The application of EU antitrust law to (dominant) online platforms

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1 Introduction

1.1 General introduction

An introduction to the subject of this dissertation should perhaps best start with the process that led to the current focus on online platforms in the context of competition policy both in and out the EU. This process can be said to have commenced, or in any case intensified with, the rollout of high-speed internet and the advancements made in the production of more efficient and powerful semiconductors in the early 2000's. These developments significantly increased the potential of personal computers that were becoming an accessible commodity among consumers. This combination enabled the creation of more advanced digital products and services as well as the *digitization* of existing real world services and products across all sectors of the economy. Some of these changes can be said to have significantly changed many aspects of our daily life.

Online communication services quickly upgraded from simple email exchanges to direct messaging programs that later led to the launch of mainstream video chat and conferencing software. Newspapers introduced web-based versions of their printed products and as online readership grew, such versions often became the main form of news consumption, causing some to abandon traditional print altogether and focus on the web-based part of the business.[1] The music industry saw the decline in demand for physical formats such as CDs with the arrival of fully digital formats that could be sold and exchanged via downloads, which in turn had to make way for online streaming services.[2] Similarly, retail commerce witnessed an unstoppable shift to the online sphere, which gave birth to the ever-expanding e-commerce sector.[3] Comparable trends were also observed in the travel sector where the rise of online travel agents has significantly changed its character and scope by extending to all the corners of the world

1 See e.g. Neil Thurman and Richard Fletcher, 'are newspapers heading toward post-print obscurity?' (2018) 6(18) Digital Journalism 1003.

2 See e.g. Steve Knopper, 'The end of owning music: How Cd's and Downloads Died' (RollingStone, 14 Jun. 2018) <https://www.rollingstone.com/pro/news/the-end-of-owning-music-how-cds-and-downloads-died-628660/> accessed 21 Mar. 2021.

3 The proportion of online retail sales grew from approx. 5% in 2015 to approx. 20% in 2021. See figures by Statista at <https://www.statista.com/statistics/534123/e-commerce-share-of-retail-sales-worldwide/> accessed 21 Mar. 2021.

while making travel planning increasingly accessible for consumers.[4] Alongside these developments social media channels made their debut and have been connecting an increasing number of users around the world ever since.[5]

These developments were further amplified by the advancement of mobile technologies and mobile internet connectivity networks that led to the emergence of smartphones and tablets. This new generation of interconnected computing devices increased the accessibility of consumers and commercial parties to what we currently refer to as the digital economy. The most visible winners of these developments were today's prominent tech companies that launched their respective online platforms in the course of this evolutionary process.[6]

When observing the various market figures and studies on the digital economy one can only conclude that these developments were received with tremendous enthusiasm. The market leaders in these new digital markets witnessed unprecedented market growth and valuations. In the early 2000's, Microsoft and IBM were the only two major technology companies who belonged to the world's largest companies. By 2020 the majority of the top 10 largest companies (based on market cap) consists of the big tech companies behind today's most prominent online platforms.[7] However, despite the phenomenal achievements of these actors and the overall satisfaction with their products and services their unyielding pursuit of constant growth and evolution is gradually fueling growing concerns with regard to their increasing market power and dependence of third parties on their services.

Now, nearly two decades after the above mentioned developments commenced, the euphoric image of digital markets and their principal players started showing its first visible cracks. The fast paced innovation wave brought by big tech companies appears to be primarily self-serving

4 See e.g. Altexsoft, 'History of Flight booking: CRSs, GDS Distribution, Travel Agencies, and Online Reservations' (Altexsoft, 12 Apr. 2019) <https://www.altexsoft.com/blog/travel/history-of-flight-booking-crss-gds-distribution-travel-agencies-and-online-reservations/>; Kevin May, "how 25 years of the Web inspired the travel revolution' (The Guardian, 12 Mar. 2014) < https://www.theguardian.com/travel/2014/mar/12/how-25-years-of-the-web-inspired-travel-revolution> accessed 21 Mar. 2021.

5 Saqib Shah, 'The History of social networking' (Digital Trends, 14 May 2016) <https://www.digitaltrends.com/features/the-history-of-social-networking/> accessed 21 Mar. 2021.

6 E.g. Booking.com launched in 1996, Amazon marketplace launched in 2000, LinkedIn launched in 2003, Facebook launched in 2004, Twitter launched in 2006, Google Android and Apple iOS together with their respective app stores in 2008, Uber launched in 2009 and Instagram launched in 2010.

7 See data on this by Statista at <https://www.statista.com/statistics/263264/top-companies-in-the-world-by-market-capitalization/> accessed 25 Mar. 2021.

when observed carefully. Consumers who were once thought to benefit most from the development of such companies are increasingly perceived as part of the service sold to the highest bidder.[8] The aggregation and analysis of big data which was once identified as a vehicle for innovation is now perceived with apprehension by both privacy and competition law experts.[9] The dynamic nature of competition which was once associated with digital markets is now called into question. The intense process of competition and the relative frequent displacement or replacement of leading tech enterprises by small innovative companies appears to be a thing of the past.[10] The dust of such battles seems to have settled long ago and the tales of memorable victories such as the replacement of IBM by Microsoft, MySpace by Facebook, and Yahoo by Google start losing their value as evidence of the fast changing character of digital markets. The victors of the past decade have managed to successfully withstand any attempts to dethrone them as market leaders and even extend their presence across multiple corners of the digital market. Their valuation in capital markets have surpassed most market leaders across the entire spectrum of the economy and continues to reach new heights which have yet to be seen.[11]

Against the backdrop of this shifting view of tech giants and online platforms, competition law was pushed to the forefront of this debate and presented as the panacea to all the competitive and market power concerns that such actors bring. In practice, however, the law is not self-executing and requires a significant degree of consideration when applied to novel situations and actors. Therefore, despite the growing calls for competition law interventions, the European Commission, as well as national competition authorities (NCAs) around the world, did not rush to open investigations against tech giants. In fact, at the time when this project commenced the only major case against a tech giant was that of Microsoft, which at the time was not considered to constitute part of the growing concerns involving digital markets. Rather than direct action, the first step concerning the application of competition policy in digital markets entailed an extensive study of digital markets and online platforms as their main actors. Such studies

8 See e.g. Tim Wu, *The attention merchants* (Alfred A. Knofpt, 2016).

9 Stigler Center for the study of the economy and state, ' Stigler Committee on Digital Platforms (2019), at 10-13, 44-61 < https://www.chicagobooth.edu/-/media/research/stigler/pdfs/digital-platforms---committee-report---stigler-center.pdf> [hereinafter Stigler report] accessed 17 Feb. 2021; Jaques Crémer, Yves-Alexandre de Montjoye and Heike Schweitzer, ' European Commission- Competition Policy for the Digital Era (2019), at 24-28 < https://ec.europa.eu/competition/publications/reports/kd0419345enn.pdf> [hereinafter Expert report] accessed 17 Feb. 2021

10 Expert report *supra* (n 9) at 12-15.

11 Apple was the first company to ever cross the 1 trillion dollar market cap in 2018 which it managed to double by 2020. See e.g. Jessica Bursztynsky, 'Apple becomes first U.S company to reach a $2 trillion market cap' (CNBC Tech, 19 Aug. 2020) <https://www.cnbc.com/2020/08/19/apple-reaches-2-trillion-market-cap.html> accessed 6 May 2021.

showed that while significant competitive concerns may arise in such a context, the application of (EU) competition law would be challenging. The challenges identified relate predominantly to the distinctive commercial reality of online platforms and the digital markets in which they are active.

The source of this special commercial reality was found to derive greatly from the distinguishing characteristics of online platforms. These characteristics, originating from economic research on two and multisided markets or platforms, were found to have implications for the application of competition policy.[12] In the OECD roundtable on two sided platforms, of 2009, where this topic was discussed in a global setting for the first time, three fundamental attributes of platforms were addressed in the context of competition policy. These attributes, which remain principal in the current debate on the application of competition policy to online platforms a decade later, are the following:

1. Platforms inherently serve at least two separate groups of customers. Such groups need to interact with each other in some way and rely on the platform to facilitate this. The platform meets the demand of such customers by providing them with one or more products or services simultaneously.

For example, (online or offline) payment platforms provide merchants and consumers with a payment processing service that allows them to offer and acquire services and products.

2. Platforms display indirect network effects across their customer groups. This means that the value of the platform for members of one customer group increases with the number of members of another customer group served by the platform. The strength of such effects then determines whether and to what extent this platform attribute will have an impact on the legal and economic analysis of the platforms' behavior.

In the case of a payment platform, such as PayPal, the presence of indirect network effects means the more merchants accept the respective platform the more appealing such platform will become for consumers (and vice versa).

3. Platforms have a non-neutral price structure. This means that a platform can affect the volume of the services that is obtained by its customers through charging its customer groups different prices for the service(s) it provides to such customers simultaneously.

12 OECD Round table on two-sided markets [2009] DAF/COMP/WD(2009)69, at 24; Julian Wright,'One-Sided Logic in Two-Sided Markets '(2003). AEI-Brookings Joint Center Working Paper No. 03-10 < https://ssrn.com/abstract=459362> accessed 8 Mar. 2021.

In the case of a payment platform, the platform can choose for example to impose a transaction fee of 0.5% from both consumers and merchants using the platform or alternatively charge the sum of both fees from the merchants alone. The profit per transaction will be identical in both cases, however, the manner in which the platform fees are divided between its customer groups will impact the number of transactions for which the platform is used.

