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THE MISSING LINK FOR FAIR AND TRANSPARENT ONLINE COMPETITION?

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The missing link for fair and transparent online competition?

I.   INTRODUCTION

"Neutrality regulation" originated in the context of net neutrality. In this context, the central policy concern was that *Internet Access Service (IAS)* providers are, due to their termination bottleneck, dominant Internet gatekeepers that could use their market power to distort competition between *content and service providers (CSPs)* on one side, and access to content and services by consumers on the other side, as well as to undermine human rights.

Eventually, in the EU, strong ex ante rules were imposed for IAS providers in order to ensure a so-called "open Internet" in which information can flow freely, and where content and service providers can compete for consumers' attention in a fair and transparent way.

Against this backdrop, it has been argued that comparable gatekeepers also exist at different points along the Internet value chain. That is, the IAS providers are only one part of the total "Internet supply chain" that is involved when accessing content and services online. Hence, net neutrality regulation may not be sufficient to ensure non-discriminatory access to content and services.

To this end, EU policymakers have subsequently turned their attention to online intermediation services, realising that "non-neutral" behaviour with respect to different CSPs may be exercised here as well.

This has recently culminated in an agreement on a new regulation to "promote fairness and transparency of business users of online intermediation services" (COM(2018)0238 – C8-0165/2018 – 2018/0112(COD)), which we will simply refer to as *Platform-to-Business Regulation* here.

However, the regulatory quest for a neutral Internet supply chain may not be over yet. In a recent series of reports, ARCEP, the French telecoms regulator, argues that devices through which services and content on the internet are accessed (e.g., smartphones, tablets, personal voice assistants) and their associated mobile operating systems are now the remaining "weak link" (ARCEP, 2018) to ensure an "open Internet".

Again, concerns similar to those in the net neutrality debate are raised. In particular, CSPs may be induced to negotiate preferred placement and functionality on devices, or may be disadvantaged in comparison to the apps of vertically integrated providers. For example, apps of vertically integrated providers may be placed more prominently or may be easier to access, may not be as easy to uninstall, or may have privileged access to hardware, such as battery management, or built-in sensors and chips (e.g. NFC, GPS, Bluetooth).

In this issue paper, we therefore highlight and explore some of the arguments on whether and to what extent an additional "device neutrality" regulation is warranted, above and beyond the existing regulations on net neutrality and on online intermediation services. We also point to some practical implementation issues in case such a regulation is deemed reasonable.

II. DIFFERENT REGULATION AT DIFFERENT ACCESS LAYERS

At an abstract level consumers' access to online content and services is governed by different layers (see Figure 1).

First, consumers require an IAS, i.e., access to the data transmission layer.

Second, they require specific hardware (e.g., computer, tablet, smartphone, smart speaker) that enables them to physically interact with the software of CSPs and to connect to the network.

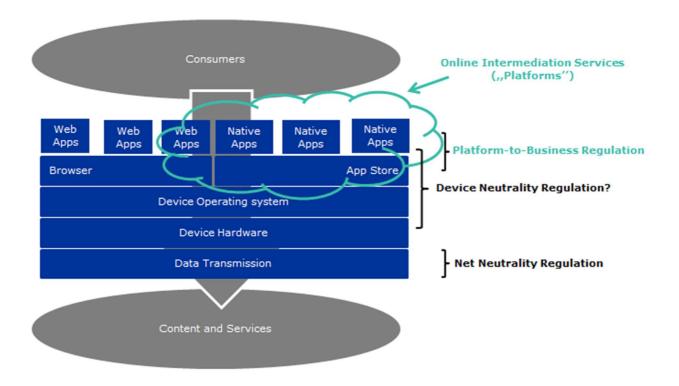Third, any hardware is closely tied to an operating system (e.g., iOS, Android).

Essentially, an operating system is a piece of software that allows applications (running on the operating system) to access hardware functionality of the device over well-defined software interfaces.

It is worth mentioning, however, that the operating system also consists of different (software) layers that provide functionalities at different levels of abstraction. Applications may therefore be granted more or fewer (hardware) privileges, depending on which software layer of the operating system they can access.

