily to switch provider, such services seem likely to predominate, as they do at present.

However, it also seems possible that there are consumers who would prefer restricted Internet access services at sufficiently low prices, and that ISP provision of such services will also be economically viable, alongside the provision of open, unrestricted services, if permitted under national rules. An alternative would be to offer packages with lower access speed or data

volume at reduced prices, which would allow end-users to decide how they use their Internet access.

The research shows that consumers put most emphasis on price in their purchase decision of an Internet access service, but also base their purchase decision on attributes that relate to traffic management. They prefer normal access to the application types that were included in the survey, and offers without data caps are most attractive to them.

Transparent, effects-based information can be effective in helping consumers with their purchase choice decision, and is more effective than educating them about the technical nature and operation of traffic management. However, for transparency to be effective, consumers need to be willing and able to switch. A significant proportion expressed a willingness to switch should their ISP introduce non-neutral traffic management practices, and at least half have already switched in all four test countries. Nevertheless, a significant minority of respondents reported that they had no real choice of alternative provider.

It is difficult to predict how significant a proportion of the market might be captured by restricted services in the long run; but without specific net neutrality regulatory policies they are likely to be available in the short term (as at present). If the policy is that such restrictive services must not be available, in order to capture the broad benefits of open Internet access, prescriptive regulation may be necessary. However, if policy-makers consider that sufficient benefits of open Internet access will be realised through a market structure which includes some restricted services but in which open Internet access is predominant, then competition, transparency and consumer switching would likely be sufficient. Under all circumstances, it will be important for NRAs to monitor the nature and transparency of ISP offerings, the access services which consumers are choosing, their effects on innovation, as well as levels of competition and ease of switching – and to consider intervention if necessary.

II. Introduction

1. Aims of the project

The focus of much of BEREC's Net Neutrality work in previous years⁵ was on considering the relevant amendments to the 2009 revisions to the Regulatory Framework for Electronic Communications, and what NRAs and other players should do to implement them. This work was mainly comprised of recommended approaches to potential problems. In particular, BEREC's December 2012 report on Differentiation Practices and Related Competition Issues in the Scope of Net Neutrality⁶ report suggested problematic market developments which may emerge.

Following these pieces of work, BEREC was keen to find out to what extent these potential problems are actual problems. We wanted to better understand developments in the market and what they mean to consumers.

Where BEREC did do some factual work – in the 2012 Traffic Management Investigation carried out with the European Commission⁷ – we discovered that, while ISPs faced the same constraints (e.g. increasing traffic load in the network, competitive markets) they applied different restrictions or prioritisations, or none at all. Therefore, a key motivation for this project was to dig deeper and try and understand why ISPs might act in certain ways, for instance in response to consumer expectations or market incentives.

The objective of this report is to provide BEREC and National Regulatory Authorities (NRAs) with a more in-depth understanding, particularly from the end-user perspective, of market dynamics which are relevant to net neutrality. This report is therefore designed to both inform BEREC's general approach and to support future analysis by NRAs of their national markets, enabling them to adapt our regulatory approach to reflect a better understanding of how consumers and providers interact.

We also hope that the report, and the underlying research we are publishing alongside it, will provide a useful contribution to the continuing public debate on the complicated and multi-faceted issue of net neutrality.

2. Approach of the project

At the outset of the project, BEREC considered what information it would need to explore the issues mentioned above. As a result, we commissioned two pieces of external research.

2.1. Desk research

We determined that much of the information we would be looking for - how consumers are using the Internet and how the market is developing - existed in the public domain. This was information that could therefore be gathered through desk research, and BEREC commissioned a study from PwC for this purpose, which can be found at Annex 1.⁸

⁵ BoR (12) 146 Summary of BEREC positions on net neutrality

⁶ BoR (12) 132 BEREC Report on differentiation practices and related competition issues in the scope of net neutrality

⁷ BoR (12) 30 BEREC findings on traffic management practices in Europe

⁸ BoR (15) 65 Annex 1 Desk Research on the Demand-Side of Internet use - PwC

2.2. Consumer research

The area where we found detailed publicly-available analysis to be lacking was an understanding of how consumers value net neutrality. When BEREC looked at what relevant consumer research existed, we did find some research into consumer understanding and perceptions of traffic management. But we did not come across anything in the public domain which quantified the economic value which consumers place on net neutrality.

BEREC therefore published a procurement process for a consumer research study.⁹ We considered a standard consumer survey approach where consumers could be asked about their opinions but we did not believe this would provide sufficient insights about how consumers value net neutrality when they make purchasing or switching decisions. Instead, we sought something more granular and detailed - a quantitative economic exercise which would provide empirical data to draw upon. By using a conjoint analysis approach, as described on page 12, we hoped to get an understanding of the economic value which consumers place on different kinds of restrictions on their Internet access – or completely unrestricted access – when they choose their Internet package.

The procurement was won by WIK-Consult, YouGov and Deloitte. Their summary report can be found at Annex 2¹⁰ and their full study can be found at Annex 3.¹¹ The different components of the consumer research are described in the box below.

Choosing such a granular and detailed approach presented two main trade-offs, given the budgetary and time constraints of the project. First, it was only possible to carry out the research in a small number of countries. We considered this to be a necessary trade-off in order to acquire information which could add real value to the debate and enable us to more fully explore the issues at hand. We therefore required the consultants to design the research to take account of, and be representative of, practices in all EU countries.

The selection of countries was done through a segmentation exercise which identified clusters of typical country profiles from which the consultants selected the four countries in which to carry out the research. The segmentation exercise used a number of salient indicators to represent characteristics of the Internet marketplace, such as levels of developments of the infrastructure and levels of participation in the market.¹² While the exercise focused primarily on a selection of market indicators, the consultants also sought to achieve diversity in the size and geographic location of the countries selected. In this way, the findings provide a proxy for the different types of national markets in Europe, making the overall findings broadly representative of Europe as a whole.

Another necessary trade-off was that it was not possible to fully cover all variations of fixed and mobile technologies in the consumer research. After some reflection, it was decided to focus on the home usage of access to the Internet, rather than usage outside the home. For

⁹ The value of network neutrality to European consumers 2013/S 243-422077
<http://ted.europa.eu/udl?uri=TED:NOTICE:422077-2013:TEXT:EN:HTML>

¹⁰ BoR (15) 65 Annex 2 Summary Report on the Value of Network Neutrality to European Consumers - WIK-Consult, YouGov and Deloitte

¹¹ BoR (15) 65 Annex 3 Full Results Report on the Value of Network Neutrality to European Consumers - WIK-Consult, YouGov and Deloitte

¹² See sections 4.1 and 4.2 of the WIK-Consult, YouGov and Deloitte Full Results Report

the purposes of this report, home usage referred to all devices connected to a fixed Internet connection in the home.¹³

While NRAs would tend to distinguish between fixed and mobile access, it was felt that looking at usage situations would be more intuitive for consumers (the subjects of the research). While BEREC's 2012 Traffic Management Investigation reported the existence of restrictions on both fixed and mobile networks, it was noted that home usage covers a far larger proportion of the bandwidth use which can be subject to traffic management restrictions (e.g. video streaming and file-sharing). Indeed, as shown in Annex 1, mobile traffic only accounted for 3% of total Internet traffic in Western Europe in 2013. While some elements of the consumer research also considered consumers' Internet usage outside the home, the quantitative economic exercise which provided the bulk of the research findings consequently looked only at home usage.

Components of the consumer research study

- Preparatory stage

This stage of the research provided vital information to help frame the consumer survey which would provide the bulk of the research findings.

In particular, information was sought to gain a solid basis for preparing the information package which would be provided to half of the consumer survey respondents. This included a review of the existing research into consumer understanding of, and attitudes to, traffic management and net neutrality. However, the main input was qualitative consumer research in the form of a series of **Focus Group discussions** with consumers in each of the test countries. As well as informing the design of the information package, the Focus Group discussions also provided some useful insights which we draw on in this report.

This preparatory stage also included desk research and meetings with NRAs to gather information about the markets of each of the test countries.

- Consumer survey

The majority of the study's findings come from the quantitative research which took the form of a consumer survey which was carried out in the test countries. The survey aimed to quantitatively assess the extent to which aspects of net neutrality influence a consumer's choice for a given Internet access service.

¹³ The consultants defined home usage as "all devices connected wired and wirelessly to the Internet through the main (stationary) Internet access of the household, which also includes mobile access technologies as substitutes for fixed access e.g. LTE at home or USB dongles for private usage". They distinguished this "At Home" usage from "Out of home", which they defined as all wireless devices used on networks outside the home including mobile networks, and commercial and open WiFi hotspots.

The survey was composed of two parts, the first being a **conjoint analysis experiment**.¹⁴ Such experiments require respondents to make a series of trade-offs, and the resulting analysis reveals the relative importance of the component attributes. In this case, the attributes were different elements of an Internet access package, such as price, speed and brand, as well as traffic management related attributes, such as whether a package was subject to any restrictions or traffic management.

The second part of the survey asked **a series of questions** in order to investigate consumers' socio-demographic and other relevant characteristics, their attitudes, and their Internet usage patterns.

In order to achieve this, the participants in the survey were split into two groups; one group was shown an information package about how the Internet works, how and why ISPs manage traffic and the possible effects of this on Internet users, while the other group did not see this. The design of the information package was built on insights gained from the focus group discussions, where it became apparent that consumers struggled with technical terminology, and preferred descriptions related to their own experience of using the Internet, as well as the inclusion of illustrations where possible. Therefore it was presented in the form of a short video clip that combined text with animated illustrations.¹⁵

3. Structure of this report

This BEREC report has been structured into four questions:

1. **Section III - How are consumers using the Internet?** This short section is designed to provide a context for the report by describing the main characteristics and uses of fixed and mobile Internet access offers. It is drawn from the desk research.
2. **Section IV - How do consumers value net neutrality?** This section looks at the insights to be drawn from the consumer research to understand consumer preferences, expectations and attitudes in relation to Internet access products and net neutrality.
3. **Section V - How does the ecosystem respond to the characteristics of consumer demand?** This section draws on the desk research and on market developments reported by NRAs to understand how incentives, and emerging relationships with other market players, influence the design of ISPs' offers to consumers.
4. **Section VI - What do these insights mean for the net neutrality debate?** This closing section reflects on the findings in the previous sections and looks at implications for policy-makers and regulators.

¹⁴ More information about the exact Adaptive Conjoint Analysis approach used can be found in section 5.3 of the WIK-Consult, YouGov and Deloitte Full Results Report

¹⁵ The individual frames can be seen in section 6.7.3 of the WIK-Consult, YouGov and Deloitte Full Results Report.

III. How are consumers using the Internet?

1. General trends

In the past twenty years or so, the Internet has been playing an ever increasing role in people's lives. Ten years ago, the number of Internet users globally amounted to 1 billion. In 2015, the number is expected to surpass 3 billion, with more than 50% of them having mobile Internet access.

People all over the world have abandoned their old fixed dial-up Internet access and are increasingly opting for high-speed broadband. As part of this trend, consumer Internet usage has shifted from text-based activities to mostly video traffic¹⁶, which already accounts for more than 50% of world Internet traffic¹⁷ and is expected to further rise to 79% by 2018.¹⁸ For comparison purposes, watching a minute of video online consumes 200 times more data than sending a basic email.

Internet consumption seems to be further intensified by the increased adoption of devices such as smartphones and tablets that are optimised to access data-heavy Internet applications. Globally, it is expected that Internet traffic will grow four-fold between 2013 and 2018, and that in 2018 it will be 64 times the volume of what it was in 2005.

However, significant traffic increases could also be observed in the past. Given this, it is important to note that so far the Internet has been able to cope well with this traffic increase, as BEREC has shown in its IP interconnection report.¹⁹ This is particularly due to competition and technological progress: e.g. router costs per Gigabyte (GB) were subject to a continuous decline in the past; a similar development could be observed for network capacities (large economies of scale) and competition has continuously driven down transit prices in the past.²⁰ Also, the emergence of Content Delivery Networks (CDNs) contributed to effectively cope with the traffic increase. Generally, the Internet ecosystem has managed to adapt its IP interconnection arrangements to reflect, among other things, changes in technology, demand patterns and business models.

Other activities that consumers value and use the Internet for are general searches, e-mail exchanges and social networking. Consumers demand high-speed broadband performance, continuous availability, value for money and rich online user interactivity and experience. The large amounts of traffic that they generate, especially as a result of video and audio streaming services, puts pressure on Content and Application Providers (CAPs) and ISPs, which in turn try to respond to rapidly evolving consumer trends and behaviour.