These three attributes were found to impact the commercial reality of (online) platforms significantly. Accordingly, they were found to affect the manner in which platforms maximize their profits, price their services, compete with other platform and non-platform undertakings as well as create a tendency for concentration in the markets in which platforms operate.[13] These circumstances in turn were found to have meaningful implications for the legal and economic analysis performed in the application process of competition policy.[14] Over time, similar studies were also performed by the European Commission and various NCAs within the EU and outside of it.[15] Such studies echoed almost unanimously a myriad of challenges posed by platforms, later specifically addressed as online platforms, for competition policy. The challenges mentioned concerned almost all corners of the legal framework of competition law. Such challenges included the definition of relevant market(s), the assessment of market power, the assessment of anti-competitive pricing, the assessment of exclusionary non-pricing practices and the assessment of coordination or collusion in platform markets.[16] Nevertheless, overtime it became evident that the primary concerns raised by platforms were most acute in the context of unilateral behavior by players with significant market power.[17]

First, the fact that platforms offer their products or services to two or more customer groups means in practice they will be competing with other platform and non-platform entities with respect to such customers. Accordingly, when defining the relevant market, this multisided nature of platforms means that multiple related relevant markets may need to be defined and assessed simultaneously. This also means that the tools used for this purpose, such as the SSNIP test, may need to be applied with respect to

13 Ibid, at 30-34.

14 Ibid, at 35-44.

15 See e.g. an extensive list of reports on the digital economy, online platforms and the role of competition policy made by numerous competition authorities across the world < https://www.chicagobooth.edu/research/stigler/events/antitrust-competition-conference/world-reports-on-digital-markets > accessed 20 Mar. 2021.

16 OECD Round table on two-sided markets [2009] *supra* (n 12) at 30-44.

17 Supra (n. 15). A reading of all such reports displays an almost unanimous focus on the concerns posed by online platforms with significant market power. The nature of this focus is further addressed in sections 1.5.2 and 1.5.4 that elaborate on the topic of research and the respective choices made with regard to its scope in the context of this dissertation.

multiple markets with different price settings at a time.[18] When assessing market power, dealing with multiple markets will require taking into account the competitive pressure experienced by the respective platform with regard to all its separate customer groups.

Second, the (indirect) network effects displayed across the separate customer groups of platforms will have to be taken into account in the scope of the legal analysis in order to make it complete. When assessing the potentially exclusionary behavior by platforms, the multisided nature of platforms will require observing the effects of such behavior across their various customer groups depending on the nature of the network effects at play.[19] For example, an exclusive dealing agreement by an online marketplace with its merchants may not only make it more difficult for other online marketplaces to compete for merchants but also for consumers since consumers commonly find marketplaces with more merchants and offers more appealing.[20] Similarly, in the context of coordination or collusion, such behavior with respect to one customer group may have implications for the state of competition with respect to other customer groups.[21] This cross-group effect is equally observable with respect to the pro-competitive effects and efficiencies that can be generated by platforms and require an assessment that extends across multiple markets.[22]

Third, the need to attract at least two separate customer groups requires platforms to adopt skewed price structures that correspond with the different demand that such customers may have for the service provided by them. In practice this means that members of the various platform customer groups pay different fees for the service or products provided to them. Such price settings may, when viewed in isolation of the platform price structure, appear suspicious from the perspective of competition policy. This is particularly so where the skewness of the prices structure results in a division where members of some customer groups pay nothing for the platform services as the respective costs are levied from members of

18 OECD, 'Rethinking Antitrust Tools for Multi-Sided Platforms' (2018) at 37-55; Directorate General for Internal Policies, 'Challenges for Competition Policy in a Digitalized Economy' (2015) IP/A/ECON/2014-12, PE 542.235, at 52-57.

19 Ibid; OECD, 'Abuse of dominance in digital markets' (2020) at 23-57<www.oecd.org/daf/competition/abuse-of-dominance-in-digital-markets-2020.pdf > accessed 7 Apr. 2021.

20 Commission, Staff Working Document Accompanying the document Report from the Commission to the Council and the European Parliament Final report on the E-commerce Sector Inquiry, COM (2017) 229 final, at. 44-50.

21 OECD, 'Rethinking Antitrust Tools for Multi-Sided Platforms' (2018) at 201-219.

22 OECD, Network Effects and Efficiencies in Multisided Markets - Note by H. Shelanski, S. Knox and A. Dhilla, DAF/COMP/WD(2017)40/FINAL, at 1-9. <https://one.oecd.org/document/DAF/COMP/WD(2017)40/FINAL/en/pdf?_ga=2.139424432.203012038.1621959056-401108414.1607942357> accessed 16 Apr. 2021.

other customer groups. For example, on platforms of online travel agents like Expedia, consumers do not pay any reservation or booking fees while airlines, hotels or airport taxis are subject to different commission fees for each transaction made via the platform. Such price settings, when viewed outside of the context of platforms can give rise to concerns of predation with respect to the non-paying customer group(s) and well as concerns of discrimination and unfairness with respect to the customer group(s) that are subject to platform fees.[23] Providing a customer group with services free of charge is instantly suspicious as it commonly means the respective undertaking is operating at a loss with regard to such customers. At the same time charging fees for this same service from other customer groups may raise concerns of unfair prices since such groups will pay significantly more than the non-paying group(s). Alternatively, discrimination concerns can also arise as it can be argued that platforms provide various customer groups with essentially the same service(s) simultaneously but charge them different prices that do not relate to quality or quantity considerations. However, within the context of platforms such price settings may be very common, legitimate and even pro-competitive.[24] The use of skewed price structures is considered imperative for such undertakings to operate viably and compete effectively. Without this possibility, platforms would not be able to effectively attract and coordinate multiple separate customer groups with diverging degrees of demand for their services.[25]

Overtime, as the focus of the inquiry into multisided platforms turned to the specific case of online platforms, additional challenges stemming from the commercial traits of such players were identified. Such challenges concerned primarily the collection of (big) data and its use for commercial purposes. It was found that the capabilities of online platforms to collect and analyze significant amounts of data allowed them to improve existing products and services as well as to invent new ones and thereby potentially create new markets, to the benefit of both consumers and competition.[26] This positive synergy between data collection and innovation is often further strengthened by the indirect network effects at play on such platforms. For example, in the case of online marketplaces the creation and improvement of services helps attract more consumers which in turn attracts more merchants and vice versa. The increase in volume of these

23 See e.g. Julian Wright (2003) supra (n 12); Amelia Fletcher,' Predatory pricing in two-sided markets: a brief comment', (2007) 3(1) Competition Policy International 1.

24 Jean-Charles Rochet and Jean Tirole 'Platform Competition in Two-Sided Markets' (2003) 1(4) Journal of the European Economic Association 990.

25 Bernard Caillaud and Bruno Jullien,'Chicken & Egg: Competition among Intermediation Service Providers' (2003) 34(3) The RAND Journal of Economics 309.

26 MonopolKommission, Competition Policy: The Challenge of Digital Markets, special Report No. 68, at 27-36. < http://www.monopolkommission.de/images/PDF/SG/s68_fulltext_eng.pdf> accessed 7 Apr. 2021.

customer groups in turn increases the amount of data generated by the respective marketplace which further allows it to improve its services or create new ones.

Given the commercial importance of (big) data collection and analysis, such capabilities could also be seen as a new source of market power and potential anti-competitive concerns.[27] In certain markets, like the market of general search (engines), the possession and ability to collect and analyze large volumes of data was found to be important for the ability of undertakings to compete effectively.[28] Accordingly, undertakings that possess such capabilities may enjoy a significant competitive advantage over those who do not. This commercial dependency on data means that undertakings which do not have access to such data facilities may depend greatly on the getting access to such data from other sources, which may often consist of (potentially) competing undertakings that will likely be reluctant to share such assets with them. Despite this commercial importance of data for online platforms (and other non-platform undertakings), the fact that data is commonly non- rivalrous, non-exhaustive and non-exclusive and subject to diminishing returns makes it difficult to assess its competitive value and to subject the aggregation and utilisation thereof to competition law scrutiny. If data can be recollected, reproduced and analyzed at relative low cost, its status of an asset representing market power is unclear. Furthermore, when undertakings that possess such data refuse to share it with third parties it is hard to see how competition law could be used to resolve such conflict of interests. Despite the competitive value that such data may have in practice for various third parties, its trade can hardly be mandated by competition policy if it cannot be considered an indispensable input.[29] These difficulties are further complicated by the fact that the collection, processing and sharing of data may at times be covered by privacy regulations that do not take into account the potential competitive concerns associated with such practices.[30]

27 See e.g. Bundeskartellamt and Autorite de la concurrence, Competition Law and Data 11–25 (10 May 2016) < https://www.bundeskartellamt.de/SharedDocs/Publikation/DE/Berichte/Big%20Data%20Papier.pdf?__blob=publicationFile&v=2> accessed 5 Apr. 2021.

28 Ibid, at 8-11. Admittedly, the sheer volume of data possessed by a certain undertaking will often not in itself be sufficient to guaranty competitive advantage. However, the absence thereof will often translate into a competitive disadvantage.

29 Expert report (2018) *supra* (n 9) at 101-109.

30 Ibid, at 73-100; Preliminary Opinion of the European Data Protection Supervisor Privacy and competitiveness in the age of big data: The interplay between data protection, competition law and consumer protection in the Digital Economy (March 2014), at 26-38 <https://edps.europa.eu/sites/edp/files/publication/14-03-26_competitition_law_big_data_en.pdf > accessed 4 Apr. 2021.

The above-mentioned challenges inspired me to look into the frictions that may arise between online platforms and EU competition policy in practice. The EU legal framework is full of well-established legal tests developed and fine-tuned throughout years of practice for the purpose of adequately addressing an ever-evolving scope of anti-competitive practices. I was therefore keen on exploring how online platforms, which rely on fundamentally different economic characteristics, may hamper the applicability of such tests and require adjustment. This is particularly so given that addressing such a topic allows for revisiting the boundaries and existing tests of current EU antitrust law and art. 102 TFEU in particular, which would commonly not be called upon in the absence of fundamentally different insights from economics.