Fourth, applications are ultimately the piece of software that represent a content and service provider's front-end through which content or services can be accessed by the consumers.

Two special types of applications deserve increased attention in this context, because they are, loosely speaking, located in a logical layer between the operating system layer and the application layer.

Figure 1: Layers of consumers' access to content and services online and corresponding "neutrality" regulations

First, app stores (e.g., Google's Play Store or Apple's App Store) are nowadays an integral part of an operating system and allow users to download and install additional applications.

Especially in mobile operating systems, app stores are usually the only practical way for ordinary users to install additional applications on the device. App stores are explicitly mentioned as an online intermediation service in the Platform-to-Business Regulation.

Second, browsers are apps that enable access to the content of the World Wide Web (WWW). As such, browsers are similar in functionality to app stores, because they allow the accessing of content of third parties.

Indeed, in modern operating systems a similar functionality and user experience as in native apps can be achieved by so-called progressive web apps (PWA) that run inside a browser and do not need to be installed via the app store.

However, browsers are not explicitly mentioned as online intermediation services in the Platform-to-Business Regulation. Therefore, it is useful to make a distinction here.

Whichever entity controls any one of these layers in Figure 1 can possibly interfere with consumer's choice of online content and services, and therefore has the ability to distort competition in the Internet ecosystem.

This has triggered regulatory efforts to guarantee that firms that control a given layer behave in a competitive, "neutral" way.

However, to date not all layers are regulated, and different layers are regulated differently.

Since April 2016, net neutrality regulation is in effect in the EU according to Regulation 2015/2120 of 25 November 2015 on Open Internet Access. This *Net Neutrality Regulation* only applies to IAS providers, i.e., to the data transmission layer.

It requires, with some notable exceptions, that IAS providers "treat all traffic equally, when providing internet access services, without discrimination, restriction or interference, and irrespective of the sender and receiver, the content accessed or distributed, the applications or services used or provided, or the terminal equipment used".

More recently, regulatory efforts are being made at the EU-level to impose fair and non-discriminatory conduct on online intermediation services, such as e-commerce and booking platforms as well as search engines.

The European Parliament, the Council of the European Union and the European Commission have recently reached an (informal) agreement on a Platform-to-Business Regulation (COM(2018)0238 – C8-0165/2018 – 2018/0112(COD)).

Notably, in the latest compromise version of this regulation (Doc. no. 6090/19 from February 19,2019), it is emphasised in Recital 29 that the provider of a vertically integrated online intermediation service or online search engine may undermine competition by giving its own offering downstream an advantage through "[..] legal, economic or technical means, such as functionalities involving *operating systems* [emphasis added][..]".

However, the rules laid out in the regulation do not impose a "neutrality regulation" that is comparable and as strict as in the context of net neutrality. Rather, the regulation is predominantly aimed at increasing the level of transparency of intermediation services (including means to monitor possible discriminatory conduct), but does not prohibit discriminatory business practices per se.

Indeed, in Article 7 of the Platform-to-Business Regulation, providers of online intermediation services are only required to make transparent any differentiated treatment between business users (e.g., apps) including "access to, conditions or any direct or indirect remuneration charged for the use of services or *functionalities or technical interfaces* [emphasis added] that are relevant to the business user or corporate website user […]" (Article 7 No. 3d).

This is in contrast to net neutrality regulation which includes both transparency obligations as well as a per se prohibition of discriminatory data transmission for IAS providers (to which only some well-defined expectations are allowed).

IN SUMMARY

At the EU level currently a rather heavy-handed "neutrality" regulation exists for IAS providers (i.e., at the data transmission layer), whereas a more light-handed "neutrality" regulation is to be imposed on intermediation services (i.e., at the app store and application layer).

Based on the visualisation in Figure 1, it can be argued that IAS providers and intermediation services define the respective end-points of the internet access value chain for consumers.

Yet, to date, no specific "neutrality regulation" is aimed at devices, which link the data transmission layer with the application layer.