2. Fixed access

As Europe comprises a mix of developed and emerging markets, with various cultural, economic and linguistic differences, and differences in penetration and availability, it is a

¹⁶ <http://www.accenture.com/SiteCollectionDocuments/PDF/Accenture-Video-Over-Internet-Consumer-Survey-2013.pdf>

¹⁷ http://www.Internetsociety.org/sites/default/files/Global_Internet_Report_2014_0.pdf

¹⁸ http://www.cisco.com/web/solutions/sp/vni/vni_forecast_highlights/index.html

¹⁹ BoR (12) 130 An assessment of IP Interconnection in the context of Net Neutrality

²⁰ BEREC concluded that "the expected volume increase will not require a significant CAPEX increase in fixed network. There is no evidence that cost are skyrocketing due to traffic increase." (ibid, p. 58).

challenge to assess the available applications and usage patterns. However, the desk research we drew on attempted to give an accurate estimation of Internet traffic and consumption rates in Europe.

In terms of Internet traffic through fixed lines, Cisco estimates that the average European in Western Europe will generate about 39 GB of Internet traffic per month per connection in 2018, an increase of 110% from 2013.²¹ In Central and Eastern Europe the average user will generate 27 GB of Internet traffic per month in 2018, a 95% increase from 2013.

The highest share of this traffic is generated by video/audio streaming services, especially in countries where Internet-based video services are available. In terms of downstream traffic in peak time, the top bandwidth consuming activity across all European countries is streaming of video and music, which averages around 43%, while web browsing and file sharing are in second and third place, accounting for 19% and 12% respectively. The upstream traffic however is dominated by social networking (40%), followed by video/audio streaming (19%) and web browsing (12%).

Overall, about 70% to 75% of total traffic originates from a small set of popular bandwidth consuming activities (e.g. YouTube, Skype and Facebook) that are available in most countries. The rest of the traffic originates from activities that are available only in some countries (e.g. Netflix, BBC iPlayer).

It is expected that, by 2018²², online video and digital TV will be the most highly penetrating services for fixed networks.

Together with the growth of Internet applications that use rich and data-heavy media such as high-bitrate Super HD video, the increase in traffic per connection is also associated with the rise in higher bandwidth connections. Increasingly, consumers are expecting the Internet to function instantaneously, increasingly reliant on high speeds.

3. Mobile access

Assessing the usage patterns of mobile networks across all European countries is equally, if not more, difficult than the analysis of fixed networks, due to cultural, economic and technological diversities. However, one thing that seems unaffected by these differences is the monthly subscriber consumption which has remained relatively static across many European countries. In the first half of 2014, the mean monthly usage over mobile networks for European consumers was observed to be 397 MB, an increase of over 11% from 358 MB observed six months before.

While in 2013 mobile traffic used to be only 3% of total Internet traffic in Western Europe, it is projected to grow to 10% in 2018, achieving a compound annual growth rate of 50%.²³ In 2018 it will be the equivalent of four times the volume of all Western European Internet traffic in 2005.

The penetration of mobile internet subscriptions in Europe was 68% by the end of 2013²⁴, growing at a rate of 33% (compound annual growth rate, CAGR), and by the time of this report it is likely that mobile Internet penetration will have overtaken fixed, which was 75% at the end

²¹ http://www.cisco.com/web/solutions/sp/vni/vni_forecast_highlights/index.html

²² http://www.keepeek.com/Digital-Asset-Management/oecd/science-and-technology/measuring-the-digital-economy_9789264221796-en

²³ http://www.cisco.com/web/solutions/sp/vni/vni_forecast_highlights/index.html

²⁴ <http://www.itu.int/en/ITU-D/Statistics/Documents/facts/ICTFactsFigures2013-e.pdf>

of 2013. This trend shows that many consumers prefer using their mobile devices (such as smartphones and tablets) on the go instead of their PCs/laptops when at home or the office. Smartphones in particular have changed the way consumers use their handsets. In combination with high-speed mobile networks, the mobile broadband Internet services available via handsets can eventually be seen as a substitute for fixed broadband access services.

For most mobile networks, video/audio streaming is the leading category, accounting for 33% of the total traffic in peak periods. Social networking and web browsing are the second and third most popular categories with a share of 20% each. Cisco estimates that video streaming will make up most of the traffic in the near future, with levels approaching 56% in 2017. This hunger for more capacity and speed is fed by the availability of smart devices with bigger screens, consumer demand for high-quality video, the ease of use of on-demand video streaming services and the upgrade of mobile networks to 4G.

As a consequence of this trend, a key challenge for mobile network operators in the near future will be to address the increasing demand for higher mobile network capacity and to keep up investment in networks as well as developing more efficient technological standards. At the same time, the strong interest among consumers for high speed Internet access represents a significant economic opportunity for operators. This trend is expected to continue with more advanced network generations, such as 5G.

IV. How do consumers value net neutrality?

This section looks at various insights which BEREC gained from the consumer research, related to:

1. How different attributes are prioritised by consumers
2. Valuation of data caps and zero-rating practices
3. Consumer attitudes
4. Consumer information
5. Switching

As mentioned in section II.2.2 above, the consumer research was carried out across four countries which were identified as being representative of the diversity of the European Internet access markets. It is therefore interesting to observe the extent to which the research suggests there are common trends between the countries.

In looking at the five areas of insight from the consumer research below, we draw out some differences between countries. However, it is notable that trends for Internet usage are substantially homogenous across all the test areas. Internet access is no longer seen as dispensable, with consumers in all countries valuing the ability to be able to always get online.

Usage of devices and applications is almost exactly the same in all four countries: email/web browsing, video streaming, instant messaging and social networks are the most used applications; laptops and smartphones are the devices used most frequently to access the Internet; and the least used devices are games consoles and smart TVs. It is also noteworthy that the economic asymmetries between the test countries did not significantly impact the general similarities between the results of all four countries.

1. How different attributes are prioritised by consumers

1.1. Valuing different attributes

As explained in the grey box in Section II, the consumer research included a conjoint analysis survey to find out how consumers value net neutrality.²⁵ The goal of this part of the survey was to determine respondents' preferences in terms of offers for stationary Internet access at home. Figure 1 below shows the importance of the different attributes tested in the conjoint analysis for each country. The overall picture shows similar patterns in the different countries.

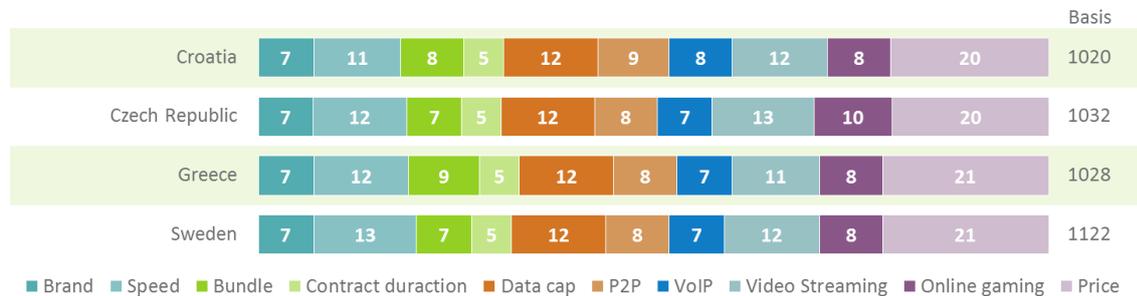
Price is the most important attribute in all countries, accounting for about 20% of respondents' decisions made in the conjoint analysis.²⁶ Download speed, data cap, and video streaming are the second most important, yet are each roughly half as important as price. Speed and price are the most common differentiation attributes for fixed broadband subscriptions. One of

²⁵ There were no significant differences between the control group not receiving the information package and the ones who did.

²⁶ While the specific conjoint method chosen (Adaptive Conjoint Analysis) was the preferred option, it should be noted that this method tends to underestimate the relevance of price in most empirical studies, as explained in footnote 175, on page 391 of the WIK-Consult, YouGov and Deloitte Full Results Report

the application-specific attributes (video streaming) is as important for the consumers as the most common attribute used for differentiation, download speed.

Figure 1: Relative importance of attributes by country²⁷



Basis: All respondents
Values shown in %

Data caps (both with and without zero-rating, where specific applications are exempted from the data quota) and the ability to stream videos online are attributes that are application-specific, and which to some extent relate to net neutrality, although net neutrality implies unrestricted access to all applications.

Based on these results, to what extent can we draw conclusions regarding how consumers value net neutrality? Does this imply that net neutrality would be an important consideration for consumers in their purchase decision? Price is considerably more important than access to each of these application types. When consumers value access to their most important application types, it does however not imply that the same would apply to any other application type, in particular not to new and emerging ones.

1.2. Valuing levels of attributes

While the relevance of attributes reflects the importance of whole attributes in the purchase decision making process of respondents, it does not give any information on which specific *levels* of attributes are preferred by respondents. Conclusions on preferences with respect to attribute levels have to be made on the basis of part-worth utilities.²⁸

Offers without a data cap are, unsurprisingly, clearly preferred over those containing any type of data cap. Data caps with a 50 GB limit are preferred over those with a 10 GB limit. When a cap is as high as 50 GB, zero-rating has a very limited effect on consumer preferences. The zero-rated alternatives are relatively more attractive when consumers are more likely to use up their data allowance, as is the case when it is 10 GB. Among the options for zero-rated applications, zero-rating of video streaming applications was the most attractive to respondents.

Unrestricted and unprioritised access to applications (video streaming, VoIP, P2P and gaming) is typically the most attractive across all countries. This means that normal usage²⁹

²⁷ Figure 7-29 of the WIK-Consult, YouGov and Deloitte Full Results Report

²⁸ Part-worth utilities reflect the value an attribute level has to respondents relative to another level of the same attribute. More information can be found in section 5.3.6 of the WIK-Consult Full Results Report

is most attractive. The level of attractiveness decreases somewhat for prioritised access, and then decreases substantially for restricted access to video streaming applications. Blocked access is clearly the least preferable.

To what extent can we draw conclusions regarding how consumers value net neutrality based on their preference for normal access to these applications? Since normal access is preferred over differentiated access, it indicates that consumers seem satisfied with the current method for accessing applications via best effort Internet access, which is an important characteristic of net neutrality. However, the conjoint analysis could not measure all elements of net neutrality - normal access to specific applications is not the same as a completely application-agnostic Internet access service, which is another typical characteristic of net neutrality, and which was not measured by the survey. However, we did gain some insights in the attitudinal questions asked in the survey and in the focus groups (see section IV.3 below).

1.3. Relationship between price and access to applications

For further analysis of the value of network neutrality to consumers, the relationship between price and application-specific attributes was investigated. Analyses were performed by systematically varying the price as well as the accessibility of specific Internet applications. By simulating offers with different price points and different types of access to P2P/file-sharing, VoIP services, video streaming and online gaming, utility scores for these offers were calculated. Other attributes were held constant by including the most attractive level across all offers simulated per country. Brand was excluded from this principle. Subsequently, utility scores of one offer (i.e. a specific price and application-specific attribute level) were averaged across all brands.

Utility scores decrease slightly for prioritised access compared to normal access. Figure 2 below presents the results for the Czech Republic. The results in the other countries show only minor deviations from this. The lower left graph presents figures for video streaming. Following the utility levels of the different prices, we can see that, out of four levels, slowed-down access with the lowest price level has about the same utility score as normal access with the second lowest price level. This implies that an ISP would be able to make an offer with slowed-down access that has the same utility as an offer with normal access by lowering the price by one level (taking into account the price levels used in this survey).

For a differentiation of service from normal to prioritised access only a marginal shift in price is needed to offer the same utility to a customer. For online gaming, P2P/file-sharing and VoIP services, the utility for slowed-down access with the lowest price level is higher than normal access with the second lowest price level. Blocked access of VoIP with the lowest price level has the same utility as normal access at the second lowest price level.