As the list of challenges became longer over the past few years, doubt started to form with regard to the ability of the current competition law framework to deal with this new reality. Instead of revisiting the boundaries of such a framework and initiating reforms and adjustments, which are considered necessary,[31] calls for specific regulation grew in momentum. In the EU these calls eventually led to the recent proposal of the Digital Markets Act (DMA),[32] which deals specifically with some of the competitive concerns identified with respect to online platforms while bypassing (some of) the challenges identified in the context of competition policy.[33] Legal intervention in the commercial practices of platforms is done ex-ante based on a predefined list of obligations imposed on platforms rather than ex-post as is common in the case of competition law. When it comes to application, the jurisdictional scope of the DMA does not appear to require the definition of relevant markets and assessment of (relative) market power. Although the DMA targets platforms with substantial market power, the decisive matter in this regard is whether the respective platform constitutes a *gatekeeper* in the sense of the DMA.[34] This qualification requires firstly that the respective platform provides one of core platform services indicated in the non-exhaustive list of services found in art. 2 of the DMA. A platform that provides such a *core platform service* may qualify as a gatekeeper when it (i) has a significant impact on the internal market, (ii) constitutes an important gateway for consumers and commercial users to interact with each

31 Two noticeable exceptions in this regard can be observed in the case of the OECD and Bundeskartelleamt who provided concrete suggestions for resolving some of the challenges posed by online platforms. See Bundeskartellamt, Working Paper – The Market Power of Platforms and Networks, Ref. B6-113/15, June 2016; OECD 'Rethinking Antitrust Tools for Multi-Sided Platforms' (2018).

32 European Commission, Proposal for a Regulation of the European Parliament and of the Council on contestable and fair markets in the digital sector (Digital Markets Act), COM(2020) 842 final.

33 Ibid, see preliminary text of the DMA where the difficulties associated with the market definition process under art. 102 TFEU is mentioned at pp. 7-8.

34 Art. 1(2) of the DMA.

other, and (iii) enjoys an entrenched and durable position in its operations or it is foreseeable that it may reach such a position in the near future.[35] In order to establish if such circumstances are present the DMA provides several quantitative criteria concerning the territorial scope of the platform service, the volume of its customers and its turnover or market value.[36] If these criteria are met, it can be presumed that the respective platform is a gatekeeper and thus subject to the ex-ante obligations included in art. 5 and 6 of the DMA.

Although the DMA was aimed at avoiding many of the challenges involved in the application of art. 101 and even more so art. 102 TFEU to online platforms its practical contribution, even if implemented, will likely be very limited. Firstly, the term core platform service that is defined in art. 2 of the DMA restricts the jurisdictional scope of the DMA to a set of specific commercial services which inevitably will not cover all types of platforms that currently exist or could be created in the future. This can admittedly be extended at later stages by the Commission, however that will likely entail a rather time consuming legislative process.[37] Secondly, the benchmark of gatekeeper will narrow such scope of application even further as the quantitative benchmarks included in art. 3 of the DMA are extremely high and thus will only be met by a handful of players in practice. This can also occur with respect to undertakings that could be considered dominant under art. 102 TFEU.[38] Admittedly, the status of gatekeeper can be reached even when the quantitative criteria of art. 3 of the DMA are not entirely met.[39] However, such an assessment would inevitably entail some form of market definition as common under art. 102 TFEU which still requires tackling this challenge in the context of platforms. Thirdly, even in the event that the jurisdictional thresholds of the DMA are met the ex-ante obligations listed in art. 5 and 6 cover only a limited number of competitive concerns associated with the commercial practices of platforms. Accordingly, many other concerns relating to price and non-price based practices by platforms with significant market power will remain to be addressed under the scope of art. 102 TFEU.

35 Art. 3(1) of the DMA.

36 According to art. 3 (3) of the DMA the undertaking must provide its core service in at least three member states; (ii) has more that 45 million monthly active end users and more that 10,000 yearly active business users; (iii) it must have an EEA annual turnover of EUR 6.5 billion or a market value of at least EUR 65 billion, and (iv) fulfills the previous points for the past three financial years.

37 The possibility to update the DMA is found in art. 10 of the DMA.

38 This could happen for example, when the turnover or market value are not high enough, when the number of customer groups is not high enough or when the core platform service is provided in only two member states.

39 Art. 3 (6) of the DMA.

Against this backdrop, the considerations mentioned above, which formed the background to my interest in the topic of research addressed by this dissertation remain relevant to both practice and academia. Although the DMA may alleviate some of the challenges faced by the Commission, NCAs as well as EU and national courts when dealing with online platforms with significant market power, the majority of such cases will remain to be dealt with predominantly under art. 102 TFEU. Therefore, addressing the legal challenges in such cases remains principal for adequately tackling the anti-competitive behavior of online platforms with significant market power. This dissertation covers a compilation of the work I have written and published with this aim in mind.

The following sections of the introduction will cover the research process performed in the context of this dissertation in a more detailed manner. Section *1.2 Research focus and dissertation structure* will set out the research questions covered in this dissertation, describe the manner in which these were fitted into its structure and provide a short overview of how the respective research questions were addressed in each of the chapters. Section *1.3 Relevance of the research*, explains how and why the conducted research is relevant for a variety of legal professionals and academics active in the field of EU competition law enforcement and policy making. Section *1.4 Explanation of key terms* provides definitions for several key terms in the body of the dissertation. Section *1.5 Methodology and limitations* clarifies the theoretical and methodological approach that I have applied in conducting my research, and provides an overview of the choices that I have made in limiting the scope of this research as well as the justification for such choices.

1.2 Research focus and dissertation structure

1.2.1 Research focus

The primary aim of this dissertation is to explore the challenges involved in the application of the current EU antitrust law, and specifically art. 102 TFEU, to online platforms and offer possible solutions for such challenges in order to maintain the relevance also with respect to such actors.[40] In order to achieve this aim, the research performed in the context of this dissertation includes descriptive, analytical and normative elements.

40 For the purpose of this dissertation the terms EU antitrust law and EU competition law and used interchangeably and are meant to refer to art. 101 and/or 102 TFEU unless specified otherwise.

The main research covers several distinct aspects involved in the challenging application of art. 102 TFEU to online platforms:

a. First, the different economic notions that underpin the business models of online platforms;
b. Second, the unconventional commercial behavior of online platforms that stems from their multisided nature and that manner in which such behavior may manifest in practical-technological terms;
c. Third, the potential misalignment between the legal tests and requirements encapsulated in the framework of art. 102 TFEU and the inherent characteristics of online platforms as well as their commercial reality.

1.2.2 Main research question and sub-questions

The Main research question addressed in this dissertation is the following:

To what extent can the current framework of EU antitrust law, and in particular art. 102 TFEU, account for the multisided nature of online platforms and accommodate an application capable of attaining a similar level of enforceability as in non-platform market settings?

Answering this question requires the exploration of several elements that are inherent to the existence of online platforms and the assessment of their relevance and impact on the application process of art. 102 TFEU. These were addressed in the research sub-questions of this dissertation which are the following:

1. What are the challenges posed by the inherent characteristics of online platforms for the application of the current EU antitrust law to these actors and what is the nature of the adjustments required in order to tackle them?

2. How should the definition of the relevant market be performed in the case of online platforms in light of their multisided nature?

3. To what extent is the current framework of non-price related abuses suitable for distinguishing between legitimate expansions and anti-competitive leveraging of market power by online platforms?

4. How can abusive pricing practices by online platforms be assessed under art. 102 TFEU in light of their inherent reliance on unconventional price settings resulting from their multisided nature?

5. How does the multisided nature of online platforms need to be accounted for when making remedy design choices for price and non-price related abuses of dominance and does the European Commission have the legal tools to design effective and proportionate remedies in such cases?

1.2.3 The structure of this article-based dissertation

This dissertation consists of a "collection of separate scientific treatises" as referred to in Article 13(2) of the Leiden University Doctorate (PhD) Regulations 2018. Its content comprises six published articles and one chapter that remains to be published.

1. Applying EU competition law to online platforms: the road ahead – Part 1 (2017) 38(8) European Competition Law Review 353.

2. Applying EU competition law to online platforms: the road ahead – Part 2 (2017) 38(9) European Competition Law Review 410.

3. Applying (EU) Competition Law to Online Platforms: Reflections on the Definition of the Relevant Market(s) (2018) 41(3) World Competition (2018) 453.

4. The SSNIP Test and Zero-pricing Strategies: Considerations for Online Platforms (2018) 2(4) CoRe: European Competition and Regulatory Review 244.

5. Tying and Bundling by online platforms- Distinguishing between lawful expansion strategies and anti-competitive practices (2021) 40 Computer Law and Security Review.

6. Abusive pricing practices by online platforms: a framework review of art. 102 TFEU for future cases (2022) Journal of Antitrust Enforcement.

7. Designing remedies for abuses of dominance by online platforms (2021).

The articles published in European Competition Law Review (ECLR) entail the two parts of chapter 2 of this dissertation and have been published following a review of the journals' editorial board. The other articles that have been published in: World Competition (chapter 3), CoRe: European Competition and Regulatory Review (chapter 3), Computer Law and Security Review (chapter 4) and Journal of Antitrust Enforcement (chapter 5) have been subject to a (double-blinded) peer-review process of the relevant journal before being admitted for publication. These publications as well as the sixth contribution that is pending publication have all been presented at the yearly ASCOLA conferences,[41] and benefited from the (double-blinded) peer-review and commentary process that forms part of the acceptance

41 Ascola is the Academic Society for Competition Law, for more see < https://ascola.org/>.

procedure. The respective journals prescribe different citation styles, which have been modified in the scope of this dissertation to OSCOLA for uniformity purposes.[42]

Minimal changes have been made to the published articles when incorporating them as chapters in this dissertation. First, I have re-joined the two publications in the ECLR into one contribution that constitutes chapter 2. The two publications were originally written as a single article that was split into two parts for the purpose of publication. Second, I have compiled the third and fourth publications on the market definition market definition into chapter 3. Their introductions were merged and slightly modified for consistency purposes. Third, the introductions and conclusions of all chapters were slightly supplemented to better explain how each fits within the broader research and how it responds to one or more of the above mentioned research sub-questions. To the extent needed, the introductory and concluding chapters of this dissertation touch upon some recent developments that were not present at the time when the published articles were submitted for publication.