III.   KEY OBJECTIVES FOR A "NEUTRALITY" REGULATION

Before exploring the issue of "device neutrality" specifically, it is useful to reconsider the objectives and values that have triggered the academic and political discourse on net neutrality. Over and beyond issues of "freedom of speech", the discussion on net neutrality centred around its impact on four key objectives (cp. Easley, Guo & Krämer, 2018):

1) Reduce incentives of vertically integrated providers to limit downstream competition;

2) Reduce fragmentation of content and incompatibility of services;

3) Increase innovation and investment incentives;

4) Increase welfare, especially with respect to consumer surplus.

These four objectives are deemed to be a useful benchmark for any neutrality regulation, irrespective of whether they are imposed on IAS providers, intermediation services or devices. Thereby, the fourth objective is considered to be a weighted overall assessment in case there may be trade-offs concerning the achievement of the other objectives, or in case an important (new) objective is missing.

It is also worth highlighting that the academic literature has brought forth numerous arguments why a strict net neutrality regulation may not contribute to achieving the above objectives (see Guo, Easley & Krämer, 2018, for an overview), and has questioned whether additional regulation, above and beyond existing sector-specific as well as horizontal (competition) rules, was indeed necessary to achieve these objectives.

Nevertheless, after a long and heated political debate, a consensus has been reached to implement net neutrality regulation in the European Union, i.e., to regulate the business relationship between IAS providers and CSPs.

Now that political consensus has been reached that neutrality regulation (with possible exceptions) is overall beneficial to achieving the above objectives, it is consequential to ask whether it is sufficient to impose neutrality just on IAS providers.

Neutrality regulation at the network layer was a logical first step, because regulation is comparably "easy" here in the sense that it just regulates the flow of bits through a network.

In the context of net neutrality there is both a simple default remedy (transmitting bits as they arrive: first-in-first-out) and some objectivity with respect to whether a discrimination is justified (based on the technical requirements of the underlying service, such as tolerance to jitter, delay and packet loss).

At the other layers of the Internet access value chain neither a comparably simple default remedy, nor a comparably objective standard for discrimination may exist (due to the increased number of dimensions that can be considered), which makes neutrality regulation of these layers much more contentious (see, e.g., Krämer, Schnurr and de Streel, 2017, for an analysis of a ban of pay-for-prominence regimes for online platforms).

This is probably also why—albeit having the same four objectives in mind—the political consensus that could be reached in the Platform-to-Business Regulation (i.e., how to regulate the business relationship between online intermediation services and business users of those services) is much more light weight, focuses on increasing transparency mainly, and is subject to an impact assessment after 18 months.

In a similar vein, a fruitful policy discussion about device neutrality should also reflect the impact of a potential regulation on the above four key objectives and find some middle ground in between the two existing instances of "neutrality" regulation.

IV. EXAMPLES OF POSSIBLE DEVICE NEUTRALITY ISSUES

As previously mentioned, discriminatory conduct may theoretically occur at each one of the access layers. While this has been extensively discussed in the context of the data transmission layer (in the context of net neutrality) as well as at the application and app store layer (in the context of online intermediation services), next, some hypothetical examples of discriminatory conduct in the context of "device neutrality" at the hardware, operating system, browser and app store level are highlighted.

These examples are meant as an argumentative testbed for discussing the scope and necessity of a device neutrality regulation.

Therefore, the examples are deliberately framed as stylised, hypothetical scenarios that abstract from specific cases or firms.

However, ARCEP (2018) provides a comprehensive treatment of specific industry examples that may be considered under the scope of device neutrality.

Moreover, it should be stressed that, by presenting these examples, no judgement is made with respect to whether or not these issues would require a specific device neutrality regulation, nor whether discrimination is deemed unjustified or harmful.