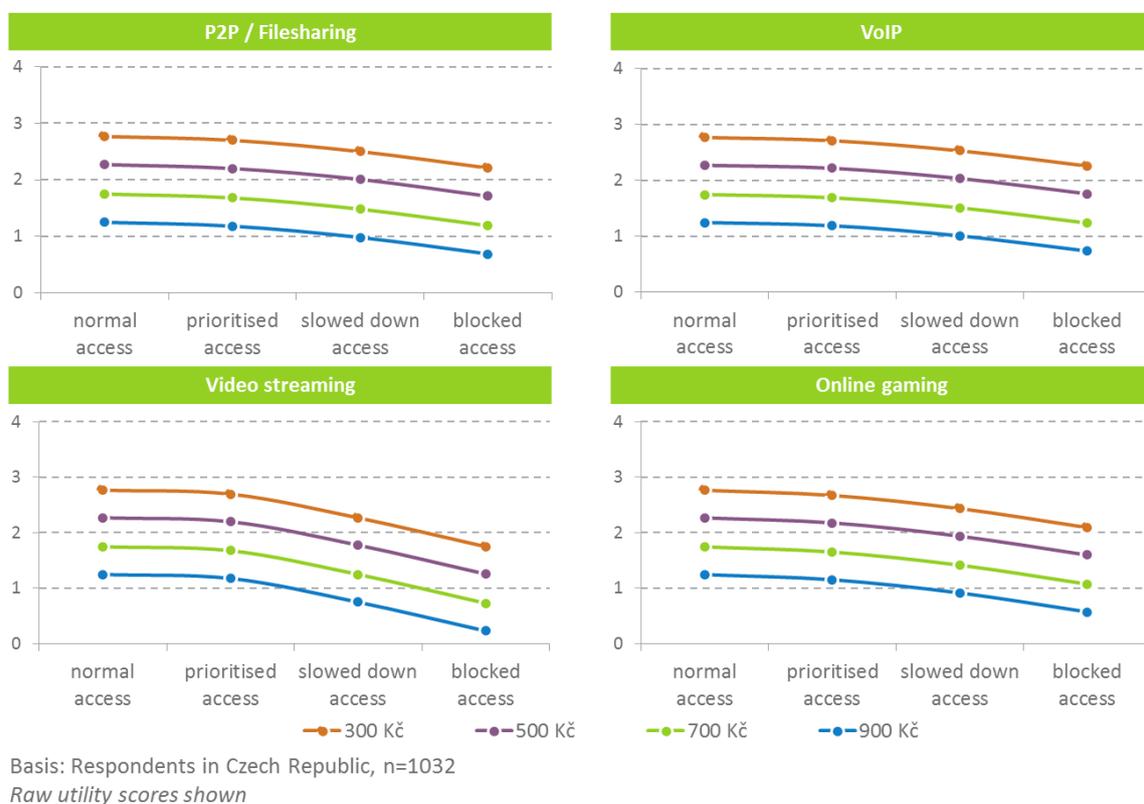
²⁹ In the conjoint analysis the application-attributes had the following explanation:

“In some cases access to certain applications can vary. You will see the following levels:

- *Can be used normally*
- *Is prioritised: This means you will have a very stable connection when using this application, without disruptions like sudden slowdown or reloading.*
- *Is slowed down: This means you will have a slower connection when using this application, so it can be more often disrupted by e.g. slowdowns or reloading.*
- *Is blocked: This means that the application cannot be accessed at all with this offer.”*

For reduced access to video streaming, the level of utility decreases more sharply than for other applications. Thus, the price of a package with slowed-down or blocked access to video streaming would have to be decreased more to be able to offer the same level of attractiveness as a package with normal access than it would have to be for other application types. There are differences in preferences among consumers. The consumer segmentation shows that some consumers place relatively more importance on the accessibility of specific Internet applications. They use these applications more often and are more sensitive to not having normal access. Others are relatively more likely to be driven by price. These consumers are less frequent users of these Internet applications. This shows that a certain proportion of consumers are more likely to respond to quality-differentiated offers from the ISPs.

Figure 2: Utility scores comparing different price levels and levels of access to the Internet (Czech Republic)³⁰



It should be noted that Figure 2 above shows the value of normal access to selected applications that are well-known to consumers, and it is the value of access to these applications that is investigated here, and not application-agnostic Internet access. Furthermore, the more popular an application is, such as video streaming, the higher the value of being able to access it. Therefore, a relevant question to ask is what value a new, unknown application would have. Extrapolating the values of the applications in the survey seems to indicate a low value for new applications with few users, which are by definition relatively unknown before they are potentially able to attract more users. The research does not provide explicit answers to this question, but we could imagine that consumers might not give much weight to access to new, unknown applications in their purchase decision.

³⁰ Figure 7-52 of the WIK-Consult, YouGov and Deloitte Full Results Report

1.4 Conclusions

The conjoint analysis measured many, but not all, elements of how consumers value net neutrality. Consumers preferred normal access over differentiated access to the applications included in the survey, which is an important characteristic of net neutrality. However, the survey was not able to measure how consumers value a completely application-agnostic Internet access service, which is another important characteristic of net neutrality. In addition to these findings regarding consumers' purchase decisions we gained some insights regarding consumers' attitudes to net neutrality from other questions as well as the focus groups.

The attitude statements analysed in section IV.3 show resistance to prioritisation that harms others and/or the performance of other applications, and varying attitudes across countries to applications being prioritised if users pay for the prioritisation. Consumers also perceive the Internet as a democratic medium that everyone who wants to should have access to. However, there were a certain amount of non-responses, especially on the questions about effects on competition and innovation. In their purchasing decisions, consumers are not able to consider overall consumer welfare effects and social efficiency. These kinds of consideration are the responsibility of the regulators.

Consumers put considerable value on access to the applications included in this survey. The most valued attribute is price. The comparisons between price and accessibility shows that the value they put on normal access in relation to, for example, slowed-down access can be compensated by a differentiation in price. Some consumers will accept these kinds of offers because there is a combination of access and price that gives the same value. Quality-differentiation under these circumstances will not automatically result in switching from non-neutral offers. For those that are likely to switch, a fairly large minority find themselves in a situation where switching is not straightforward.

The figures show that the most popular services, such as video streaming, give higher value to the consumer. New, unknown applications are by definition less popular at first before they are potentially able to attract more users. The ability of new applications to attract users and grow in popularity is, among other things, dependent on the quality of access to consumers.

2. Valuation of data caps and zero-rating practices

2.1. Definition and limits of zero-rating

ISPs can use different methods to differentiate their products, including by offering varying levels of quality, such as access speed and data caps.

Data caps are monthly limits on the amount of data a user can use over their Internet connection. When the user hits the limit, ISPs engage in different actions such as slowing down data speeds, charging extra fees, or preventing further usage.

Zero-rating is a commercial practice which consists of allowing end-users to access particular content, services or applications without being charged or having it count towards their data usage. In Europe, it is currently observed mainly in the context of mobile Internet access with data caps.

While data caps are usually not considered a net neutrality issue, provided that all traffic is handled equally³¹, zero-rated services are a case of differentiation between different types of traffic. This is because, once a consumer has used their data allowance, the consumer will continue to have access to exempted traffic, while all other traffic could be subject to further charges, or throttled or blocked. There is more detail about these commercial practices in the grey box in section V.1.

However, it must be clarified that there also exist bundling practices where a content service is included as part of a package along with Internet access, but there is no differentiated treatment of the specific content's data traffic in the sense that traffic to this specific content still counts towards their data usage. Thus, this would not be a zero-rated offer with net neutrality concerns as the network would be managed in a neutral way.

2.2. Insights from the research

Data caps (with or without zero-rated) constitute a relevant purchase choice driver since they influence 12% of consumers' purchase decision (see Figure 1 above), being roughly half as important as the most important attribute (price) and ranking as one of the second most important attributes driving the decision.

Users attach a very high value to fixed Internet without a data cap, compared to fixed Internet with a data cap (with or without zero-rated content). This higher value is significantly greater than a data-capped offer of 10 GB, for example, roughly €14 per month in Greece.³² Also, offers including data cap options of 50 GB reach only about 60% to 75% of the attractiveness of offers not including a data cap.

On the other hand, when a data cap is the only option consumers prefer offers with zero-rated attributes. This is in line with expectations, since having zero-rated applications increases the amount of data which can be used. In Croatia, the Czech Republic and Greece, options with zero-rated applications are more attractive than the data cap of 50 GB without any exemptions.

This is especially true when it comes to offers including the zero-rating of video streaming applications. Again, this is in line with expectations, given that these applications consume the most data, and were shown to be the most popular type of application at other points in the survey.

Given that offers with data caps have a low value, they might only have a role to play in the fixed Internet access market for those consumers with a low willingness to pay, who would be interested in subscribing to a low-price offer to obtain an Internet connection.

³¹ However, some could argue that it infringes on access to information.

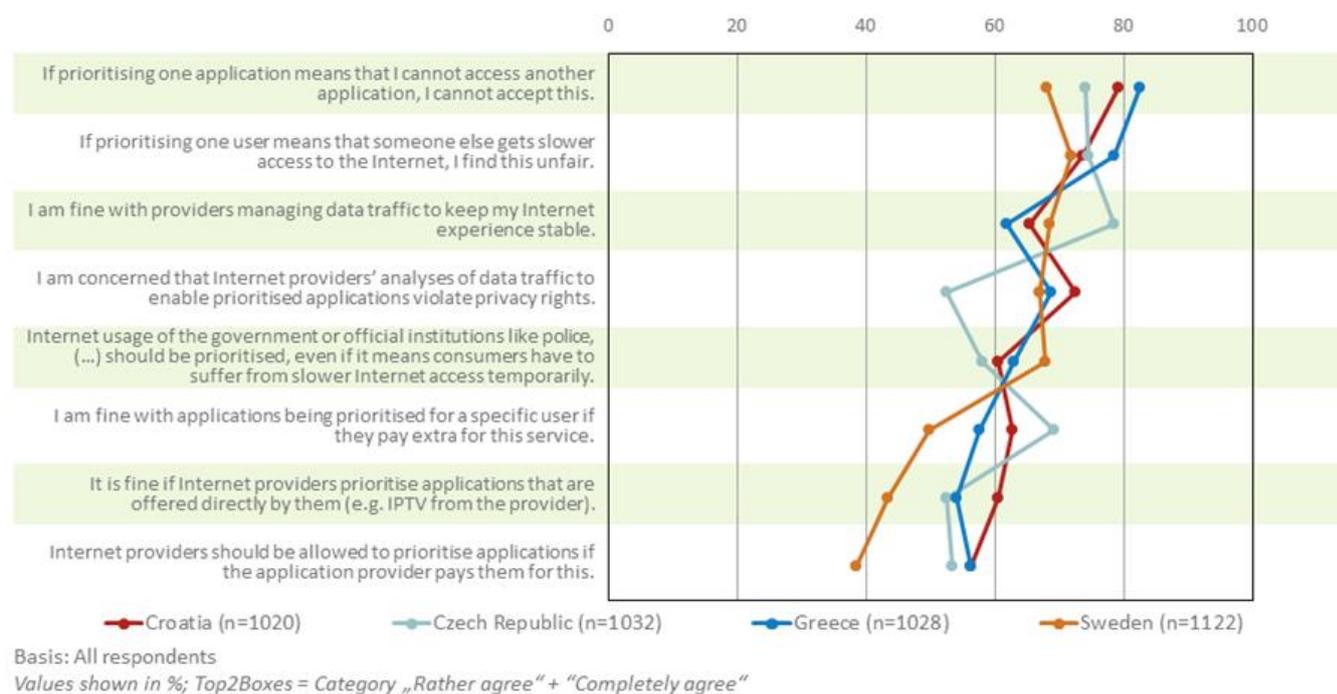
³² In Sweden, the difference in value was roughly 200 kr, in the Czech Republic roughly 200 Kč, and in Croatia roughly 80 Kn. Section V.2 below goes into more detail on the valuation of these differences in value and provides an explanation of how these values were estimated and the limitations of these estimations.

Nevertheless, the conclusion is clear: including data caps on fixed Internet access does not appear to make those offers efficient, including when they are combined with zero-rated content.

3 Consumer attitudes towards traffic management and net neutrality

3.1. Attitudes towards traffic management across test areas

Figure 3: Attitudes towards traffic management across test areas³³



One result from the focus group discussion performed for the study revealed that net neutrality and deviations from this principle can be a very emotional topic for consumers once they have learned about the effects that it may have on their own quality of experience, the quality of experience for others (i.e. slowed-down access) and the wider economic environment.

In addition to this, the survey included a section on respondents' attitudes towards certain aspects of traffic management and net neutrality in general, as shown in Figure 3 above. As explained in section IV.4 below, an interesting result is that the answers from those who saw the information package and those who didn't showed very few differences across the test areas. The following sections will look more closely into the attitudes observed among consumers across test areas towards traffic management and net neutrality.