Writing an article-based dissertation has been acknowledged to have several advantages. As a PhD candidate one of the main advantages of such an approach is that it allowed me to select and focus on the most relevant aspects of the research that have the most value for academia and practice. When dealing with a research topic that is highly dynamic and quickly evolving as the topic of this dissertation has proved to be, having the ability to focus and work specifically on stand-alone legal challenges within an overarching context of a greater legal debate has had tremendous value for me. This approach allowed me to focus on the topics that do not only have academic relevance, but also practical relevance. While academic relevance can at times be assessed in advance, practical relevance is constantly evolving. Thus, by being able to tackle the various challenges explored in this dissertation on a stand-alone basis, I was better able to ensure the academic and practical relevance of the dissertation throughout the entire writing process. This ability also allowed me to actively take part and contribute to the ongoing and constantly evolving debate around the topic of research of this dissertation in academic and practice oriented circles.

Nevertheless, the mentioned advantages of an article-based dissertation do not mean this approach has no drawbacks. The freedom and ability to pick specific standalone legal problems also means that the author must be

42 OSCOLA was accepted as the reference method for the articles published in the European Competition Law Review, CoRe: European Competition and Regulatory Review and Computer Law and Security Review used in chapters 2, 3 and 5 of this dissertation. World Competition uses the Association of Legal Writing Directors citation style, which concerns the article that forms the first part of chapter 3.

careful with the choice he or she makes as writing an article based dissertation requires more than writing a collection of published articles. The publications must entail a collection of selected topics that, when brought together, form one comprehensive and cohesive dissertation. This in turn means that throughout the process the author must constantly ensure that the selected topics are not only suitable to serve as standalone publications but also that such topics interact with each other in a manner that produces a valuable contribution to both academia and practice as a whole. Consequently, at times, one must be able to exclude topics and articles that, although related to the topic of research, do not fit in well with the story covered by the dissertation or its aim while selecting and adding articles that would otherwise make the entire selection appear incomplete. In the case of this dissertation, this selection has been done throughout the entire writing process. The first two publications focus on the myriad of challenges posed by the application of EU competition law to online platforms while the subsequent articles, as will be explained, focus on the most pressing and relevant ones.

Against this backdrop, I believe the seven contributions written as the main body of this dissertation all directly relate to the main research focus described above. Each of these articles covers a key aspect of the legal challenges involved in the application of EU competition law, and specifically art. 102 TFEU to online platforms that justifies their inclusion in this dissertation. The insights and findings produced by these articles in combination with this introduction and overall conclusion chapter of this dissertation are therefore able to offer a comprehensive and well-reasoned answer to the main research question. Although the research performed for this dissertation could have avoided some of its current limitations (see section 1.5 on Methodology and limitations) by adding supplementary articles, I believe that their omission does not render the dissertation incomplete nor does it risk the possibility that the overall final findings and conclusions would have been meaningfully different with their inclusion.

Although the seven contributions all entail independent yet related works, some overlap between them certainly exists. The overlap concerns two elements of each contribution. First, all the general introductions start off by mentioning the growing importance of online platforms in the constantly evolving digital markets, which makes potential frictions with competition policy increasingly visible in practice. Therefore, upon a complete reading of this dissertation a reader would notice that this scene setting, which emphasizes the growing tension between competition policy and prominent online platforms, serves as the backdrop for all contributions to different extents. Second, all contributions include a description of the key characteristics of online platforms and their commercial reality which is required to different extents in each of the pieces. These descriptions were required in order to present the source of friction between online platforms and the

existing framework of EU antitrust law and specifically art. 102 TFEU, and motivate the eventual need or lack thereof for adjustments to current practice. As these descriptions concern predominantly the same characteristics and circumstances it is inevitable that these sections of the respective contributions will display a noticeable degree of overlap. Nevertheless, such overlap is predominantly limited to a general description of the core characteristics of online platforms and their commercial reality. Beyond such general description, each contribution focuses on a different perspective of the characteristics of online platforms and the respective effects these are expected to have on a specific element of the application process of EU antitrust law to them. Accordingly, despite the overlap described here each contribution is the result of a well thought through selection of independent topics that each contribute an important insight for the purpose of answering the main research question of this dissertation. The relevance and complementary value of each of the works included in the chapters of this dissertation is laid out in the bellow:

Chapter 2: The challenges of applying EU antitrust law to online platforms

This chapter presents the various practical and substantive challenges involved in the application process of art. 101 and 102 TFEU (EU antitrust law) to online platforms due to their multisided nature and corresponding special characteristics. The chapter identifies multiple challenges throughout the entire application process of these articles covering: their jurisdictional thresholds for legal intervention, the qualification of business practices as prohibited under their scope and the possibility of applying justifications and derogations under these provisions.

This chapter primarily addresses the first research (sub)question, namely '*What are the challenges posed by the inherent characteristics of online platforms for the application of the current EU antitrust law to these actors and what is the nature of the adjustments required in order to tackle them?'*.

The subsequent chapters address a more focused selection of challenges covered in the scope of the dissertation. The scope of challenges was narrowed down to those falling under art. 102 TFEU in light of ongoing developments in practice and the evolving focus of the European Commission and academia in this regard so as to ensure that the addressed topics have both theoretical and practical relevance. This selection of challenges was further narrowed down based on personal insights gained in the process of research. This gradual filtering was made based on whether the selected challenges involve an inevitable friction between the characteristics and commercial practices inherent to online platforms and the current framework of art. 102 TFEU. This final selection of challenges is specifically suited for providing a comprehensive answer to the main research question of this dissertation.

Chapter 3: The definition of the relevant market for online platforms

This chapter addresses the market definition process which entails a mandatory legal step in the process of applying art. 102 TFEU to the business practices of undertakings as well as an indispensable element for multiple procedures involved in the application of both art. 101 and 102 TFEU including but not limited to: the assessment of anticompetitive effects and efficiencies, the setting of fines and the design of remedies.

The chapter covers the difficulties associated with the market definition process in the case of online platforms from both a theoretical as well as practical perspective. These difficulties are explored with respect to the process on the market definition as such, as well as with respect to the SSNIP test which constitutes the main legal tool that the EU Commission (and often national competition authorities) uses for defining markets. Accordingly, this chapter consists of the third and fourth published articles previously mentioned and answers primarily the second research (sub) question, namely '*How should the definition of the relevant market be performed in the case of online platforms in light of their multisided nature?*'.

Chapter 4: Platform expansions and anti-competitive market power leveraging

The fourth chapter covers the matter of expansions by online platforms where such actors choose to increase the number of services they provide on a single platform or otherwise launch an additional platform that is then connected to the initial one. This expansion process has been found to be imperative for platforms in order to remain viable in the long term. Successful expansions in practice entail, however, some type of market power leveraging to the detriment of competitors even in the absence of any anticompetitive intentions or motives. In this regard the implementation of various kinds of tying or bundling practices by platforms can serve as some of the most effective strategies to deploy a successful expansion. At the same time the use of tying and bundling practices may give rise to numerous competitive concerns, which the enforcement of art. 102 TFEU aims to prevent.

Accordingly, the fourth chapter seeks to explore to what extent the existing framework of art. 102 TFEU is capable of applying to the expansion strategies of online platforms that are implemented through the use of tying and bundling practices when such practices display anti-competitive effects. This chapter consists of the fifth article mentioned above and answers the third research (sub) question: '*To what extent is the current framework of non-price related abuses suitable for distinguishing between legitimate expansions and anti-competitive leveraging of market power by online platforms?*'

Chapter 5: Platform pricing and the identification of potential price-related abuses

The fifth chapter covers the manner in which platforms implement their respective pricing schemes, which are often significantly different from pricing schemes commonly adopted by non-platform undertakings in conventional markets. Nevertheless, as in the case of any type of undertaking, abusive pricing practices can also occur in the case of online platforms. Therefore, the fifth chapter seeks to assess how the legal tests of price-related abuses of dominance could be applied to the unconventional price setting of online platforms. In this regard the chapter covers three specific abuses, namely predatory pricing, discriminatory pricing and abusive pricing. These three abuses cover the three main forms of harm that dominant undertakings can produce with their price setting strategies, namely (i) the exclusion of competitors, (ii) the exploitation of consumers and commercial customers and (iii) the distortion of competition between commercial customers. The insights from the assessment performed in this chapter can later extend to the remaining forms of price related abuses under art. 102 TFEU as all such forms share the same core theories of harm as the three abuses selected for this chapter.

This chapter consists of the sixth contribution mentioned above and answers the fourth research (sub) question: '*How can abusive pricing practices by online platforms be assessed under art. 102 TFEU in light of their inherent reliance on unconventional price settings resulting from their multisided nature?*'.

Chapter 6: Designing remedies for abuses of dominance by online platforms

The sixth chapter covers the challenges involved in the design of legal remedies in cases where abuses of dominance are established in the case of online platforms. This chapter is a fundamental part of the research that deals with the second part of the application process of art. 102 TFEU, namely bringing the abusive behavior of the respective online platform to an end and tackling the harm caused by its prohibited practices. The focus of this chapter is on the possibilities that the Commission has, within the current legal framework of EU competition law, to deal with abuses of dominance by online platforms, which may require more elaborate forms of intervention due to their multi sided nature. Such nature will often mean that the harm caused by the abusive practices of online platforms will extend across multiple interrelated markets, which may require that the corresponding remedies do so as well. By exploring the suitability of the current legal framework to accommodate the type of remedies that would be required in the case of platforms, the chapter delves into the legal objectives of competition law remedies and the legal boundaries involved in the implementation of such remedies such as the principles of effectiveness and proportionality. Furthermore, this chapter also explores the potential relevance of the recently proposed Digital Markets Act, which specifi-

cally addresses the business practices of online platforms for the purpose of remedy design in abuse of dominance cases concerning these actors. The abuses selected for the purpose of the discussion in this chapter concern the price and non-price related abuses covered in the fourth and fifth chapters.