A firm controlling the *hardware level* could	A firm controlling the *operating system level* could
• privilege, restrict or prohibit access to certain networks (mobile, ad-hoc or infrastructure networks);	• privilege, restrict or prohibit access to certain networks (mobile, ad-hoc or infrastructure networks);
• prohibit or inhibit the installation of certain operating systems;	• prohibit or inhibit the installation of the operating system on certain hardware;
• reserve or privilege system resources (e.g., battery, memory, computing power, storage, dedicated interfaces) for specific apps;	• reserve or privilege system resources (e.g., battery, memory, computing power, (data) storage) for specific apps;
• prohibit, inhibit or restrict software at higher layers from accessing hardware components (e.g., sensors, chips, camera, microphone);	• privilege, prohibit, inhibit or restrict software at higher layers from accessing hardware components (e.g., sensors, chips, camera, microphone, screen);
• prohibit, inhibit or restrict compatibility with ancillary hardware components and devices.	• prohibit, inhibit or restrict compatibility with certain applications and devices;
	• pre-install certain applications and restrict removal of some or all of these applications;
	• integrate certain applications more tightly in the operating system and user work-flow (e.g., voice and zero-click activation, background performance, notifications).

A firm controlling the *browser* could	A firm controlling the *app store* could
• privilege, restrict or prohibit access to selective content (e.g., block advertisements, set default starting page and default search engine);	• deny, unduly delay or discriminate access to the app store based on (legal) app content, app functionality or identity of the app developer;
• privilege, restrict or prohibit access to selective plug-ins / extensions;	• bias, distort or restrict "findability" of certain apps based on (legal) app content, app functionality or identity of the app developer.
• bias, distort or restrict "reachability" of certain websites or plug-ins based on (legal) content, functionality or identity of the website owner (e.g., discriminate with respect to the loading speed of certain websites, warning messages).	• require or prohibit apps to use ancillary services and functionalities (e.g., payment services, push notifications, reporting services)
• privilege, restrict or prohibit websites' or plug-ins access to the browser's full functionality (e.g., JavaScript, service worker, stored data);	• require apps to share data or deny access to data in a discriminatory way;
• prohibit or inhibit its installation on certain operating systems;	• prohibit or inhibit its installation on certain operating systems or devices.
• reserve or privilege system resources (e.g., battery, memory, computing power, storage) to specific content;	
• unduly delay or omit the adoption of web standards (e.g., in order to retain control over functionality reserved for native apps, especially if the firm controls the app store level as well).	

V. ARGUMENTS FOR AND AGAINST DEVICE NEUTRALITY REGULATION

It is important to note that there are various reasons why such discrimination, as exemplified in Section 4, could occur. It may, for example, be due to technical constraints, security or privacy considerations, or the result of a legitimate business model.

Particularly, in the latter case, selling privileged access and additional functionalities may be done in order to recoup investments that have been undertaken in building up the (software or hardware) infrastructure. Consequently, if these profit opportunities are restricted by regulation, investments may be hampered (conflicting with Objective 3 above).

Moreover, price or product differentiation is not a worrisome business practice per se, and commonplace in many other industries. Firms should have sufficient freedom to experiment with new business models.

However, in the context of access to Internet content and services (such as in the context of net neutrality), these precise business practices have been viewed sceptically in the policy arena.

In reverse, enshrined dominant positions and termination monopolies (e.g., due to the fact that devices can be very expensive and consumers use them for an extended period of time) may well exist in the context of devices, and operating systems, as well as their associated (software and hardware) ecosystems.

A position of economic power gives rise to concerns that some of the imposed restrictions are not mainly due to technical or security considerations, but are motivated by business considerations. Clearly, restrictions on the use of a device reduce consumer's freedom of choice and may therefore be a policy concern.

In this context, it is worth highlighting, however, that limiting choice is not necessarily something that diminishes consumers' welfare, because it can also reduce decision complexity for consumers and increase the average quality that a consumer can expect.

For example, a policy to ban apps of low quality from the app store can increase overall consumer satisfaction.

Likewise, pre-installing apps reduces consumers' transaction costs and allows them to use a device out-of-the-box. This may contribute to an increase in consumers' surplus in line with Objective 4.

However, consumer surplus may, of course, also be reduced if consumers' choice is limited. Particularly, as many applications and services involve network effects, steering consumer's attention in an early phase of competition between competing CSPs (e.g., toward the vertically integrated CSP) may result in a "tipping" of that market; an effect that is not reversible later on, i.e., through an ex-post remedy.