3.2. Attitudes towards net neutrality in general across test areas

A high level of agreement was found with the statement that it would be unfair if one user would be prioritised over another, with the consequence that the other user gets slower access to the Internet. Swedish and Croatian respondents are more worried about ISPs analysing their data than respondents from Czech Republic and Greece. Swedish respondents feel more

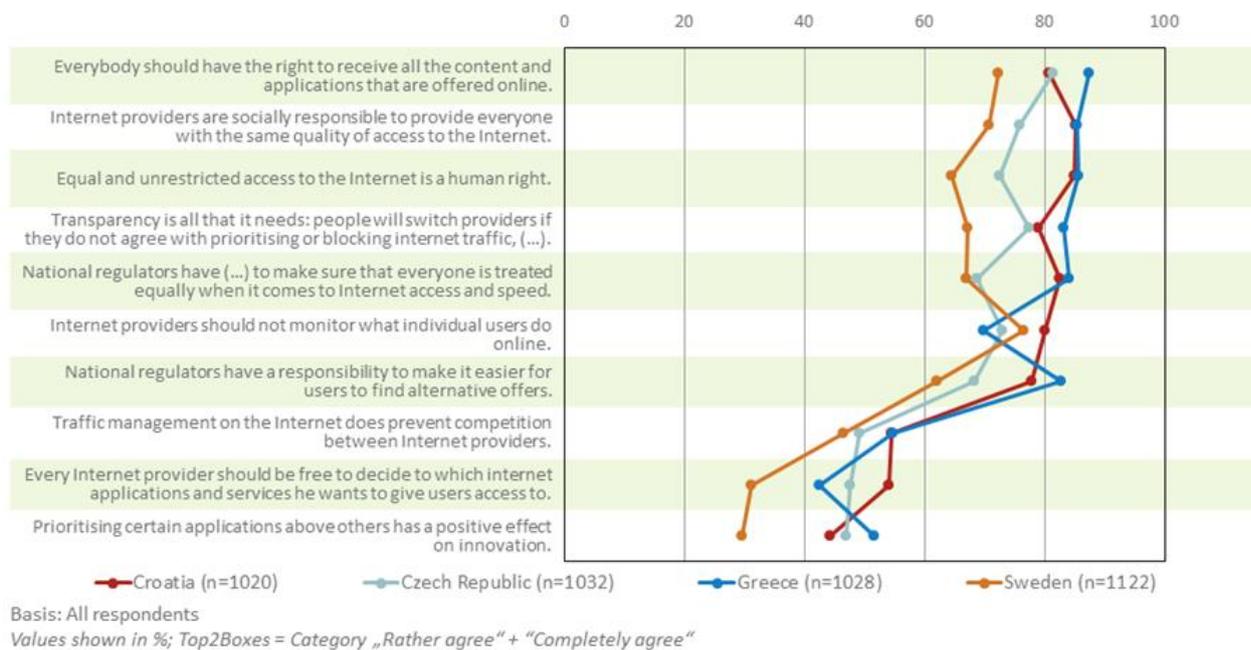
³³ Figure 7-58 of the WIK-Consult, YouGov and Deloitte Full Results Report

strongly than others that the Internet usage of governmental or official institutions (including the police, fire departments and hospitals) should be prioritised, even if it means consumers get slower Internet access temporarily.

Attitudes vary a lot across test areas regarding the prioritisation of applications for a specific user that would pay extra for the service. Around half of respondents agree, while the other half are sceptical, that it is fine for applications that are offered directly by the ISP to be prioritised (e.g. IPTV from the ISP). The results show a generally lower level of agreement that it is acceptable for ISPs to prioritise applications where the application provider has paid the ISP to do so.

We should be cautious about extracting solid conclusions about consumers' preferences and indications that could serve as a foundation for policy conclusions regarding traffic management. Consumers seem to be aware to some extent of the net neutrality debate. But on the other hand the high percentage of non-responses indicates that only some factors might be important to consumers or that consumers do not feel they have sufficient knowledge to answer the question. Potential policy implications emanating from the above will be discussed further under section IV.3.3 below.

Figure 4: Attitudes towards net neutrality across test areas³⁴



The results across the test areas as shown in Figure 4 above demonstrate a lower average level of agreement for the statements related to traffic management, such as the statement that it prevents competition between ISPs. The highest levels of agreement across test areas on average can be found for the first statement that everybody should have the right to receive all content and applications. This can be linked to a finding from the focus groups that consumers understand the Internet as a fundamentally free and open environment where they can make decisions about what applications they want to use and what kind of content they want to engage with. On the other hand, it should be noted that around half of consumers in

³⁴ Figure 7-63 of the WIK-Consult, YouGov and Deloitte Full Results Report

the test countries also agreed with the statement that ISPs should be free to decide which applications it wants to provide access to.

A relatively high average level of agreement can be found with the statement that transparency is a 'solution' for consumers. Respondents also provide a relatively high level of agreement for the statement that "ISPs should not monitor what individual users do online". On this subject it is worth mentioning that online privacy was discussed during many of the focus group discussions, with a general concern expressed that privacy issues were not dealt with in a proper manner.

The results show that consumers consider the Internet as a highly democratic medium that needs to be accessible to everyone in an unrestricted manner, and that everyone should have the right to unrestricted access to content and services.

Two questions in the survey relate to the role of NRAs and their level of involvement in net neutrality issues. The responses indicate that consumers are likely to want their national regulator to ensure equal access to the Internet and its applications and content.

The consistently high percentages of non-response for the statements regarding traffic management and its relevance to competition and innovation indicate that respondents had great difficulties in evaluating them. It is clear from this that consumers generally lack the technical knowledge necessary to express their desires in technical or economic terms. The focus group study also supports the assumptions that consumers find it very hard to evaluate the wider economic impact of traffic management.

3.3 Conclusions

Consumers are clear about their preferences in the sense that they seem to value normal access to Internet applications and a stable Internet experience. In particular, they do not want to be blocked from using certain applications. They trust their NRAs to ensure that everyone is treated equally and that the NRAs should make it easier for them to find alternative offers.

However, consumers do not seem to be able to evaluate certain aspects of traffic management or net neutrality. For example, the high level of non-responses that relate to technical and economic aspects of traffic management or net neutrality indicates that consumers do not understand net neutrality implications in depth.

Competitive aspects and innovation are also hard for consumers to grasp. The net neutrality debate was not as familiar to respondents as public debates on privacy and freedom of speech, which seem to be of concern to consumers. They see access to the Internet as something essential that everyone should have equal access to. However, when it comes to the actual purchase decision, consumers seem to accept some forms of traffic management (see more under section IV.1 above).

There is an important distinction as to what expectations consumers have that are relevant to net neutrality and to other Internet-related policy fields such as privacy, freedom of speech and human rights. Within the scope of this work, only implications related to the regulation of

net neutrality are relevant. However indications regarding adjacent policy fields still provide us with a better overall picture of consumers' perception of Internet usage implications.

4. Consumer information

One of the aims of the WIK-Consult consumer research was to investigate whether a technical understanding of traffic management and how the Internet works has an effect on consumers' purchasing decisions and their opinions about net neutrality. As explained in the grey box on page 12, in order to understand the role which consumer information could have on decisions consumers make, half of the respondents were provided with an information package explaining how Internet traffic could be managed, including possibilities for restricting and prioritising traffic. The other half of respondents did not have access to the information package, leading the consultants to draw conclusions about the role and utility of providing consumers with information. Consultants ensured that the information package given to the respondents was unbiased, including about the roles of ISPs and CAPs.

4.1. Effectiveness of the information package in educating participants

Eight "true or false" questions about the Internet and traffic management were included early in the survey, with the aim of assessing the educational impact of the information package. In six of the eight questions, the percentage of correct answers was higher amongst those who had seen the information package than those who hadn't seen it.³⁵ The differences between the two groups for the other two questions, which were about the roles of ISPs and content providers, were not statistically significant. This suggests that, overall, the information package achieved its goal of educating participants about traffic management.

4.2. Impact of different types of information on purchasing decisions

The survey showed that the information package actually had very little effect on participants' purchase choice criteria because whether or not they had seen it had very little impact on the importance that they gave to the different factors when choosing an Internet package.³⁶ Furthermore, it had very little impact on the part-worth utilities expressed by the two groups for each attribute³⁷ and on their opinions about traffic management.³⁸

The close similarities between the two groups' responses are likely to be a result of the way that the questions in the conjoint analysis section of the survey were formulated. Both groups were presented with pairs of hypothetical Internet access service offers and asked to choose which one they preferred. The description of the offers contained a brief, clear and effects-based explanation of the end-users' experience of certain applications, e.g. "slowed-down video streaming" or "prioritised VoIP". One of the possible factors that shape an end-user's Internet experience is traffic management, so participants were able to know the potential effects that it could have without needing to know about traffic management itself. Therefore,

³⁵ Section 7.3.1 of the WIK-Consult Full Results Report shows how both groups of participants responded to all of the questions.

³⁶ See Figure 7-30 in section 7.3.2 of the WIK-Consult, YouGov and Deloitte Full Results Report

³⁷ See Figures 7-32 to 7-52 in section 7.3.2 of the WIK-Consult, YouGov and Deloitte Full Results Report

³⁸ See Figures 7-58 to 7-67 in section 7.3.4 of the WIK-Consult, YouGov and Deloitte Full Results Report

it did not matter whether or not they had seen the information package and had an understanding of how traffic management works, because the effects that it would have on their Internet experience were presented to them clearly and transparently, and they were able to choose between the offers on that basis. This suggests that transparent, effects-based information can be effective in helping users to take traffic management practices into account when choosing an Internet access service. It is reassuring that it did not prove necessary for consumers to have been educated about the nature and operation of traffic management to be able to take account of relevant ISP practices in choosing a service provider.

4.3. Conclusions

When respondents were asked to make a choice between two highly transparent hypothetical offers, it did not make a difference whether or not they had an understanding of traffic management. This shows the impact of a clear, effects-based description of an Internet access service offer, as was given to all participants in the conjoint analysis part of the survey. The Internet is an experience product, which means that consumers learn about the quality of a particular Internet access service through experiencing it themselves. This explains why the survey's clear description of the effects of traffic management was so effective in helping them to choose between offers. Therefore, rather than educating consumers about how traffic management works, it would be far more effective, and also important for competition, to ensure that offers are transparent about the possible effects that traffic management could have, focussing on its potential impact on accessing content and using applications.

This conclusion suggests that consumers can play a role in resolving net neutrality issues when they have been informed about the possible effects of traffic management in different Internet access service offers. When presented with transparent offers that related to their own Internet experience, they were able to make informed choices. They showed a preference for offers with normal access to content and applications over offers that could have adverse effects, such as throttling and blocking. The research does not provide clear answers as to how consumers would value applications that are yet to become popular and so were not included in the survey. Adequate transparency allows consumers to make choices that allow them to avoid some of the possible harmful effects of traffic management, provided that switching is a straightforward process.³⁹

There are a number of possible avenues that policymakers might want to explore in order to ensure effective transparency. As noted in BEREC's 2011 Guidelines on Transparency in the scope of Net Neutrality⁴⁰, it is likely that no single method will be sufficient. A combination of complementary measures at different points of the relationship between the customer and the ISP may be necessary to achieve transparency successfully. NRAs could stipulate which types of information must be provided by ISPs and where, for example on their websites, at points of sale, and in the contracts concluded with end-users. The information could also be provided by NRAs themselves, or other third parties such as comparison websites. However, in these guidelines BEREC also stresses that transparency alone is probably insufficient, as the ease of the switching process is also important.

³⁹ Since Internet communication is based on two ends communicating with each other, it should be noted that consumers switching to a neutral offer may still be affected if connecting to another user which has restricted access.

⁴⁰ BoR (11) 67 BEREC Guidelines on Transparency in the scope of Net Neutrality

The research suggests that this kind of service information does not need to reflect a particular position on net neutrality to ensure that consumers take it into account in making their decisions. When making decisions, consumers are able to take their needs into account in when presented with transparent and clear service information. This is shown by the differences between the part-worth utilities for the consumer segments.⁴¹ For example, in Figure 7-74, the increase in attractiveness from a 50 GB data cap to no data cap at all is lowest for the participants in segment 4, which is the segment that uses the Internet least, so this is the result that one would have expected. The choices presented to survey respondents only stated the various levels of data cap (including no data cap at all), and it did not attempt to persuade consumers that a particular level suited their needs best, nor did it tell them how important no data cap could be to them. This could be taken to suggest that consumers are able to interpret neutral information.

5. Switching

The ability of consumers to switch provider – and their propensity to do so – is a central aspect of the operation of competition in telecoms markets. Switching behaviour and possible barriers to switching are likely to be important to NRAs independently of the net neutrality issue on which this report focuses.

The issue of switching in relation to net neutrality gives rise to two separate questions:

1. Would consumers be inclined to switch provider in response to changes in the traffic management features of the Internet access service?
2. Are consumers generally willing and able to switch Internet service provider?

The WIK-Consult consumer research study explored consumer attitudes to specific traffic management features, as well as the role such features play in the choice of ISP, and also asks more general questions about attitudes to switching. This section of the BEREK report exclusively considers the findings relating to switching, as opposed to the more general discussion of the value consumers place on open Internet services versus traffic-managed services.

5.1. Inclination to switch provider in response to the traffic management features of the Internet access service

The WIK-Consult study asked a series of questions about the way consumers would respond to specific changes in the traffic management policies operated by their ISP – for example, the introduction of throttling on video traffic, or of data caps.⁴²

A significant majority of respondents across all countries and all WIK-Consult study consumer segments say that they would switch in response to some significant changes in the traffic management policies of their ISP. For example, on the question “If my Internet provider decreased the speed for video streaming unless I paid extra, I would switch providers”

⁴¹ See section 7.3.5.2 of the WIK-Consult, YouGov and Deloitte Full Results Report

⁴² These are detailed in figures 7-101 to 7-104 of the WIK-Consult, YouGov and Deloitte Full Results Report

respondents in agreement were 86% in Greece, 80% in Croatia, 73% in Czech Republic and 70% in Sweden.

It should not be a surprise that many consumers say they would switch provider in response to a change which reduces the range of uses they may make of their Internet access service. However, this is a significant finding if we believe that respondents have given due consideration to the various hurdles and risks involved and nevertheless indicated they would switch provider.