This chapter consists of the seventh contribution mentioned above and addresses the fifth research (sub) question: '*How does the multisided nature of online platforms need to be accounted for when making remedy design choices for price and non-price related abuses of dominance and does the European Commission have the legal tools to design effective and proportionate remedies in such cases?*'.

Following these substantive chapters, chapter 7 of this dissertation will provide the final findings and remarks that conclude this research project. This final chapter will provide the findings and conclusions reached in each of the chapters with respect to the research (sub) questions that are then brought together to provide a comprehensive answer to the main research question of this dissertation.

1.3 Relevance of the research

My interest and research into online platforms was triggered by an article I read back in 2015, by Ariel Ezrachi and Maurice Stucke, who had just published their article on algorithmic collusion.[43] In their work the authors explored how the evolution of algorithms and their utilization in the context of digital markets, such as e-commerce, may lead to anti-competitive outcomes that cannot be tackled by present day competition policy. The idea that certain types of practices would simply escape competition law liability due to the technology supporting such practices was intriguing for me. During my LLM studies on EU competition law I had seen time and time again how EU competition law was adaptable enough to deal with novel and unforeseen commercial constructions. Therefore, stumbling across an example that might challenge the adaptable character of competition policy made me want to further look into commercial developments in high technology industries and the challenges such developments may pose for competition law enforcement. This inquiry eventually led me to the case of online platforms that I found to be a suitable topic for extensive research given their growing societal and economic role in today's world. My motivation for picking this topic relates to its multi facet character that combines legal, economic and technological components. This combination made the topic of online platforms interesting for me from a theoretical and

43 Ariel Ezrachi and Maurice E. Stucke, 'Artificial Intelligence & Collusion: When Computers Inhibit Competition' Oxford Legal research paper No. 18/2015 <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2591874#> accessed 10 May 2021.

practical perspective. From a theoretical perspective, I wanted to explore the boundaries of current competition policy and its ability to accommodate cases that rely on different economic insights than the ones forming the fundament of such policy. From a practical perspective, I wanted to explore whether some of the shortcomings of the existing competition policy rules in the case of online platforms can be alleviated through a more strategic and flexible application of such rules as an alternative to their reformulation. In this regard, I wanted to explore to what extent the technological characteristics of commercial practices may impact their legal assessment in practice.

At the time when I came across the topic of online platforms, there were only a handful of authors that looked into this topic, most of them from the fields of economics, industrial organization and business management. The legal literature in the field of (EU) competition law or antitrust policy was extremely scarce and considered to concern a rather niche specialist topic. Since then it is safe to say that the debate on the relationship between online platforms and (EU) competition policy has grown exponentially and extended from academia to practice. In the past five years a sharp increase in academic publications as well as regulatory assessment reports and debates has been observed. What started as a rather niche topic has now become one of the core areas of focus of numerous competition authorities around the globe. The magnitude of this growing interest is, however, perhaps best displayed by the recent Platform-to-Business Regulation and the Commission's proposal of the Digital Markets Act which both seek to address some of the competitive concerns posed by online platforms. Such regulatory developments were quite unthinkable at the time when the research for this dissertation first commenced as competition law was considered to be either capable of dealing with any commercial matter including online platforms or simply not applicable or relevant to such actors as the operated in zero priced markets. Nevertheless, over time it has become clear that the challenges posed by online platforms to competition law policy are quite substantial and the adaptability of the existing framework can no longer simply be assumed to exist. Furthermore, the growing importance of platforms across the various corners of the economy and the raising dependency of third parties on the services of such platforms amplified the need to resolve any related legal challenge in the short rather than long term.

I believe that the relevance of my research stems from the theoretical and practical insights provided with regard to the challenges posed by online platforms as well as from the observations and suggestions made in this dissertation for resolving some of these challenges in practice. By doing so, this research project does not only contribute to the advancement of the academic and practical knowledge of this topic but also further advances the debate on this topic by providing concrete recommendations for poten-

tial solutions or guidelines for reaching feasible solutions. The relevance of this dissertation is to some extent supported by the fact that some of the publications included in this dissertation have been used as reference points for the challenges involved in the application of competition policy to online platforms by various international organizations,[44] national bar associations,[45] and regulatory bodies.[46]

In addition to the direct relevance of this research to the ongoing debate concerning the role of online platforms in the EU, this project is also relevant to the greater context of this debate which concerns the application of competition policy to online platforms across a multitude of jurisdictions around the world. Despite the differences in the legal frameworks outside of the EU, competition policy as such relies on similar economic fundamentals. Therefore, many of the insights and suggestions included in this dissertation are relevant for this debate also in the context of non-EU legal frameworks. Furthermore, the relevance of the research also extends to the greater debate concerning the challenges posed to competition policy by current technological developments in the field of artificial intelligence (AI) and the roll out of the Internet of Things (IoT) products and networks. The use of AI for commercial purposes is, for a great deal, done by various kinds of online platforms and often those currently subject to competition law investigations.[47] Accordingly the insights and suggestions offered in this dissertation will also be relevant for instances where the utilization of AI technologies by such platforms can lead to anti-competitive effects. The implementation of IoT technology and products will in essence entail the creation of new online platforms that are also supported by dedicated compatible hardware for a wider range than we see today. In essence, the roll out of IoT will concern providing all electronic devices and machinery with the same level of (internet) connectivity that smartphones have. Therefore, this research will also be directly relevant to this new kind of platforms that will share most if not all of the characteristics of online platforms as discussed in the scope of this dissertation.

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44 E.g. OECD Roundtable, Implications of E-Commerce on competition policy DAF/COMP(2018)3, at 28, 33, 35 and 38.

45 Bundesrechtswaltkammer, Position Paper on a new competition tool („NCT"), Sep. 2020, at 5-6 <https://brak.de/zur-rechtspolitik/stellungnahmen-pdf/stellungnahmen-europa/2020/september/stellungnahme-der-brak-2020-50.pdf> accessed 7 May 2021.

46 Kamerstuk 35134, nr. 4, Initiatiefnota van het lid Verhoeven over mededinging in de digitale economie (17 Sep. 2019); European Commission, ' Support study accompanying the evaluation of the Commission Notice on the definition of relevant market for the purpose of Community competition law' (2021) at 64, 96 < https://ec.europa.eu/competition-policy/system/files/2021-06/kd0221712enn_market_definition_notice_2021_1.pdf>.

47 Expert report (2018) *supra* (n 9) at 36; For this reason the EU Commission has launched a sector inquiry into IoT. See Commission press release 'Antitrust: Commission launches sector inquiry into the consumer Internet of Things (IoT)' (16 Jul. 2020) <https://ec.europa.eu/commission/presscorner/detail/en/IP_20_1326> accessed 10 Apr. 2021.

In terms of audience, this dissertation is relevant for a wide scope of readers. First, the dissertation is aimed at the legal professionals that are involved in the enforcement process of EU competition policy. This includes the competition authorities at the EU and national level, EU as well as national courts and competition lawyers (private practitioners and in-house counsels). Secondly, this dissertation is relevant for academics that are active in the field of (EU) competition law and focus on the myriad of challenges posed by digitization. Thirdly, this dissertation is also relevant for the professionals and officials working at the various international organizations involved in the enforcement or study of (EU) competition law such as the OECD, UNCTAD, ICN, ECN as well as members of various think-tanks associated with enforcement and regulatory instances such as CEPS and Bruegel.

Finally, I hope that the efforts made in the context of this dissertation to adjust an existing legal framework to the new (market) settings brought by digitization and technological innovation will encourage academics and/or practitioners from other fields of law to pursue a similar approach. The legal challenges posed by digitization in general and online platforms in particular are not limited to competition law policy. Thus a similar effort in other fields of law would undoubtedly assist in future proofing their respective legal frameworks.

1.4 Definition of key terms

This section provides an explanation of some of the main terms used in this dissertation.

1. Online platforms

The term online platform used throughout the dissertation encompasses an open-ended category of undertakings that meet the main criteria associated with two or multisided markets as defined by economic literature in the seminal work of Rochet and Tirole,[48] which has formed the fundament of most academic work in the field of competition law and platforms. These criteria are: (i) the platform plays an intermediary role between two or more separate customer groups; (ii) such customer groups display positive indirect network effects, (iii) the platform pricing scheme is non-neutral.

The intermediary role played by platforms entails that they brings two or more customer groups together and allows them to interact. The commercial services offered in the context of such a role are not relevant in this

48 Jean-Charles Rochet and Jean Tirole 'Platform Competition in Two-Sided Markets' (2003) 1(4) Journal of the European Economic Association 990.

regard, meaning that platforms can be active in any sector of the economy. In this context, the term platform customers can consist of (end) consumers as well as commercial customers. Such groups display indirect network effects where their demand for the platform by a customer group increases as the number of members of a separate customer group rises. A platform has a non-neutral price scheme when the volume of platform customers is determined not only by the total amount of fees charged for its intermediary service (also referred to as the price level) but also by the manner in which such fees are divided across its customer groups (i.e the price structure).

Due to the synergy between the term online platforms and the economic literature on two- and multisided platforms or markets, these terms are often used interchangeably with the scope of this dissertation.

2. Platform interaction

The term platform interaction used throughout the dissertation refers to the service(s) provided by the platform as part of its intermediary role. A platform interaction can entail any type of service (or combination thereof) used to allow members of the separate customer groups of the platform to interact with each other. For example, an online marketplace allows consumers and merchants to buy and sell goods online. This service constitutes the interaction that such a marketplace facilitates for these two customer groups to interact with each other. In some chapters the term matchmaking interaction is used so as to better accentuate the functional purpose of such services with respect to the platform customer groups. To a limited extent the term platform (matchmaking) interaction is interchangeably used with platform (matchmaking) functionality or service.

In some instances, the dissertation mentions successful interactions or profitable interactions. These terms indicate that the services offered by the platform to its customer group have been used in a manner that generates revenue for the platform. For example, in the case of the marketplace, every time consumers make a purchase that constitutes a profitable or successful interaction since the marketplace platform commonly receives a transaction fee for each purchase made on it.