Taken together, as in the case of Net Neutrality Regulation and Platform-to-Business Regulation, it is difficult to say where exactly policymakers should draw the line between consumer's freedom of choice, on the one hand, and contractual freedom of firms, on the other hand.

Generally, such uncertainty in policymaking would usually call for ex-post rules, where decisions can be taken on a case-by-case basis, rather than for ex-ante rules, where per se prohibitions are defined.

There is consensus that practices that aim at limiting competition within or across an Internet access layer should be prohibited. Clearly, this is the realm of competition policy and thus an ex-post approach.

However, the logic of the three-criteria-test could also be applied in the context of device neutrality. If the market structure in a given layer is characterised by:

i) high and non-transitory barriers to entry,

ii) no tendency towards effective competition, and

iii) if competition law is considered to be insufficient,

then ex-ante regulation of that layer may be warranted.

ARCEP (2018) highlight in their report that the operating system layer in mobile and "smart" devices such as tablets, smartphones and smart TVs is especially highly congested and dominated by either Android (largely controlled by Google) or iOS (controlled by Apple).

Likewise, the associated market for app stores is dominated by Google's Play Store and Apple's App Store. Furthermore, due to large sunk investment costs, as well as network and club effects, conditions i) and ii) of the three-criteria test could well be fulfilled.

The fact that even Microsoft, which still dominates the market for operating systems for PCs, could not exert competitive pressure on iOS and Android reinforces this viewpoint.

Likewise, the long duration of recent competition cases has demonstrated that competition law may not be fast enough to address the market failures in digital market in a timely fashion, such that the third criterion also could be fulfilled. Clearly, to date more competition exists in the hardware layer, and also the browser layer, thereby questioning the application of ex-ante regulation here.

However, there is also a clear industry trend that firms which have established a dominant position in any given layer, also seek to establish dominance in the other layers.

For example, the market for smart speakers is dominated by Amazon (already enjoying dominance in the app layer), and Google (already enjoying dominance in the app, browser, app store and operating system layer).

With increased vertical integration across the different access layers, concerns pertaining to achieving Objectives 1 through 4 also rise, and may spur the need to impose "neutrality regulation" across all layers.

In particular, neutrality regulation may be able to counterbalance the leverage of market power across layers (Objective 1), and reduce the emergence of fragmentation of content and services, as these become exclusively available on certain devices (Objective 2).

This would ensure more competition in the long run, for example, because consumers can switch more easily between ecosystems. This is widely considered to be a driver of innovation and investment (Objective 3), and ultimately leads to higher welfare (Objective 4).

However, one can also take a more sceptical stance that neutrality reduces the number of dimensions in which firms can compete, lowers efficiency gains from economies of scale and scope as well as network effects, and therefore may reduce innovation and investment incentives.

Moreover, as argued above, closeness and curation may also be appreciated by consumers as it reduces transaction costs and can increase quality and security.

A neutrality regulation also limits the entrepreneurial freedom of firms that have innovated, invested and taken entrepreneurial risks in anticipation of profits stemming from controlling a certain layer. In this context, a "neutrality" regulation may also hamper innovation and investment.

The potential negative effect on innovation and investment has also been one of the main counterarguments for Net Neutrality Regulation, and it was substantiated by several (theoretical) studies (cf. Easley, Guo and Krämer, 2018).

However, given the short amount of time in which the regulation is in effect, no robust empirical evidence exists yet that could substantiate the theoretical findings. Moreover, in the case of net neutrality these considerations did not prevent a corresponding regulation.

Likewise, an argument against Net Neutrality Regulation, which may also apply in this context, was that it would limit the revenue streams that firms controlling a certain layer can earn from selling preferential access to that layer.

Economically speaking, firms are operating a two-sided market (here: an operating system, device, browser or app store), which means that they can set different prices for different customer groups (business customers vs. end-users) for access to that market.

In two-sided markets, prices on one side can well be zero or even negative. However, it is also a well-known result that if prices on one side go up (e.g., because a firm can sell "preferential" access), then the price on the other market side (e.g., for end users) tends to go down.