A smaller proportion of respondents said they would switch in response to the introduction of traffic management practices affecting other types of online activity (such as VOIP or gaming), and responses also varied among the different consumer segments used in the WIK-Consult study identified. Nevertheless, the lowest score in any country, among any segment, was 38% (in response to the throttling of gaming traffic, and among the Swedish “pragmatic average users” segment, who are relatively less likely to use a broad range of Internet applications). However, the questions did not elucidate consumers’ potential response to a traffic management policy which limited access to a new, unknown and hence not (yet) popular category of content.

These figures are consistent with the analysis provided that shows consumers pay significant attention, and assign significant value, to the traffic management features in their choice of Internet access package. However, these hypothetical responses may not translate into actual switching behaviour – that depends on consumers’ general readiness to switch (as well as other issues, including price, as noted in section IV.1.3).

5.2. General willingness and ability to switch ISP

Whether consumers are willing and able to switch is a broad question that has implications for NRAs which go well beyond the net neutrality debate. General readiness to switch underpins effective competition among ISPs, so a finding that consumers feel unable or unwilling to switch provider should be a significant concern for any NRA. The importance of switching means that it has been the subject of a wide range of research, some going into more depth than the WIK-Consult consumer research study could. Section 4 of the WIK-Consult Full Results Report summarises some third party research relating to switching, in particular the 2013 *Eurobarometer E-Communications and Telecom Single Market Household Survey*. This found that an average of 43% of consumers has ever switched ISP across the EU28, with a high of 61% in Portugal and a low of 22% in Romania, and similar averages for mobile telephony (44%) and telecoms bundles (45%).

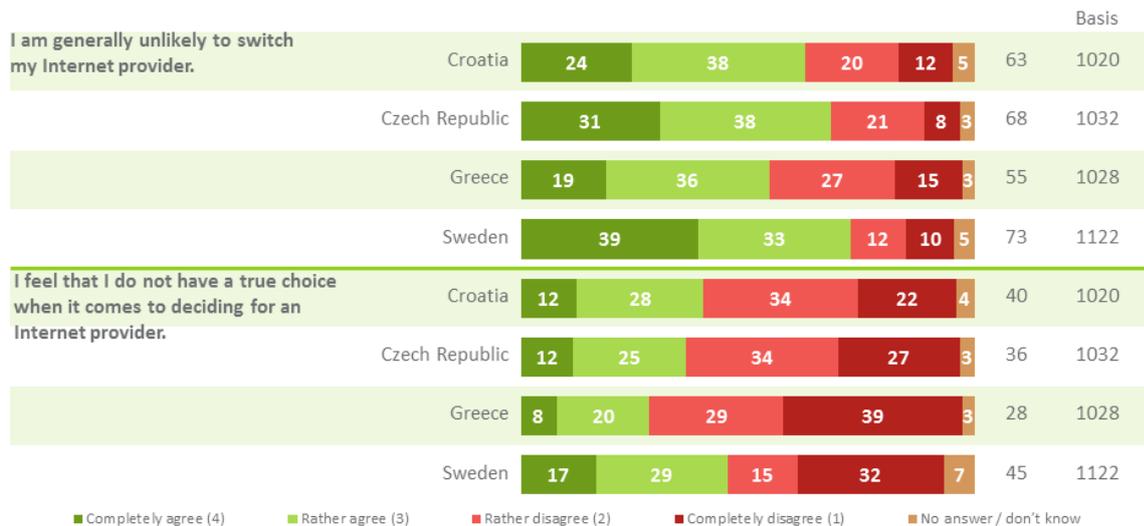
The WIK-Consult consumer research found that switching ISP was higher than the EU average among the sample countries.⁴³ Between one-third and two-thirds of respondents in the survey had switched “because they wanted to”; and between 50% (Czech Republic) and 73% (Greece) had ever switched.

The Greek NRA, EETT, believes that the high levels of switching in Greece may be attributable to consumer response to economic hardship and the opportunities to reduce household outgoings through switching focused on price.

⁴³ See Figure 7-21 of the WIK-Consult, YouGov and Deloitte Full Results Report

In all countries other than Greece, a majority of consumers said they were not considering switching ISP and a smaller but still significant proportion said that they did not have a “true” choice of ISP, as shown in Figure 5 below. It is not clear whether the absence of “true” choice refers to an actual lack of alternative providers, or a perceived absence of competitive providers or of competitive and technologically comparable alternative offerings. Another possible factor in consumers' perception of the lack of choice may be the bundling of Internet access services with other services, such as Pay TV.

Figure 5: Inclination to switch ISP by country⁴⁴



Basis: All respondents
Values shown in %

However, among the consumers who said they were not considering switching, the WIK-Consult study found the majority expressed satisfaction with their current ISP, as shown in Figure 6 below. Satisfaction and a perception of value-for-money were the two most significant reasons consumers cited for not considering switching, though a significant minority (between 8% in Greece and 24% in Croatia) said there was no alternative provider available to them.

⁴⁴ Figure 7-23 of the WIK-Consult, YouGov and Deloitte Full Results Report

Figure 6: Reasons for not switching ISP⁴⁵

	Croatia (n=639)	Czech Republic (n=707)	Greece (n=567)	Sweden (n=812)
Satisfied with current Internet provider	69	70	69	61
No other Internet providers offer better value for money	39	41	45	26
No other Internet providers available for my household	24	14	8	21
Long binding times / minimum contract durations	28	12	18	11
Risk of a temporary loss of service during the switching process	16	17	23	11
Requires too much time / effort	16	8	13	24
Risk of paying for two Internet providers during the switching process	13	12	27	8
Comparing different Internet providers is too difficult	6	8	7	13
Loss of related services (e.g. e-mail address, personal web page)	6	4	6	12
Finding information on Internet offers is too difficult	2	6	2	5
Not sure what steps to take	2	3	2	5
Other	4	3	3	8
No answer / don't know	1	3	1	2

Basis: Respondents who are (rather) unlikely to switch their provider
Values shown in %

5.3. Conclusions

It is not possible to draw a clear conclusion from the WIK-Consult study findings about the extent to which consumer preference and switching behaviour constrains ISPs from offering restricted, non-neutral Internet access services. There is evidence of consumer willingness to switch in response to the introduction of traffic management. However, significant minorities say they do not have a true choice, suggesting they may feel trapped in their current contract and that there may be a market inefficiency. Moreover, almost 4 out of 10 consumers claim that no provider offers better value-for-money.

The survey also revealed that while price is the single most important factor for consumers when choosing an ISP, neutrality considerations such as "slowing down their video streaming unless they paid more" would lead the vast majority to switch provider. The results lead us to believe that while price sensitivity is definitely high, consumers' sensitivity to access to popular types of Internet applications is also significant and, under certain conditions, could result in increased switching. However, we also note that the survey shows that consumers will, in some cases, choose a restricted Internet access service offer if the price is sufficiently low.

In the four test countries, at least half of the respondents have switched at some point, which would seem to suggest some degree of effectiveness of the switching process. However, it is a matter of judgement, possibly specific to individual countries, as to what level of switching and other factors would indicate that the market is operating effectively and that barriers to switching are not excessively restricting competition. The ability of consumers to switch provider, and their propensity to do so, is a central aspect of the operation of competition in telecoms markets. Switching behaviour and possible barriers to switching are likely to be important to NRAs independently of the net neutrality issue on which this report focuses.

⁴⁵ Figure 7-24 of the WIK-Consult, YouGov and Deloitte Full Results Report

If an NRA considers that there are significant barriers to switching and unsatisfactory levels of competition in its market, a net neutrality policy which emphasises transparency and consumer choice is unlikely to be appropriate, whatever general position is held on net neutrality regulation. However, the consumer sensitivity to undesired traffic management features regarding popular types of Internet application mentioned in the WIK-Consult consumer survey suggests that, where an NRA considers there is effective competition in Internet access service provision, an emphasis on transparency and consumer choice may be appropriate.

V. How does the ecosystem respond to the characteristics of consumer demand?

The WIK-Consult study analyses the response which can be in theory expected from consumers (the demand side) to various types of Internet access offers with elements related to net neutrality. More specifically, it indicates how users value different Internet packages offered to them. To facilitate an analysis of these results, it seems important to describe and understand how, and why, the market players serving these users (ISPs and CAPs) behave.

The focus of this reflection will be mostly on ISPs providing Internet access services to consumers, because every user of the Internet “interacts” with such an ISP, whereas they do not necessarily contractually interact with a content or application provider (e.g. subscription for video content). However, this possible relationship between consumers and CAPs must also be taken into account in the overall understanding of how the ecosystem is evolving.

This section will thus look into the latest developments known about real market conditions in Europe, in order to:

1. Describe the Internet access offers actually proposed to end-users, in particular to what extent there are offers which are “neutral” (i.e. exempt from differentiation practices) or not

Section V.1 will rely in particular on information that BEREC gathered from NRAs in 2013. It will include a focus on what complaints or disputes have been brought to public light, how they have been handled, and on the most recent practices that are being considered in public discourse on net neutrality, such as zero-rating.

2. Describe the factors that may provide an incentive to behave “neutrally”

Section V.2 will look at economic conclusions on market efficiency which can be derived from users’ valuations identified in the WIK-Consult study, taking into account an assessment of providers’ costs and opportunity costs when designing their retail offers. It will also reflect the regulatory and public policy environment discussed in section V.1.3.

3. Describe ways in which the ecosystem may respond, including factors that may provide an incentive to behave “non-neutrally”

Section V.3 will explore the reasons why deviations are observed from neutral behaviour, despite the contextual or theoretical incentives discussed in section V.1.2. We will discuss the explanations often mentioned by stakeholders themselves (e.g. technical constraints or targeting of certain specific customers). We will also look at other developments that may trigger particular strategies from operators, notably regarding marketing differentiation, capacity to adapt business models in a fast-changing environment, and responding to competitive challenges from CAPs (including by maintaining sufficient bargaining power).

4. Consider long-term implications

Section V.4 will consider long-term implications of developments in the ecosystem.

1. Situation in the markets

In 2013, BEREC gathered information from NRAs to inform its work on ecosystem dynamics and demand-side forces. Since then, it has continued monitoring the latest relevant developments, observing in particular the new and/or popular offers in the markets, as well as public debates and policy initiatives. Considering the environment in which ISPs operate (including how potential disputes or complaints are handled), and how they behave vis-à-vis their customers, helps us to draw an updated picture of the net neutrality situation in Europe.

a. Legal, political and public environment

The following looks at regulatory developments and the evolution of the perception of net neutrality in the public debate.

Normative trends

As of October 2013, all Member States had transposed the 2009 Framework Review, which included some provisions related to net neutrality. Only two, the Netherlands and Slovenia, have adopted national laws establishing net neutrality principles and rules that go beyond the 2009 Framework. At the same time, most European countries have at least adopted an official position on net neutrality, be it by contributing to the European Commission's public consultations or by launching a national debate. Some countries have moved on to providing guidelines for industry and launched voluntary codes of conduct. Some consider that the European regulatory framework for electronic communications is capable of handling net neutrality issues, provided that there is competition in the telecommunications market. Others expect the European Commission to lead, favouring a harmonised approach within the European Union, while others have taken additional measures, either applying legislation or using "soft law".

In recent years, some national Parliaments initiated debates around net neutrality topics, and several government initiatives were launched. However, since the Commission published the draft Connected Continent Regulation in 2013, which included net neutrality provisions, a wait-and-see approach appears prevalent among national legislators in Europe.

Regulatory approaches

While the Netherlands and Slovenia have regulated net neutrality through national law, the majority of NRAs have used a soft-regulation approach, either by publishing reports, studies and guidelines, or by adopting official positions and statements. In most cases, these initiatives were accompanied by public consultations in order to involve stakeholders, including consumer organizations as well as industry and market players. Thus, NRAs have played a role in promoting a better understanding of net neutrality issues at the national level.

The contents of non-binding documents adopted by NRAs in the context of net neutrality vary across Europe: some NRAs support the idea that regulatory intervention may be justified, whereas others show a preference for a market-driven approach. Where regulatory action was taken, it mostly targeted transparency objectives, although some initiatives have gone further in order to prevent restrictions to Internet access services.

Consumer awareness

NRAs reported that consumer awareness is relatively low at the national level. Several regulators pointed out that net neutrality debates engaged only experts and market players of the Internet value chain, with consumers only being represented by consumer associations. More specifically, individuals are in many cases not aware of the technical concepts and terms used in the net neutrality debates, as most definitions are not expressed in common language. Nevertheless, the existence of complaints shows that consumers are interested in, and aware of, the providers' traffic management practices, such as VoIP blocking, P2P blocking or throttling, or traffic optimization techniques. In two national markets, NRAs consider consumer awareness to be high partly as a result of net neutrality being a relatively hot topic in national public debates.

b. Disputes and complaints

Based on information gathered from NRAs, BEREC was able to get a picture of complaints from end-users, ISPs and CAPs, and how they have been tackled. It is worth noting in this respect that the ability for regulators to intervene in disputes between companies, and / or complaints from individuals, varies across Member States.