3. Market tipping

The term market tipping which is used in multiple instances, refers to the situation in which a platform obtains an initial impassible advantage over its competitors that further increases over time as the platform grows. This situation means that in the long term, the customers of the respective platform will no longer switch or consider switching to competing platforms. Accordingly, the markets in which the respective platform archives such an impassible advantage will tip in its favor endowing it with a (near)

monopoly position. This outcome is associated with the process of competition between platforms that is characterized by competition *for* the market rather than competition *in* the market, which in turn leads to winner-takes-all situations once the process of tipping commences.

4. Platform oriented terms

Throughout the dissertation multiple terms originating from economic literature concerning the characteristics of platforms or the markets they operate on were used. These terms include: direct and indirect network effect (both positive and negative), single and multi-homing patterns, skewed pricing schemes and structures, critical mass and others. Such terms that concern the distinguishing characteristics of platforms have been defined and explained in multiple sections of this dissertation. In order to prevent additional repetition these terms have not been defined in this section.

1.5 Methodology and limitations

1.5.1 General research approach

In this dissertation the main research question, as well as sub-research questions, were addressed in a similar manner that combined different insights and perspectives on online platforms from the fields of law, economics, management and to a limited extent software development. The chosen overall methodology is therefore that of doctrinal research, focused on the analysis of existing legal provisions and corresponding legal tests with the use of insights from predominantly the fields of economics and management.

The dissertation has descriptive, comparative, legal analytical and normative elements. Each of the chapters of this dissertation provides a description of the core characteristics of online platforms from an economic perspective and provides a legal analysis of the implication of such characteristics for the application of competition policy to these actors. To the extent relevant insights from the field of business managements are also included to further clarify the rationale behind certain business practices commonly adopted by platform entities. In the context of the legal analysis, a description of various components of the existing framework of art. 102 TFEU was provided depending on the focus of each contribution. Where specific challenges concerning the application of this provision or corresponding remedies were addressed, normative claims were made with respect to the possible solutions for challenges.

The overall research approach and methodology of this dissertation certainly involve some flaws. Some of these are inherent to the methodology of doctrinal legal research. This is perhaps most relevant with regard to the main assumption in doctrinal research that does not always sufficiently account for the myriad of (external) factors that may impact the application of the law as it stands. For example, by focusing on the law as such and less with those who apply it may entail that some of the suggestions or insights reached, even if objectively correct and logical, may nevertheless not transfer into practice due to such actors. When dealing with new insights from economics in the context of competition policy, the overall receptiveness of the enforcement agency (and legislator) to such insights may significantly influence any potential change in the application or modification of existing legal frameworks. Other drawbacks relate to the scope and focus of the research which is primarily focused on. The overall focus of the legal research concerns the EU legal framework. References made with regard to the US legal framework of antitrust as well as the case law or the decision making practice of several Member States jurisdictions are primarily used as examples to support certain claims made in this dissertation. In terms of scope the research is predominantly focused on several specific aspects of art. 102 TFEU and not on the entire framework of this provision.

Nevertheless, despite potential shortcomings I believe the research performed provides a comprehensive and well-substantiated answer to the main research question of this dissertation. Furthermore, the selected approach for this dissertation consisting of doctrinal legal research supported by insights from economics and business management is aligned with the character of competition policy which relies greatly on economic theory. This special relationship between competition law and economics is to a great extent also present in the application of the existing framework in practice as EU courts have repeatedly noted that the application of such a policy must always take account of the legal and economic context of each case. Therefore, the general approach adopted by this dissertation follows in essence a similar process to the one that gave rise to the creation of the existing competition law framework, as well as the behind the application of this framework in practice. Admittedly, however, the dissertation did not revisit the objectives of current competition law policy, but rather attempted to explore how its current functioning could also be adequately extended to online platforms. The uniform application of this research approach also ensures a greater degree of consistency across the various chapters despite these being part of standalone publications or research papers.

A detailed description of the applied research approach and its application in each chapter, including the benefits and drawbacks of this approach is provided below.

1.5.2 Chapter specific approach

Chapter 2: The challenges of applying EU competition law to online platforms

This chapter provides the general background for the research project. The chapter provides a brief description of the special characteristics of online platforms as identified by economic literature as well as some common commercial practices and technical attributes of such actors. These factors are then assessed under the legal frameworks of art. 101 and 102 TFEU in order to point out the challenges these could give rise to in practice. This assessment includes a review of the wording of the two provisions as well as their application in practice on the basis of various corresponding legal tests.

This chapter is important for demonstrating the significance of the legal challenges posed by undertakings, like online platforms, that rely on economic models that were not considered or addressed throughout the development of the current EU framework of competition law. For this purpose, both provisions, which entail the main body of EU antitrust law were selected. The chapter shows that the application of art. 101 and 102 TFEU to online platforms gives rise to challenges at three important stages of the application process. These stages concern:

1. The application thresholds which determine whether art. 101 or 102 TFEU are applicable to the commercial practices of undertakings.
2. The qualification of commercial practices adopted by the concerned undertakings as legitimate or prohibited under art. 101 or 102 TFEU.
3. The justification possibilities that the concerned undertakings have to demonstrate that their potentially prohibited practices should nevertheless be permitted due to their efficiency generating potential.

These stages concern the three of the four main steps in the application process of both provisions and cover the perspective of both enforcement authorities (or private claimants) and undertakings suspected of engaging in prohibited practices. The first two stages concern matters for which the enforcement authority (or claimant in private enforcement cases) carry the burden of proof and the third stage concerns a challenge for the concerned undertakings as they carry the burden of proof for it.

In this chapter the matter of remedies, which constitutes the fourth main step of the application process, was not addressed as many of the challenges involved in the design of suitable remedies depend greatly on the specific type of prohibited practices that require scrutiny. This in turn requires a thorough discussion of such prohibited practices, the competitive concerns these raise and the manner in which they manifest. As this chapter was intended to provide a general overview of the challenges posed by online platforms, such an in-depth discussion was not suitable for this article. This

preliminary chapter does not discuss the manner in which the prohibited practices of online platforms should be assessed under these provisions but rather points out the challenges involved in this process. Accordingly a meaningful exploration of the challenges involved in remedy design was not entirely attainable in such a context. Instead, the matter of remedy design was covered in chapter 6 in relation to the abuses extensively discussed in chapters 4 and 5, which allowed for a material discussion with regard to remedies.

Chapter 3: The definition of the relevant market for online platforms

This chapter focuses on the definition of the relevant markets in cases concerning online platforms. The definition of relevant markets is a key element of the application of (EU) competition policy. In the context of art. 102 TFEU, the market definition is required for multiple reasons. Firstly, it constitutes an obligatory step that needs to be taken in order to establish dominance which in turn determines whether this provision is applicable. Secondly, the outcome of this process also determines how the pro-and anti-competitive effects in each case need to be assessed. Thirdly, it will determine how the corresponding remedies need to be implemented and how eventual fines need to be calculated. Accordingly, I have chosen to focus on the aspect of market definition, as it is indispensable to the application process of art. 102 TFEU and to a large extent also to other areas of EU competition law where it plays a comparable role.

The research in this chapter is focused on assessing the implications of the economic and commercial characteristics of online platforms for the market definition process. The chapter is split in two parts, each covering a separate angle of the market definition process. The first part of the chapter is concerned with the substantive approach to the market definition process and how such process needs to be performed in the case of platforms in light of their multisided nature, which may require the definition of multiple separate, yet interrelated relevant markets. In short, the first part is concerned with the challenge of deciding how many relevant markets need to be defined when dealing with cases concerning online platforms. The second part of the chapter focuses on the practical aspect of the market definition process that involves the SSNIP test which is commonly considered to be the main quantitative tool used by the Commission (and NCA's) for defining relevant markets. This part of the chapter is concerned with the applicability of the price-based SSNIP test to the pricing schemes of online platforms that often entail zero priced services which prevent the SSNIP test from being applied in its current form.

For the purpose of both parts of the chapter, economic and management literature on online platforms is consulted in order to establish the nature of the challenges posed by these actors for the process of the market definition

and the SSNIP test. Existing theoretical solutions for the identified challenges are analyzed in order to show why these are not entirely compatible with the commercial reality of online platforms actors in practice. The final section of each part of the chapter takes a normative approach and provides some suggestions with respect to possible solutions that can be adopted for future practice. The offered solutions are based on insights from academic literature as well as the analysis of EU case law, the decision making process of the Commission as well as insights from case law of national courts and the decision making practices of NCA's.

Chapter 4: Platform expansions and anti-competitive market power leveraging

The fourth chapter focuses on the expansion strategies of online platforms, which have been found to be indispensable from a commercial and strategic perspective for these actors. Such strategies will involve, however, various forms of market power leveraging, which may be considered prohibited under competition law when implemented by dominant platforms. This is particularly so when expansion is implemented through tying or bundling practices which are efficient strategies for this purpose and thus likely to be pursued by online platforms in their pursuit for further growth. Against this backdrop chapter 4 is focused on assessing whether the current framework is suitable for filtering out anti-competitive tying and bundling practices from the variety of expansion techniques that online platforms can attempt. This topic was selected because the ability of the current legal framework to distinguish between legitimate and anti-competitive expansion strategies is paramount for the protection of the competition in the context of platforms. As expansions by platforms are inevitable for their viable existence, incorrectly condemning legitimate expansion strategies risks distorting competition among such actors and undermining their viability in the long run. Similarly, not tackling anti-competitive expansion strategies that rely on tying or bundling practices risks the distortion and even elimination of competition across multiple markets as such practices can be highly effective for leveraging market power across markets.