In this sense, due to the logic of two-sided markets, prices for end users may rise (e.g., because a positive price is charged for the operating system, eventually levied onto the price of the users' devices) if firms are prohibited from, or limited in, charging business users.

At the same time, neutrality regulation may increase horizontal competition (e.g., between apps and device manufactures), which is likely to reduce end user prices again.

VI. SCOPE OF THE REGULATION AND IMPLEMENTATION ISSUES

Supposing that device neutrality regulation would be warranted, immediate questions would arise relating to the appropriate scope of the regulation, as well as how it can be efficiently implemented.

Questions of scope arise with respect to which layers should be part of a possible regulation. Should hardware device manufactures be in the scope of the regulation, even if they employ a third-party operating system? Should browsers be addressed by the regulation, even though they may not be vertically integrated with the device or operating system provider? In a given layer, not all players may be considered dominant.

Moreover, it may be necessary to differentiate the scope of the regulation even within a given layer depending on the specific type of device. Devices with "thin interfaces", such as smart speakers or smart watches may require a different regulatory approach than smartphones or tablets. Also very practical questions concerning an effective and coherent implementation of agreed-upon rules arise.

While Net Neutrality Regulation is typically governed by the national authority responsible for telecommunications regulation (coordinated by BEREC), it is not yet clear which (existing or new) national authority will be designated to govern the Platform-to-Business Regulation.

At the EU level, the Online Platform Observatory has been newly founded to monitor and evaluate the implementation of this regulation. Given this patchwork of authorities, who would be the most capable authority to deal with device neutrality?

Finally, it is evident that there exists a complex technical and economic interplay between the different internet access layers.

In addition, the speed at which (device) innovation and competition takes places is breath-taking. An ex-ante approach to regulate "neutrality" across the Internet access layers must be flexible enough to be able to foresee possible issues of discrimination, while providing legal certainty and not stifling innovation.

It will be a challenge to find a compromise here, but provided with the political will, similar challenges have been overcome in the past.

VII. CONCLUSIONS

Consumers' access to online content and services is mediated by numerous access layers, ranging from the network, over operating systems and app stores/browsers to online platforms and search engines.

So far, regulatory efforts have concentrated on the "end points" of the Internet access chain, but not the intermediate layer that comprises operating systems and devices.

However, as has been pointed out, there exists a similar potential for abuse and distortion of consumer choice here.

A potential device neutrality regulation would be logically located in between the light-handed regulation of intermediation services (imposing mostly transparency obligations for existing business practices, and possibilities for redress) and the heavy-handed net neutrality regulation, which outright prohibits certain business practices, such as selling prioritised access to the network layer.

This immediately raises the central question of whether device neutrality should be approached rather from the perspective of net neutrality (taking a heavy-handed approach) or from the perspective of intermediation services (taking a light-handed approach focussed on transparency).

In other words, should device neutrality regulation prohibit certain business practices, e.g., pre-installing of apps, selling default settings, refusal of listing due to purely commercial reasons? Or should device neutrality also focus on increasing the level of transparency and possibilities for redress?

In the latter case, it may just require additional clarifications in the existing Platform-to-Business Regulation.

However, the proposal to include operating systems in the same manner as app stores or other "online intermediation services" into the scope of the regulation was in fact made by the European Parliament, but was, by and large, not included in the final compromise version of the regulation.

The ultimate goal should be to establish a level playing field across all layers of the Internet ecosystem, ranging from network access to apps.

Currently, there is no harmonisation according to the level of intervention (ex-ante vs. ex-post; heavy-handed vs. light-handed vs. no regulation) as well as with respect to the governing institutions across the different access layers — despite the fact that the potential discriminatory conducts are of similar nature and that a familiar set of dominant players exist at several layers, giving rise to issues of market power leverage across layers.

In the long term it would therefore be desirable to adopt a more layer-independent regulatory approach. That is, an approach that offers one stringent regulatory framework that is aimed at achieving fair and equal online competition and acknowledges that competitive distortions may be triggered at any layer.

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