Most complaints are from end-users, and they mostly relate to transparency and quality (in particular for mobile services) rather than actual net neutrality incidents. This generally relates to bandwidth restrictions experienced by customers who have subscribed to "unlimited" traffic plans, or to discrepancies between advertised and actual speeds, especially at peak hours. There are also cases of complaints relating to the behaviour of non-ISPs, and this suggests that consumers are not always fully aware of the distinction between traffic management and other techniques which may affect their user experience. Many regulators have put in place measurement tools to measure Internet access speeds. Regarding complaints related to a potential deviation from the net neutrality principle, it appears that a number of them, after investigation, were not actually related to net neutrality.

There are a number of consumer complaints concerning the sharing of bandwidth between Internet access services and specialised services (typically IP-TV over DSL). Other complaints, from either consumers or CAPs, relate to port blocking (in one country), the blocking of some applications (such as VoIP, in two countries), peer-to-peer throttling (in one country), IP interconnection or peering contract issues (in two countries), multicasting conditions (in two countries), the assignment of private IP addresses to individuals (in one country).

Several of these complaints have been informal, for instance reported within public consultation processes, rather than formally lodged with an appropriate complaints-handling body. In one reported instance, the regulator started the dispute resolution procedure, but the issues were ultimately settled amicably by the parties involved. Some other complaints have led to formal investigations.

Finally, it can be noted that, in a few instances, ISPs themselves have filed complaints more or less directly linked to the net neutrality topic. Notably, in one country, a group of mobile

operators presented a common position which requested the inclusion of some VoIP applications, and in particular Viber, in the regulatory framework applicable to electronic communication operators. The request was based on the grounds of allegedly unfair competition. More generally, in the Netherlands where ISPs are subject to net neutrality rules, the regulator observes that, although they have not received a concrete complaint from an ISP, ISPs are very alert when it comes to their competitor's degree of net neutrality, and also very keen to come to the regulator if they suspect something is wrong.

c. National situations regarding traffic management

The experiences of NRAs when canvassed in 2013 seemed to confirm the findings of BEREC's 2012 traffic management investigation. ISPs cope with increasing bandwidth requirements by routing traffic on a best effort basis, without implementing prioritization practices and without differentiating between services in terms of quality and price. At the same time, specific practices, such as blocking or throttling of peer-to-peer traffic or VoIP, are still reported in certain countries. They mostly occur in the mobile market. Most NRAs still report congestion management as the main reason for traffic management by mobile operators. Most mobile operators in Europe reserve the right to carry out temporary traffic management in case of congestion, generally stated in consumer contracts or mobile operators' websites.

The mobile sector is still the main area of concern among NRAs, and a number of emerging differentiation practices have been reported as worth monitoring. One is the introduction of data caps or other billing policies that distinguish between applications accessed using the Internet access service. In some smartphone tariffs with data caps, certain applications (e.g. Facebook or streaming services) are not counted against the data cap, the zero-rating practices discussed in section IV.2. In the Netherlands and in Slovenia, NRAs have taken concrete decisions against zero-rating based on national laws and in Norway it has been clarified that, in principle, zero-rating would be regarded as a breach of the national net neutrality guidelines.

Similarly, some national mobile markets have experienced the launch of premium offers allowing the use of VoIP (premium packages) while basic offers do not include access to VoIP applications. These policies are usually communicated by mobile operators in their marketing.

In fixed markets, practices including the throttling of P2P traffic during peak hours, or port blocking in areas where the local loop has not been unbundled, are occasionally reported. Prioritisation of traffic is mostly implemented for specialised services (e.g. IPTV) on fixed networks, where TV traffic has a dedicated capacity potentially at the expense of IAS (when both are simultaneously used by the same end-user). In the fixed Internet access market, bundles of products including voice, IPTV and Video on Demand (VOD) are available. In some, but not all, national markets MNOs combine their offers with content platforms which provide video streaming (e.g. TV channels) and / or music streaming provided by some major CAPs.

Market development case study: zero-rating

The incentives for ISPs discussed in section V.2 below are useful for interpreting the competitive strategies emerging in the market. In this context, recent developments observed in mobile data plans indicate that the consumer ISP business is evolving differently in the fixed and mobile retail markets. In particular, in the mobile market the emergence of zero-rating offers is one of the new commercial practices observed in Europe during the last year. According to PwC, around 49% of mobile operators worldwide now offer at least one zero-rated application (and it is Facebook in 65% of the case).⁴⁶

The main feature of zero-rating, as explained before, is not to charge subscribers for traffic from specific applications or digital services in limited or metered data plans and tariffs. In the mobile sector, this commercial policy has especially become an option to market 4G networks with data cap plans. In such cases, Internet traffic generated by specific applications or services is not counted in the cap and when the data cap is exceeded users can access the sponsored applications or services free of charge and with no other restrictions.

However, operators in European mobile markets have arranged these practices in different ways, mainly choosing three key dimensions: the type of favoured applications or services, the mechanism of promotion, and the owner of the favoured service or application, which may be the ISP itself or a third party CAP.

The practice in principle applies to a variety of services, such as video streaming services, TV services, music streaming services, cloud services, instant messaging applications or social networks.

The mechanism adopted in order to promote a specific application or service normally consists of offering free access to certain popular online services that do not count against a subscriber's data cap and / or offering the data free of charge once the cap is passed. Under such plans, other types of data services can be accessed and used by paying additional charges, or are accessible on a slowed-down basis.

Regarding data which is not subject to zero-rating, it is worth noting that operators sometimes do not allow consumers to buy additional usage allowance once the cap is exceeded, which seems to be especially the case for video services.

The features described above suggest there are differences between bundles and zero-rating offers. Zero-rating implies price and/or traffic discrimination to favour specific applications and services in data cap plans.

Based on what is observed in the market, it is too early to give a full assessment of zero-rating in terms of competition, consumer welfare and innovation, but it is certain that one should consider both short-term and long-term effects of such practices.

⁴⁶ Data from Mobile Charging Report (2014), cited in the Desk Research on the Demand-Side of the Internet - PwC

2. Incentives to behave neutrally

As described in the previous section, the actual market conduct of ISPs seems, for a large part, consistent with net neutrality principles, although there are exceptions to this – more frequently in the mobile environment than in fixed networks.

Two main driving forces may explain this situation. First of all, in a competitive environment, it can be expected that operators will try to serve the market with offers best suited to users' demand, insofar as it is technically and economically viable. We will explore here to what extent this economical equation (aiming at “market efficiency”) fits with a portfolio of neutral service offers. The second aspect to explore is how other external factors, related to public and policy pressure, can also push operators into the neutral direction, independently from any marketing and business strategy. This second aspect is important to take into account especially in market situations where competition pressure is much lower (e.g. in some rural regions with few ISPs available), in which case the market efficiency trigger may be weaker.

a. Market efficiency – optimal responses to consumers' valuations

It is interesting to reflect on what the results of the WIK-Consult study indicate as possible expectations from end-users regarding ISPs offers. Nevertheless, it is important to note beforehand that it was obviously impossible to compare “neutral” offers with all possible types of differentiating practices, given that the potential combinations are infinite. Similarly, this section analyses the study's results on the possibility to apply data cap exemptions for specific applications on Internet access offers, or on offers where certain applications are slowed down or blocked (typically, Internet-based services competing with operators' traditional services). However, there are other forms of practices that could have been submitted to such an analysis, for instance a mixture of premium or basic offers, where the quality differentiation is applied depending on the nature of the end-user contract. It is thus important to bear in mind that the analysis below does not claim to provide an exhaustive understanding of mechanisms for all type of net neutrality-related offers, and any premature generalisation should be avoided.

The WIK-Consult study provides us with the valuations of consumers for normal access to Internet applications and uncapped offers. The response of operators is, in theory, mainly driven by the difference in consumer valuations of different possible offers and the cost differences of these offers. Providers will usually try to offer products that have the highest user valuation minus the cost of offering the product. Because the valuations measured in the study concern fixed Internet only, this section is about fixed Internet only.

In section IV.2.2, we have seen that users of fixed Internet connections attach a high value to normal access to Internet applications and uncapped offers. It is interesting to note that the values of uncapped offers are significantly higher - roughly €14 per month in Greece, for example⁴⁷ - than those of a 10 GB capped offer. The value of normal (neutral) access to video

⁴⁷ and valued roughly 200 kr higher in Sweden, roughly 200 Kč higher in the Czech Republic, and roughly 80 Kn higher in Croatia. This was calculated by noting that the utility ratings in Figure 7-57 of the WIK-Consult Full Results Report for an offer with no data cap were roughly the same as an offer

is similarly significantly higher than that of an offer with the video applications slowed down, for example, roughly €14 per month higher in Greece.⁴⁸ The higher valuations of uncapped offers and normal access to popular Internet application types provide an incentive for ISPs to offer such services.

To predict how ISPs will respond to consumer valuations, it is relevant to compare the cost of offering normal access to applications to that of slowed-down applications, and an uncapped service compared to that of a capped offer. The incremental cost can consist of the extra network capacity that must be built to carry the extra traffic, but can also consist of the potential loss of revenue due to the usage of Internet-based services competing with traditional ISP's services, or on the contrary, on the opportunity cost of lost revenue from CAPs. We assess these cost factors below.

Regarding the incremental cost of network capacity for fixed Internet, it is generally agreed that the incremental cost of fixed Internet traffic is low and so the incremental cost of a neutral and uncapped offer compared to a slowed down or capped offer is small. This is different from mobile, where the incremental cost of traffic is much more substantial. These aspects are debated though, particularly among operators. The arguments are described in more detail in section V.3.

Regarding the potential lost revenue due to the usage of Internet-based services competing with traditional ISPs' services, it is worth noting that an ISP could do several things to incentivise payment from the supplier of that content, including threatening to block certain content, offering solutions to prioritise the content, or combining data caps with zero-rating of specific content. After all, a better treatment (whether it is prioritisation or zero-rating) provides a certain value to the provider offering that content. This could be extra revenue that can be used to lower the retail price of the Internet package and compensate the users for the lower value of slowed down or capped Internet, or it could be used to increase profit. It is difficult to predict how high these incoming wholesale revenues could get (see section V.3 for more detail).

ISPs therefore seem to have a customer-driven incentive to offer neutral non-capped fixed Internet, since this is the offer that users value most, and associated costs appear bearable in most situations. The extra cost of capacity and the forgone revenue from CAPs seem substantially lower than the extra value that can be provided to users; indeed, the study results indicate that an ISP introducing, for example, a 10 GB data cap, or slowing down video applications, would have to decrease its price significantly (e.g. by roughly €14 per month in Greece⁴⁹) to offer an equally competitive product. It is unlikely that the ISP could compensate for this through lower network costs or by increasing revenue from CAPs.

The loss of revenue from traditional services impacted by competing Internet-based services may be a more complicated question, and this is more or less reflected in the types of practices

with a 10 GB data cap at one price level below. We then calculated the averages of the three intervals between the four price points.

⁴⁸ and valued roughly 200 kr higher in Sweden, roughly 200 Kč higher in the Czech Republic, and roughly 80 Kn higher in Croatia. This was calculated in the same way as explained in the previous footnote.

⁴⁹ or roughly 200 kr in Sweden, roughly 200 Kč in the Czech Republic, and roughly 80 Kn in Croatia

observed in the market, which more frequently target VoIP or instant messaging. Another notable exception, where the practice may be considered profitable, is the capping of very high bandwidth users.⁵⁰

Putting aside these exceptions, a profit-maximising ISP would therefore, at least theoretically, probably prefer to propose a neutral fixed Internet access offer.

One element to nuance the above analysis is that the research measures the valuations for blocking or slowing of the respondents' favourite applications. It can be imagined that the decrease in valuations for blocking and slowing down of less popular applications is lower. The incentives for blocking or slowing of those applications are more difficult to predict. A smaller decrease in valuation could make it easier to block or slowdown those applications. On the other hand, the amount of payment that can be extracted from providers of those applications through the threat of blocking or slowing down those applications is also substantially smaller.

Even more importantly, it is worth noting that the study provides an average valuation of consumers, but there may actually be an important difference between the valuations of different groups of consumers, at least in certain markets. Consequently, although the general valuation of neutral offers is high, there may be certain market segments where the incentive to provide neutral offers will be lower.

It is, however, important to bear in mind that the valuation mechanism described here cannot be fully generalized, and it may prove less efficient in certain markets with lower levels of competition, or for certain types of users or applications.

b. Influence of other stakeholders

A variety of stakeholders, many of them being non-commercial actors, can influence ISPs when they consider how to construct their offers.

Public institutions may sometimes play a role. Public policy-makers can launch a national debate about ISP offers if they judge them unsatisfactory, thus constraining ISPs' decisions. If the debate results in legislative action, for example through a net neutrality law, the influence of public policy-makers could extend as far as directly prohibiting some practices. In addition, the regular exchanges that regulators have with ISPs, and the legal instruments available to regulators (investigations, dispute settlement), could be perceived by ISPs as an incentive to limit offers that would appear contrary to regulators' objectives, e.g. protecting consumers or long-term innovation. Therefore, when constructing their offer, ISPs may sometimes do so in a way that seeks to avoid coming into conflict with the objectives of regulators or public policy-makers.