This chapter starts off with an exploration of the commercial trajectory that is pursued by online platforms from the moment they are launched to the moment they will seek to expand according to economic and management literature. This part also includes the manner in which such expansions may manifest and how these might resemble tying and bundling practices in the context of competition law. From there a discussion of the various competitive concerns associated with tying and bundling practice according to economic theory is provided. This discussion shows that the risks posed by tying and bundling practice in the context of multisided platforms are similar to those identified in the past in the case of traditional markets, thus justifying a similar degree of legal scrutiny and diligence. This section engages in a legal analysis of the existing legal framework for abusive

tying and bundling practices under art. 102 TFEU, which covers the case law of EU courts and the decision making practice of the Commission. This final part of the chapter explores how this existing framework translates to the settings of online platforms. The results of the research in this chapter provide guidance on how tying and bundling practices can manifest in the commercial practices of online platforms so that art. 102 TFEU could be applied in a manner that avoids under and over enforcement.

In the context of this chapter, a choice was made to focus predominantly on tying and bundling practices as a source of competitive concern in the process of expansion strategies by online platforms. In practice, however, anti-competitive leveraging of market power could theoretically be implemented by online platforms outside the scope of tying and bundling. This possibility is also addressed to a limited degree in the context of this chapter. Such discussion of general abusive practices of leveraging was limited, given the open ended and unclear framework associated with this kind of abuses that constitute a form of catch-all or rest category of abuse. Accordingly, pursuing such alternative leveraging strategies more extensively could have undermined the effort made by this chapter to provide clarity on the application of art. 102 TFEU to online platforms. By contrast, the legal framework of tying and bundling is well established and extensively addressed in legal literature and practice. Furthermore, tying and bundling practices or practices that resemble tying and bundling have already been widely used by platforms in practice. Moreover, tying and bundling, have been found to be effective for market power leveraging and thus more likely to be used in the context of expansions. Therefore, the choice made in this chapter may mean that anti-competitive practices that may fall out of the framework of tying and bundling may not be fully covered by the scope of this chapter.

Chapter 5: Platform pricing and the identification of potential price-related abuses

This chapter focuses on the pricing practice of online platforms and assesses how the current legal tests of price-related abuses can be used for dealing with such practices in light of the multisided nature of platforms. The multisided nature of platforms entails that these will commonly rely on pricing schemes that are unconventional in the context of non-platform markets and undertakings. The most common example in this regard is the use of zero pricing by online platforms, such as Booking.com, where one (or more) platform customer group (mostly consisting of consumers) does not pay for using the platform because the costs of serving such customers with the platform service are recouped from other customer groups (mostly consisting of commercial parties). Such unconventional pricing strategies, despite being considered suspicious when viewed through the prism of previous practice, can be perfectly legitimate in the context of online platforms. In fact, platforms depend greatly on such skewed pricing structures

in order to attract multiple separate customer groups with different degrees of demand for the intermediary service provided by the platform. Without this ability, platforms would be unable to overcome the chick-and-egg problem inherent to multisided platforms. At the same time, online platforms, like any other kind of undertakings are driven by the same profit maximization motives. Accordingly, platforms are just as likely to adopt anti-competitive practices as any other undertaking; however, their multisided nature makes the analysis of their pricing strategies far more complex.

Therefore, this chapter looks into how price-related abuses should be identified and assessed in the case of online platforms. To do so, the first part of the chapter dives into economic and management literature on multi sided markets in order to establish how platforms price their services and what are the main factors that impact this price setting. The rest of the paper goes into a legal analysis of the respective framework of the price-related abuses selected for this chapter. This analysis combines the insights from the first section of the chapter so as to see how the legal framework of each abuse could accommodate the price setting reality of platforms and its determinants. To do so, the chapter goes into an analysis of EU case law, the decision making practice of the Commission and the official documents used by these bodies for the purpose of these abuses.

In the context of this chapter a choice was made to focus on three specific price-related abuses of dominance. These are predatory pricing, discriminatory pricing and excessive pricing. The reasons for this selection are both theoretical and practical. From a theoretical perspective these abuses represent the three forms of harm that dominant undertakings can cause with their pricing practices. Such forms include undermining competitors, exploiting customers and distorting competition between customers. Accordingly, the theories of harm covered by these abuses are also covered by all other price-related abuses which makes the analysis in this chapter also relevant for the price-related abuses not included in this chapter.[49] From a practical enforcement perspective, these abuses already are or have been the subject of claims in practice.[50]

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49 E.g. margin squeezes, selective price cuts, non-quantitative rebates may involve elements of predation, discrimination and excessive fees.

50 In the case of predatory pricing, in the US a case was launched against Uber by its competitor SideCar which was allegedly pushed out of the market by Uber's pricing policy, see SC Innovations, Inc. v. Uber Techs., Case No. 18-cv-07440-JCS (N.D. Cal. May. 1, 2020); In the case of discriminatory pricing, see the case of Dutch real estate platform Funda in Decision of the District Court of Amsterdam dated 21 March 2018 concerning real estate platform Funda ECLI: NL: RBAMS:2018:1654- Rechtbank Amsterdam, 21-03-2018/C/13/528337/HA ZA 12-1257 (*Funda* decision); in the case of excessive pricing see the recent claim of Spotify against Apple for its commission fee in the App Store see Spotify 'Time to Play Fair – Frequently Asked Questions' www.timetoplayfair.com/frequently-asked-questions/ accessed 1 June 2020.

Chapter 6: Designing remedies for abuses of dominance by online platforms

This chapter looks into remedy design challenges involved in abuse of dominance cases by online platforms. The topic of remedies was selected due to the imperative role played by effective remedies in the application process of competition policy. In the absence of adequate remedies following a final finding of infringement there is little to be gained by the enforcement process, as the competitive harm caused by the respective infringement will not be removed. Despite the importance of remedies in practice, in the context of online platforms this topic has been rather neglected. Instead, preference was clearly given to the discussion of whether the potentially undesirable practices of online platforms are caught by the current framework of EU competition law, and particularly in the context of art. 102 TFEU. In order to fill this gap in the debate, this chapter seeks to promote the topic of remedies and make several suggestions with regard to the platform characteristics that need to be taken into account in the process of remedy design within the current framework of EU competition policy.

In order to do so, the chapter first provides an overview of the EU legal framework for remedy design in abuses of dominance cases under Regulation 1/2003. In this context, the prime objectives of competition law remedies are discussed together with the limitations on remedy design stemming from the principle of proportionality. This is done through the analysis of legal literature, case law of the EU courts and the decision making practice of the European Commission. This overview covers predominantly the compulsory remedies available under art. 7 and 8 of regulation 1/2003. Following this overview, platform specific considerations from economic and management literature that should be taken into account for the design of remedies are discussed. This discussion shows that similar to the case of abuses, the multisided nature of online platforms means in practice that the remedies administered by the Commission (or NCAs) may have to extend on to multiple interrelated markets and concern multiple platform customer groups. From there the chapter dives into a legal analysis of previous practice on remedies in abuses of dominance cases. This analysis concerns the specific abuses of dominance covered in chapters 4 and 5 and covers the case law of EU courts and the decision making practice of the Commission. The analysis is then used in order to see how the specific platform considerations previously identified could be incorporated in the existing framework of remedies under art. 7 and 8 of Regulation 1/2003. The chapter then offers several suggestions on how such platform considerations should or at least could be incorporated in the process of remedy design. Furthermore, the chapter also provides suggestions on how the current use of remedies under Regulation 1/2003 could be enhanced, by utilizing interim measures in a more strategic manner, so that such a framework is better capable of addressing the potential harm caused by platforms. Additionally,

the chapter also looks into the possibility of introducing flexible remedies under art. 7 of Regulation 1/2003. Such remedies, if implemented, would provide a valuable solution to the dynamic character of competition in platform markets by making the ordering of behavioral and structural measures dependent upon the market developments post abuse.

In the last section of the chapter the recent Commission proposal of the Digital Markets Act is analyzed in order to assess how this Regulation could contribute to the design of effective and proportionate remedies. This analysis is focused on the various theories of harm covered by the DMA specifically with respect to online platforms as well as the jurisdictional scope of this regulation which determines which kind of platforms may fall under its scope. In this respect, the section provides that the jurisdictional thresholds of the DMA limit its relevance to a very narrow category of platforms, namely those that meet the definition of gatekeeper platform under the DMA. Furthermore, the scope of theories of harm included in the current proposal may make it relevant for certain types of tying by online platforms, however, not for price related abuses which are mostly unaddressed.

In this chapter several choices have been made with regard to the scope of the research. First, the chapter focuses on the abuses of dominance covered in chapters 4 and 5. Other types of abuses of dominance by online platforms were not included in the discussion of remedy design, as they have not been studied thoroughly in this dissertation. This is because the design of remedies is inherently impacted by effects created by respective abuses. Therefore, a discussion on remedies which aims to provide practical guidance, as this dissertation does, inevitably requires to be done with respect to specific abuses whose effects have extensively been researched.

Second, the discussion of remedies was solely focused on public enforcement measures under art. 7, 8 and to a limited extent 9 of Regulation 1/2003 directed at modifying the commercial practices of the concerned platforms. Fines and other monetary penalties were not included as these concern different types of challenges primarily with regard to calculation methods. Private enforcement remedies were not included as these vary across the jurisdictions of Member States and many of the design considerations are the same as the ones covered by this chapter.

1.5.3 Sources

The research in this dissertation is based on the analysis of various sources:

Literature: a wide range of academic and professional literature was used for the research in this dissertation. Such literature covers the fields of economics and management with a specific focus on the study of (online)

platforms, two or multi sided markets and network and IT sectors. The legal literature used covers the framework of EU competition law, and to a limited extent the general frameworks of US antitrust law and several national jurisdictions of EU and non-EU states. The literature used consists of (hand)books, academic and professional articles, conference and working papers. In order to access such literature, I have made use of the (digital) library of Leiden University, the competition law specific tool of Kluwer Competition Law I have access to, open access databases such as SSRN, internet searches and references included in other contributions.