In this respect, some NRAs have expressed a preference that ISPs only provide neutral Internet access (unrestricted Internet access), because this will increase the size of the "Internet platform", in turn increasing the value of the Internet for consumers, as well as

⁵⁰ There is a specific rationale for caps at high levels that seek to limit exceptionally high data usage, e.g. usage that is generated by the top 1-5% high data users. Those data caps would not limit the large majority of users and may therefore be considered as effectively uncapped offers for most.

increasing the size of the “marketplace” for CAPs (the “network effect”). They advocate that the ability to generate innovation is an essential feature of the Internet which has led to the emergence of a vast number of applications. This dissemination of content (e.g. music, video) has been made much easier by the Internet. Technically, the separation of the network and application layers has enabled competition and allowed service innovation to take place at the edges of the network. Entry barriers for providing applications and content over the Internet are rather low. In order to do so, no interaction with the network provider is necessary (“innovation without permission”).

It should also be noted that other stakeholders, such as consumer organisations, activists, bloggers and others are able to exert some sort of influence, depending on the importance that they have at the national and international level, and this may indirectly influence some ISPs. This influence would appear to be lower than that of CAPs and public institutions, but concern about the potential reaction of such stakeholders, and a potential ensuing debate, has to be taken into account by ISPs before launching new offers. Anticipating the reaction of such stakeholders could be challenging for ISPs as these stakeholders are diverse and may express multiple different concerns, sometimes contradicting themselves, depending on their perspectives. It is more predictable that consumer organisations will defend consumer protection and long-term innovation.

3. Ecosystem developments, including factors which may lead to “non-neutral behaviour”

Despite the strong incentives described in the above section (e.g. demand preferences, regulatory constraints, media pressure), there are still a number of reported cases where non-neutral practices are observed in the markets, particularly in mobile networks. This section will explore the possible factors explaining such a divergence in ISPs’ response to consumer demand.

In addition, ISPs generally oppose net neutrality regulation. Their reasoning often stresses that it is important that ISPs can differentiate in the sense that different applications could require different quality. The Commission summarised the views of fixed ISPs as follows: *“Fixed operators emphasised that traffic management practices are indispensable to ensure a robust, secure and efficient functioning of the network and should be regarded as a commonly accepted technique for network optimisation”*.⁵¹

A first area of explanation relates to the dynamic challenge posed by the digital economy and in particular the Internet, which is not a static entity; instead it sees constant, sometimes even disruptive, developments. This is particularly due to the emergence of innovative applications and content leading to changing traffic patterns and users’ behaviour. The necessity for operators to adapt to, and even anticipate when possible, those changes, may partly explain

⁵¹ European Commission (2013), ‘Impact Assessment accompanying the document “Proposal for a Regulation of the European Parliament and of the Council laying down measures concerning the European single market for electronic communications and to achieve a Connected Continent, and amending Directives 2002/20/EC, 2002/21/EC and 2002/22/EC and Regulations (EC) No 1211/2009 and (EU) No 531/2012”’, 11 September 2013, SWD(2013) 331 final, COM(2013) 627 final, SWD(2013) 332 final.

certain strategies of experimentation from ISPs, towards users as well as towards CAPs (see section V.3. a below).

In parallel, technological progress is also very rapid, and is a major driving force impacting cost structures: some innovative services may require specific technical management (in terms of bandwidth, latency, security features), while the latest technologies help to handle the growth of fixed and mobile traffic. In this respect, mobile offers more often present restrictions in terms of data volumes, which can be explained by the limited transport resources in mobile (access) networks.⁵² This combination of opportunities and constraints also influences ISPs when they build their offer – this is discussed in section V.3.b below.

Finally, the value chain of stakeholders participating in the provision of electronic communication services has undergone significant changes in recent years. New businesses have emerged (e.g. CAPs and CDNs), providers sometimes vertically integrate into other parts of the value chain, and IP interconnection arrangements adapt accordingly.⁵³ As mentioned in section V.2.a, in some cases, Internet-based services compete with operators' traditional services and it is often understood that when an operator blocks or contractually forbids VoIP usage it does so in order to protect mobile voice revenues. On a higher level, some players (e.g. search engines, mobile operating systems, social networks) have acquired an extremely strong market position, sometimes challenging the strategic role of operators, particularly regarding their relationships with end-users. In this new environment, ISPs may develop strategies (e.g. becoming a platform or a provider of content, developing premium-quality traffic handling) that may be explained by a relatively strong power conflict. Through such approaches, operators may expect gains in the short or the long term (in partnership negotiations, or in their capacity to influence the choices of the big Internet players). These aspects are described in section V.3.c below.

a. The ability of ISPs to test the market in a fast-moving environment

As already noted, the theoretical assumptions in section V.2.a are directly based on the results of the research and it is possible that the research overestimates the true value users attach to net neutrality in their actual behaviour. After all, a user saying what he or she will do in a hypothetical situation when responding to a survey is not the same as a user in an actual choice situation.

Moreover, it is also possible that ISPs have a more targeted approach than the study does. While the study was considering an average user and four consumer segments in each country, it may be that ISPs are able to approach the market with more granularity, identifying some specific sub-segments of population which may value particular differentiations in traffic management practices.

Finally, it could also be said that, in a fast-moving environment where new usages are developing all the time, ISPs want to test the market in order to develop evidence on the attractiveness of non-neutral offers to end-users.

⁵² A second reason is that network dimensioning is more complicated in mobile due to the fact that the number of users is not constant over time for each access node

⁵³ BEREC has analysed these broad scale developments in its report, BoR (12) 130 An assessment of IP Interconnection in the context of Net Neutrality

b. Technical factors

As noted in section III, Internet traffic is still increasing, but the growth rate is declining. For fixed Internet, Cisco projects a compound annual growth rate of 20% for Western Europe and 24% for Central/Eastern Europe.⁵⁴ This increase is mainly due to an increase in traffic per subscriber.⁵⁵ For mobile, both actual traffic growth rates in recent years and future projections are even higher, although this seems plausible as the starting level is lower for mobile.

Traffic patterns also change. While in the past Internet usage patterns were rather uniform (e.g. web-surfing, file transfers), nowadays bandwidth-intensive applications, such as streaming of audio and video, account for an increasing part of overall traffic. This also accounts for the traffic increase per subscriber. Such bandwidth-intensive applications are rather sensitive to latency.

As some services need a specific quality of service (especially latency) in order to allow their functioning, ISPs may want to operate technical optimisations of the network in order to ensure those services enjoy the required levels of QoS. This type of intervention may be understandable as long as people generally agree on the need to protect these services, and as long as ISPs do this in a non-discriminatory way, and do not reduce the QoS of all the other services.

Regarding the increase of traffic, this is a legitimate reason to charge end-users for increased access speed given that it requires investment from ISPs. Nevertheless, it has to be underlined that some technical developments have enabled the ecosystem to largely cope with this issue. For example, the emergence of solutions such as CDN services which allow CAPs to store content closer to the user helps CAPs with higher bandwidth and quality requirements but also reduces a possible bandwidth issue in core networks.

At the same time, technological progress and competitive forces have led to an ongoing decline of transit prices as well as prices for CDN services, reducing significantly the incremental cost of the deployment of more bandwidth.

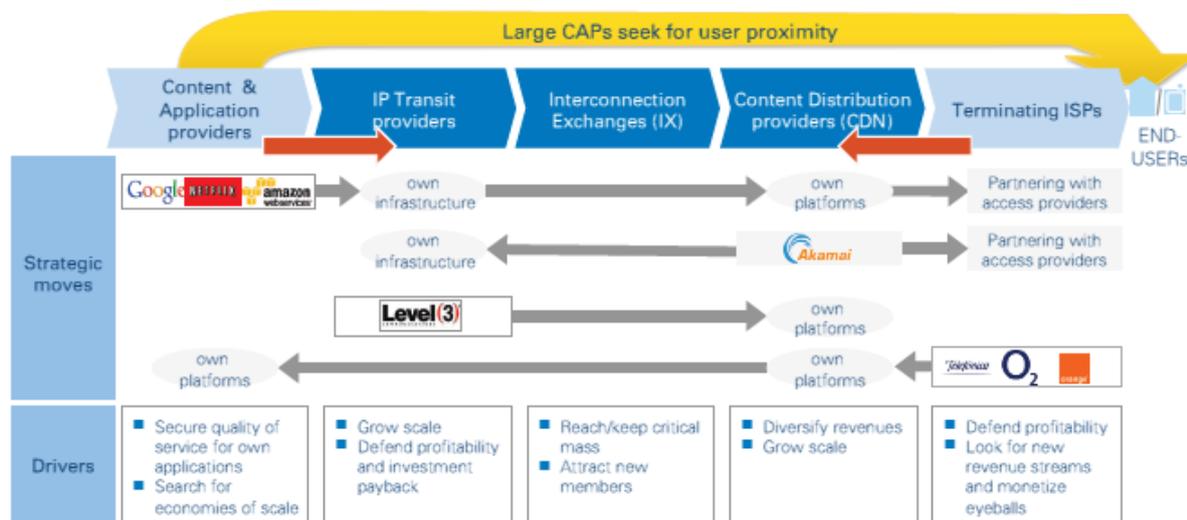
c. The position of ISPs in the value chain

Large content providers increasingly invest in their own infrastructures and CDN services in order to exploit economies of scale. While the separation of network and application layers also enables small players and end-users to provide content, an increasing percentage of all content stems from hypergiants (e.g. Google, Netflix). Given this, it seems plausible that direct interconnection and agreements between content providers and (terminating) ISPs will become more relevant.

Along the value chain from content provision to the terminating ISP, business models of the various players increasingly overlap as these players vertically integrate up- or downstream. This is illustrated by the following figure:

⁵⁴ http://www.cisco.com/web/solutions/sp/vni/vni_forecast_highlights/index.html

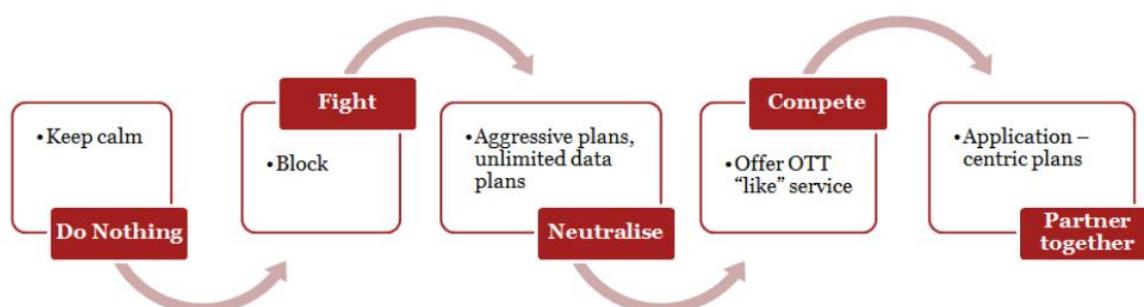
⁵⁵ The increase in subscriber numbers plays a smaller role

Figure 7: Trends over the IP interconnection value chain⁵⁶

Telcos and ISPs are exposed to competition from CAPs. At the same time, and with decreasing transit prices, the creation of value along the value chain has shifted from the network to the provision of services and content. Competition is a driving force for new business models to emerge, with providers integrating into other segments of the value chain, and interconnection arrangements also adapting.

Broadly, these are the different options for action that are available to telcos and ISPs which are exposed to competition and ongoing changes in the Internet ecosystem as described above:

Figure 8: Evolution of the ecosystem relationship between ISP and CAP



These options range from "do nothing" to "engage in partnerships". The intention here is not to make an abstract assessment of which strategy is optimal but rather to sketch the range of available options. Different providers may come to very different conclusions as to what – according to their assessment – might be the appropriate strategy. Some of the main incentives in ISPs strategies are presented below.

⁵⁶ Arthur D. Little (May 2014), *The Future of the Internet – Innovation and Investment in IP Interconnection*, study conducted for Liberty Global, page 8 (http://www.adlittle.com/downloads/tx_adlreports/ADL_LibertyGlobal_2014_FutureOfTheInternet.pdf)

On one side, as some services provided by CAPs cannibalise revenues from traditional telco services (voice, SMS),⁵⁷ some ISPs may try to block them or to make them less attractive through bundling / flat-rate strategies, or by providing specialised services (e.g. VoLTE) to compete with Internet-based services).⁵⁸ In particular in the U.S. some providers have experimented with introducing data caps. Critics claimed that this is a move to “encourage a climate of scarcity” in order to ultimately increase revenues or to decrease the relative attractiveness of competing Internet-based video offers (e.g. Netflix) and to protect their own video offers.⁵⁹ Furthermore, operators are incentivised to favour their own services by prioritisation or zero-rating.