Case law: case law has been used as a source throughout this entire dissertation. As the research is focused on evaluating the challenges posed by platforms to the existing framework of art. 102 TFEU the analysis of case law was required in the main body of all the chapters. Such case law originated almost entirely from EU courts. Case law from the US and other national jurisdictions was only occasionally used. Case law of the EU courts is easily accessible via the EU courts' own database and EUR-Lex. Case law from the US and other jurisdictions was found via their respective national databases.[51]

Prohibition decisions: Given the practice-oriented nature of this research project, all of the chapters include a legal analysis of prohibition decisions implemented by the European Commission and to a limited extent by NCAs. These decisions have been an important source for showing how the current framework of art. 102 TFEU operates in practice so as to assess which eventual adjustments may be required in the case of online platforms. The decisions of the Commission were accessed through its own database that contains an up to date registers of all the infringement decisions implemented by it. In the case of NCA's their respective national database was used. To a limited extent, national reports used in OECD roundtables were also consulted for this purpose.

Legislation: Existing and past legislations played an important role for delineating the legal frameworks analyzed in this dissertation. Such legislation primarily concerns the EU treaties provisions and regulations on EU competition law policy. An exception to this focus is the DMA which, despite not being an official competition law tool, is of direct concern to the state of competition among online platforms. To a very limited extent references were made to the Sherman Act with respect to US antitrust.

Official documents: Existing and past official documents concerning the application of art. 102 TFEU (or its predecessor art. 82 EC) an important role for delineating the legal frameworks analyzed in this dissertation. Such

51 E.g. in the Netherlands rechtspraak.nl was used. In the US supremecourt.gov and justice.gov were used.

official documents consisted primarily of the EU Commissions' guidelines, notices as well as green, white and other types of discussion papers. Most documents were easily accessible via EUR-Lex although certain older discussion papers required more effort to find, as these were not always well transformed into digital copies.

Policy documents and reports: National and international reports and policy documents on the challenges caused by online platforms for the application of competition policy were consulted. In addition, general reports and policy documents on the legal framework of EU competition law in general as well as art. 102 TFEU in particular were covered. Such documents and reports consist mainly of documents drafted by the Commission (or some of its working groups or think tanks), NCAs', OECD, policy oriented think tanks, governmental commissions, consumer associations, national bar associations.

Other public sources: in addition to the previously mentioned sources I have relied on a wide range of publicly available sources. This includes press releases of the Commission, NCA's and companies as well as professional and academic legal blogs, and news articles published by technology focused media outlets.

All online sources referred to in this dissertation have been accessed last in October 2021 so as to confirm this availability. In the event that the respective sources were no longer available, specific notice was placed in the concerned footnote.

1.5.4 Limitations

The scope of research within the framework of this dissertation is limited in several ways. These limitations concern in general terms the choice to focus on EU competition policy and specifically on art. 102 TFEU. The various choices I made to exclude or limit the coverage of certain topics in this dissertation and thus limit the scope of my research either from the start or throughout the process of research are explained below.

i. Excluding other (national) legal frameworks of competition policy

The research covered by this dissertation solely concerns the EU legal framework of antitrust law. The legal frameworks of other jurisdictions were at times referred to for the purpose of presenting additional examples used to support certain claims or arguments. A thorough research of such (national) legal frameworks or enforcement practice was not undertaken. The reasons behind this choice are the following. From a practical perspective covering the legal frameworks of other jurisdictions would have significantly impacted the scope of the research. A thorough comparison

across multiple legal frameworks would have also demanded an extensive broadening of my knowledge of such respective national frameworks and overcoming the inevitable language barriers involved in such a process. From a substantive perspective, extending the research to include other legal frameworks would have also likely forced me to change the character and structure of my project. A comparative project covering multiple jurisdictions would not accommodate the research of multiple legal challenges in the application process of art. 102 TFEU and the corresponding national equivalent provisions, but instead would most likely require focusing on one challenge, which can be observed across all the compared jurisdictions.

ii. Limited discussion on the challenges concerning art. 101 TFEU

The research covered by this project is predominantly focused on the challenges posed by online platforms for the application of art. 102 TFEU, and to a lesser extent art. 101 TFEU. The initial inquiry into the challenges caused by platforms for the application of both provisions is provided in chapter 2. The consecutive chapters narrowed down the scope of these challenges and research to matters that concern primarily the application of art. 102 TFEU, which has also become the focus of this dissertation as a whole.

The reasons behind this narrowing down follow from the theoretical nature and the practical relevance of the selected topics as well as those excluded. First, following the research performed for chapter 2 it became clear that the challenges identified in the context of art. 101 TFEU were significantly less pressing in practice than those discussed in the context of art. 102 TFEU. This is evidenced by the various institutional and academic reports and studies on online platforms that predominantly focused on the aggregation and misuse of market power by these actors. This focus seems to have translated overtime also into the enforcement priorities of the Commission that mainly focus on the misuse of market power by platforms.[52] Second, the challenges identified with respect to the application of art. 101 TFEU were to a great extent problems that do not stem necessarily for the specific characteristics of online platforms and the economic theory behind them, which could have required the adjustments of the existing legal framework of this provision. Such a fundamental challenge in the case of art. 101 TFEU was only present in the context of justification possibilities under art. 101(3) TFEU. This challenge and the potential solutions for it was, however, extensively covered in chapter 2 as well as in the context of chapter 3 when dealing with the market definition and its implications for the use of justification arguments in the context of both art. 101 and 102 TFEU.

52 Most the investigations initiated by the Commission against prominent platforms (GAFA) have focused on potential infringements of art. 102 TFEU.

Although this choice of focus admittedly narrowed down the scope of the research substantially, it also allowed for a thorough discussion to be conducted, of the most pressing challenges from a practical perspective as well as the most fundamental ones from a theoretical perspective. Extending the scope of research to the challenges concerning art. 101 TFEU would have significantly enlarged the magnitude of the project which would have made it less manageable and feasible while the added value of such an expansion to practice and academia would have been relatively modest.

iii. Limitation of scope of challenges covered in the context of art. 102 TFEU

The scope of challenge discussed with respect to art. 102 TFEU identified in chapter 2 was also narrowed down in the consecutive chapters. In this regard the topic of refusal to supply and the essential facility doctrine discussed in this chapter was not further explored in the dissertation. The reason for excluding this discussion is that the difficulties posed by platforms with respect to the application of these legal tests are not inherently connected to the distinguishing characteristics of platforms as such. Instead, the identified challenges in this respect concern their application to data that such platforms commonly collect and process, in significant proportion, for various commercial purposes. Therefore, similar problems would arise also with respect to other non-platform undertakings which equally collect and rely on data for the advancement of their commercial endeavors. Accordingly, while such a challenge has admittedly become rather pressing and relevant in practice in relation to various prominent online platforms, such as Facebook or Amazon Marketplace, it is not a problem that is inherent to them. Therefore, including this in the dissertation would not suit the character of this research, as it would require a shift of focus from the characteristics of platforms to those of data.

iv. Private enforcement of EU competition law

It is well established that the application and enforcement of art. 101 and 102 TFEU can happen via the routes of public and private enforcement. Although private enforcement currently plays a secondary role in the enforcement of EU competition policy, this role has increasingly grown over the years since the direct effect of these provisions was established by the CJEU. I made the choice, however, to focus only on the public enforcement aspect in this dissertation, not including the procedural aspects involved in the process. The reasons for this choice are the following. From a practical perspective, including private enforcement would have significantly extended the scope of this project making it less manageable as it would require diving into the national practice of multiple national jurisdictions, which may also involve language and accessibility barriers. From a substantive perspective, such an addition would have limited added value as national courts and competition authorities are expected to apply the same

legal tests and criteria covered by this dissertation when relying on EU law provisions. Accordingly, while covering the angle of private enforcement could admittedly have added to the completeness of the research as such, I do not believe such an addition would have led to significantly different findings and insights than the ones included in this dissertation.

v. Economic perspective of platforms

The research relies to a great degree on insights from economic literature on platforms and multisided markets. The literature used in this context does not cover the topic of platforms exhaustively. Such a review and analysis of economic literature would go beyond the scope and nature of this dissertation. Instead a choice was made to rely predominantly on the seminal and most recognized works in the field of economics that have become the reference works for Commission, NCA's and both EU and national legislators. To the extent that economic literature was used, the models covered in such works were not assessed or analyzed with regard to their robustness. Such materials were only used for the purpose of identifying the distinguishing characteristics of platforms and provide an understanding on how such characteristics may manifest in practice where the friction with competition policy would arise.

vi. Conclusions concerning the impact on the application of EU competition policy on the dynamics of digital markets

A noticeable part of the debate concerning the application of EU competition law to online platforms, particularly art. 102 TFEU, touches upon the implications of enforcement on the dynamics of digital markets. Specifically, this aspect of the debate is concerned with the impact of enforcement on the innovation potential of online platforms that may be reduced by (overly) aggressive enforcement policies and priority setting. Although this part of the debate is certainly worth exploring it was not included in the scope of this research beyond addressing application concerns that might lead to false positives. This is because including such matters would significantly change the nature of the research. Providing a meaningful answer on this matter would require an extensive inquiry into the economic theory of enforcement that would then be supported by extensive empirical evidence on the implications of competition law enforcement on innovation in practice. This in turn would transform this legal oriented dissertation into an economics oriented one.

Final note on choices and limitations

I am convinced that the research done for this dissertation would not have been manageable within the same framework of time granted to me by Leiden University if the above mentioned choices to narrow its focus were

not made. Including the aspects mentioned above would have significantly expanded the required research efforts for completing this project both in the field of law and outside of it. Attempting to do so in practice would have also risked losing track and control over the research given the myriad of angles that would have had to be considered and covered. This in turn may have undermined the ability of this thesis to communicate to readers the fundamental nature of the challenges posed by online platforms and the length of effort required to tackle such challenges in a comprehensible manner. Accordingly, I believe that the above-mentioned choices made to narrow the scope of research contributed to the quality of the research from an academic perspective, as well as to the relevance of this project for practice. Despite the seemingly specific scope of this dissertation, I believe that the research covers a fundamental part of the debate about the application of EU antitrust law to platforms. It provides key conclusions and insights capable of providing comprehensive and well substantiated guidance for practitioners and academics that are actively taking part in this debate with the aim of finding satisfactory solutions for the legal challenges posed by platforms.