It could be also the case that ISPs would agree with some larger CAPs to provide their content through the ISP network, creating a “platform ISP” where only some content would be available at a lower price.⁶⁰ It is not yet a widespread phenomenon, and it is not necessarily clear that this would lead to non-neutral practices, but it would be interesting to see how this “platformisation” trend develops.

From a two-sided market economics perspective, ISPs may try to enter into commercial agreements with content providers in order to increase their revenues from both sides. Whether or not these agreements include payments from the CAP, they may create a strong incentive for both the CAP and the ISP to encourage the consumption by end-users of this service instead of one offered by competitors. This could be done through specific marketing strategies or by prioritizing or zero-rating the partner application.

Finally, claims for monetising data termination were proposed by ETNO in the context of the World Conference on International Telecommunications 2012 (WCIT 2012),⁶¹ in which ETNO advocated for a specific interconnection charging mechanism (Sending Party Network Pays - SPNP). In its comments on the ETNO proposal, BEREC pointed out that replacing the current Bill-and-Keep approach with SPNP could lead to a need for regulatory intervention as the “*ISP providing access could exploit the physical bottleneck for traffic exchange and derive monopoly profits*”.⁶² Furthermore, in its proposal ETNO advocated the concept of end-to-end QoS delivery. As ETNO themselves put it, the only reason for putting end-to-end QoS on the table seemed to be “*to enable incremental revenues by end-to-end QoS pricing and content value pricing*”. BEREC pointed out that the lack of demand for differentiated QoS classes results from customers’ unwillingness to pay much of a premium for a better service and because the best effort Internet often delivers high quality of experience for users. BEREC concluded that “*over the Internet, a guaranteed end-to-end QoS offer is neither commercially nor technically realistic*”. The endorsement of QoS by network providers contrasts with the

⁵⁷ However, it is important to note that the attractiveness of Internet access hinges in particular upon the availability of attractive content and applications, which are an important driver of Internet consumption.

⁵⁸ Similarly, integrating telephony flat rates into Internet access packages reduced the attractiveness of VoIP services, e.g. Skype.

⁵⁹ http://www.newamerica.net/publications/policy/capping_the_nation_s_broadband_future#3

⁶⁰ See section 5.3.1 of the Desk Research on the Demand-Side of Internet use - PwC

⁶¹ <https://www.etno.eu/datas/itu-matters/etno-ip-interconnection.pdf>

⁶² BoR (12) 120 rev.1 BEREC’s comments on the ETNO proposal for ITU/WCIT or similar initiatives along these lines

overall findings from the WIK-Consult study, which show that users prefer normal access to Internet applications.⁶³

As a conclusion to this section, it can be recalled that, to a large extent, the EU market is characterised by a majority of neutral offers (although this is more true in fixed than mobile networks), which seems to indicate that the incentives described in part V.3 are, in most cases, largely compensated by the natural market efficiency equation presented in V.2, combined with some public policy pressure. However, the description above has also shown that certain incentives (e.g. technical considerations, specific users' expectations, or particular relationships with some CAPs) may vary significantly, as well as market conditions, particularly the level of competitive pressure. Thus, the costs-benefit equation may, in certain cases, result in much higher incentives for non-neutral behaviour. This should encourage regulators to maintain a sufficient level of vigilance towards the development of certain practices which may ultimately prove detrimental to long-term innovation and overall welfare.

4. Long-term implications

As the net neutrality debate is about the future rules for the Internet, it is also a debate about the long-term effects and implications of these rules. These effects are very difficult to explore in consumer or desk research and this study did not seek to do so. In general, short-term and static effects of purchasing decisions are easier for consumers to take into account than long-term, dynamic effects (e.g. innovation and competition).

The discussion about the long-term effects of deviations from net neutrality centres on the innovative and open character of the Internet which enables content and application providers (CAPs) to offer their services to a potential worldwide market with very low market entry barriers. A lot of the currently successful CAPs started as small independent garage start-up companies and were able to succeed on the open Internet which provides a level playing field for every single CAP, independent of its size. The open character of the Internet has a beneficial influence on many parts of society and on the economy because individuals can gain access to information and services, and businesses can offer their products on a larger scale, or can become more specialised.

There are various deviations of net neutrality. The most prominent deviations are currently application-specific blocking or throttling. Both have potential negative long-term effects: they reduce the available customer base of CAPs and therefore make their business cases more likely to fail. Network effects are harder to achieve and it gets harder to reach consumers. These disadvantages can have potential negative long-term effects on the competition and innovation initiated by the current open Internet. These disadvantages would affect not just the users of the ISP carrying out such practices, but all other Internet users, and these other users are furthermore not able to react to the practices through their own purchasing or switching decisions.

Specialised services – services provided in parallel with, but separated from, the Internet access service – are another form of application-specific differentiation. Currently, they are

⁶³ See section 7.3.2 of the WIK-Consult, YouGov and Deloitte Full Results Report

not part of the market on a large scale;⁶⁴ therefore, end-users have limited experience with them, nor can they assess their future implications. Net neutrality itself is a complicated issue for ordinary users, and specialised services and their possible long-term impact on the Internet are even more difficult to understand.

An increased use of specialised services could raise market entry barriers as smaller CAPs may suffer from disadvantages if they cannot afford to buy these services. It is not currently known what future demand there will be for specialised services and what kind of future innovation could be initiated by them. However, there could be innovation based on specialised services. Another effect could be that possible future innovative Internet-based services or applications are not created due to the existence of specialised services. Hence the effects of deviations from the principle of net neutrality are rather unclear.

Consumers do not consider the above-mentioned effects as they cannot value future services and applications that do not exist today. In addition, they have a less technical, legal and economic perspective of the Internet than ISPs, CAPs or NRAs. This may also be the reason for the large proportion of non-responses to the question concerning future innovation in the WIK-Consult consumer research.⁶⁵ Although end-users do perceive the Internet as citizens and therefore seem to value aspects like fairness, equal access for all and the democratic nature of the Internet,⁶⁶ it cannot be expected for them to understand all of the economic, legal and technical implications of deviations from net neutrality; and the results of the study therefore do not provide insights in this regard.

However, there are different options for dealing with these long-term implications. In contrast to end-users, NRAs have the necessary expertise and knowledge to consider these effects when it comes to evaluating deviations from net neutrality and considering their policy approach. Another option is for NRAs to take these potential effects into account in information they provide to end-users about net neutrality and traffic management. This could include guidance for the end-user to help them to incorporate these effects into their purchasing decisions.

In addition, NRAs should consider policies with an emphasis on end-user control concerning quality-differentiation. In this way, the decision about the use of traffic differentiation would be influenced by the end-users to safeguard their choice. End-users can, for example, choose to enable web filters, prioritise traffic of their favourite applications etc. Business users value the Internet as well, including being able to choose different quality levels. A mechanism for deployment of user-controlled application-agnostic traffic classes is described in the 2012 BEREC NN QoS Guidelines.⁶⁷

⁶⁴ Or are not perceived by end-users as being services separate from the Internet access service, such as IPTV.

⁶⁵ See page 422 of the WIK-Consult, YouGov and Deloitte Full Results Report

⁶⁶ See page 415 and focus group results in section 6 of the WIK-Consult, YouGov and Deloitte Full Results Report

⁶⁷ BoR (12) 131 BEREC Guidelines for quality of service in the scope of net neutrality

VI. What do these insights mean for the net neutrality debate?

In the broad net neutrality debate, the overall goal is the continued operation of the Internet as an open environment, enabling innovation and competition among service providers and enabling choice and freedom to communicate for consumers. The debate about net neutrality regulation is about the necessity for, and the form of, regulation to secure this outcome. An essential consideration in this regulatory debate is the extent to which consumer behaviour, and the economic incentives and behaviour of ISPs, can be relied upon to maintain an open, innovative Internet. The consumer research and desk research commissioned for this report sought to explore this question, primarily for fixed Internet access.

The longer-term implications of the choices made by consumers, and of the broader societal implications of restrictions to Internet access, such as the possible impact on network effects of future applications, are important elements of the debate. However, consumers cannot generally be expected to take these long-term implications into account in their purchasing decisions. Specifically in relation to net neutrality, we would not expect consumers to take account of the consequences for innovation of their immediate choice of Internet access packages; rather, it falls to regulators to consider these issues. The consumer research instead sought to deliver a better understanding of the drivers of consumer choice of Internet access package, and in particular the extent to which restrictions on the neutrality of packages may influence purchasing decisions or behaviour, such as the prices consumers are willing to pay.

The survey results showed that consumers place the highest value on fixed Internet access packages that did not include discriminatory traffic management practices. This was most clear for packages that restricted video streaming, whose value fell most relative to unrestricted packages. This suggests that some obviously undesirable practices – such as restricting access to competing video services in favour of an ISP's own service – are unlikely to be attractive to consumers, at least at economically viable prices. For less popular applications such as Internet-based VoIP and gaming the difference in value between restricted and unrestricted offers was smaller. The costs and benefits for ISPs to differentiate access to these services are less clear. Overall, the research indicates that consumer preferences and consequent ISP incentives will tend to lead to the provision and selection of neutral access to popular Internet applications.

However, the expectation that there will be widespread provision of open Internet access services will depend to some extent on transparency – the clarity and effectiveness of the information provided to consumers – and on the ease and accessibility of switching. Although the research suggested that switching was working well for the majority of consumers, it also suggested that there is a significant minority which may be unable or unwilling to switch. Addressing this is something which NRAs must continue to make a priority, in order to support the continued provision of open Internet access services.

Furthermore, there may still be some consumers who would prefer restricted ISP packages when offered at a sufficiently reduced price. In particular, the research suggests that, for packages with relatively low data caps, features like zero-rating – which favour specific

services – are valued. It therefore seems likely that some ISPs may choose to offer packages that favour individual services (e.g. Spotify) or types of service (e.g. video streaming), if permitted under national rules. Of course, an alternative would be for ISPs to offer packages with lower access speeds or lower data allowances at reduced prices, which would not raise concerns regarding net neutrality.

There is also some uncertainty about the value consumers place on “unknown services”: the extent to which they value the option of accessing services of which they are currently unaware. The evidence is unclear – the probable lower discount assigned to known but less popular services like VoIP might suggest a limited value. However, the price discount that a consumer might expect for a walled garden proposition – which restricts access to *everything* but a specific subset of the Internet – could nonetheless be significant. In addition, the incremental revenue (or reduction in cost) an ISP might realise by blocking access to much of the Internet is also uncertain. Given this, it seems unlikely that walled garden propositions (which are rare in the market today) would become a widespread feature of the Internet access market, whatever the regulatory environment.

Finally, it is essential to acknowledge the continued strategic appeal to ISPs of the development of a role as a gatekeeper to their subscribers, such as charging CAPs for access. In the mobile sector, the adoption of VoIP and Internet messaging is affecting traditional voice and messaging services. ISPs may still consider it desirable to manage their networks in ways that benefit or restrict CAPs in order to capture revenue from these content and application providers. However, consumers’ preference for “normal”, unrestricted and unprioritised access to popular applications, and the uncertain revenue opportunities for “gatekeeper” ISPs, suggests that where there is transparency, choice, competition, and accessible switching, this seems unlikely to be a widely successful strategy, at least not in the fixed market which was the primary purpose of the consumer research.⁶⁸

This report, and the underlying research, does not help determine whether the broad benefits of open Internet access require that all ISP services are neutral or unrestricted. Nor does it help determine whether it is merely necessary for such neutral services to predominate in the market, even if some providers offer – and some consumers choose – Internet access services which are in some way restricted. The evidence from the research suggests that consumers tend to prefer Internet access packages with normal access to popular applications, and that these are likely to be economically attractive for ISPs to offer. As long as there is transparency, and consumers are able easily to switch provider, such services seem likely to predominate, as they do at present. However, it also seems possible that there are consumers who would prefer restricted Internet access services at sufficiently low prices, and that ISP provision of such services will also be economically viable, alongside the provision of open, unrestricted services, if permitted by national rules. Of course, it is also an option for ISPs to differentiate offers based on access speed or data volume, which would allow end users to decide how they use their Internet access.

It is difficult to predict how significant a proportion of the market might be captured by restricted services in the long run; but without specific net neutrality regulatory policies they are likely to be available in the short term (as at present). If the policy is that such restrictive services must

⁶⁸ We also note that the 2012 BEREC Traffic Management Investigation showed that restrictions were more widespread in the mobile than fixed markets

not be available, in order to capture the broad benefits of open Internet access, prescriptive regulation may be necessary. However, if policy-makers consider that sufficient benefits of open Internet access will be realised through a market structure that includes some restricted services, but in which open Internet access is predominant, then competition, transparency and consumer switching would likely be sufficient. Under all circumstances, it will be important for NRAs to monitor the nature and transparency of ISP offerings, the access services which consumers are choosing, their effects on innovation, as well as levels of competition and ease of switching – and to consider intervention if necessary.