

Internet of things and competition law: main challenges

Extended abstract

Provisional version to be presented at the 15th annual ASCOLA Conference

Roberto Augusto Castellanos Pfeiffer

Professor of the Faculty of Law of University of São Paulo, Brazil. PhD (University of São Paulo). LLM (University of São Paulo). Former Commissioner of the Brazilian Competition Authority (CADE). Roberto.pfeiffer@usp.br.

Abstract

The paper will analyze the connection between three themes of great importance to digital markets: competition law, internet of things and data-driven economy.

More specifically, the article will study issues affecting competition between companies operating in the internet of things markets, focusing especially on the following aspects: 1- interoperability between smart objects produced by different companies and 2- the importance of data portability to enhance competition between different brands of smart objects and. 3- whether competition authorities should take into account issues related to the use of personal data collected and processed by smart objects, in particular related to privacy.

The essay concludes that innovations brought by internet of things, especially the intensive use of data, require reflections on improvements, adaptations and modifications of traditional antitrust standards. On the other hand, the enforcement of competition law contributes to the enhancement of the positive effects brought by the internet of things and the data-driven economy to improve the digital market.

KEYWORDS: Competition law, internet of things, data-driven economy, digital markets, data portability, privacy.

Summary: 1. Introduction. 2. Internet of things and digital markets. 3. Importance of interoperability. 3.1. Lock in effects. 3.2. Intellectual property and competition law. 3.3. Would mandatory interoperability be enforced or regulated? 4. Internet of things and data-driven economy. 5. Importance of data portability for the internet of things. 6. Data privacy as a competitive concern. 6.1. Data processing should be analyzed on merger control ? 6.2. Privacy violation as an abuse of dominant position? 7. Bibliography.

1. INTRODUCTION

The paper will analyze questions related to the competitive impact of the internet of things, focusing especially on three themes: a- interoperability between smart devices and b- importance of data portability to stimulate competitiveness and c- feasibility and convenience of using competitive law for personal data protection.

The competitive interest of interoperability stems from the feasibility of objects manufactured by the same or different producers communicate with each other¹. Interoperability is a variable that the consumer usually takes into account in the decision of which trade mark to acquire.

In this context, there is a clear competitive differential in the development of interoperating systems between smart objects. Thus, if a manufacturer can develop a system that is interoperable with everyone else, it will have a competitive differential.

On the other hand, the manufacturer of product with a dominant position may have the incentive to develop mechanisms that prevent interoperability as a way to force consumers to purchase the other products of their brand. In this case occurs the lock in effect, which is usually limiting competition².

Therefore, the paper will examine the importance of interoperability for competitiveness in digital markets, analyzing if regulatory authorities should establish

¹ Rossi, Gus and Slaiman, Charlotte. Interoperability = Privacy + Competition. Public Knowledge. <https://www.huntonak.com/images/content/3/1/v3/3122/The-new-right-to-data-portability-Bapat.pdf>.

² Farrell, Joseph and Klemperer. Paul, Coordination and Lock-In: Competition with Switching Costs and Network Effects (May 2006). https://papers.ssrn.com/sol3/papers.cfm?abstract_id=917785.

measures to stimulate or even impose interoperability³, as well as the possible capitulation of the refusal to implement interoperability mechanisms by a dominant company, an extremely controversial issue⁴.

The other two topics covered in the article (data portability and protection of personal data) derive from the relationship between the internet of things and the data driven economy.

Indeed, the internet of things depends heavily on technological advances and the collection and processing of personal data for your development⁵. Smart objects rely heavily on the collection and processing of personal data for their best performance⁶.

In this context, the essay will analyze the competitive impact of data portability, that is, the possibility of the data subject enabling his transfer to a new smart object acquired by him, to stimulate competition and innovation in the Internet of Things markets⁷.

The analysis will prioritize jurisdictions where there are legal provisions establishing the right to portability.

The paper will review of the existing literature and analysis of legislation and decisions of competition authorities will be carried out, with emphasis on Europe, the United States and Brazil.

³ The interoperability is an issue that raises concerns, for example, to European authorities. See: European Commission, *A Digital Agenda for Europe*, Brussels, 19.5.2010, COM(2010)245 fin., p. 3.

⁴ Kerber, Wolfgang and Schweitzer, Heike. Interoperability in the digital economy, MAGKS Papers on Economics, Philipps-Universität Marburg, 2017. <https://econpapers.repec.org/paper/marmagkse/201712.htm>.

⁵ Chen, F., Deng, P., Wan, J., Zhang, D., Vasilakos, A.V., Rong, X.: Data mining for the internet of things: literature review and challenges. *Int. J. Distrib. Sens. Netw.* 11(8), 431047(2015). <https://journals.sagepub.com/doi/full/10.1155/2015/431047>.

⁶ Malek, Y. and Kharbouch, A. and ElKhoukhi, H. and Bakhouya, M. and DeFlorio, V. and El Ouadghiri, D. and Latre, S. and Blondia, C. "On the use of IoT and Big Data Technologies for Real-time Monitoring and Data Processing". *Procedia Computer Science*, V. 113 (2017): 429-434. https://www.researchgate.net/publication/319938193_On_the_use_of_IoT_and_Big_Data_Technologies_for_Real-time_Monitoring_and_Data_Processing.

⁷ Urquhart, L., Sailaja, N., McAuley, D. "Realising the right to data portability for the domestic Internet of things". *Pers Ubiquit Comput* 22 (2018): 317–332. <https://link.springer.com/article/10.1007/s00779-017-1069-2>.

This is the case, for example, of article 20 of General Data Protection Regulation of European Union⁸ as well as article 18 of Brazilian General Law of Data Protection⁹.

The article will examine whether competition law should also be enforced to strengthen the effectiveness of the right to data portability¹⁰, in the hypothesis, for example, of a company with a dominant position in its market refuses to comply with the right of portability.

Finally, the paper will analyze the peculiarities of the application of competition law in the merger review and analysis of alleged abuses of a dominant position involving big data companies that act on the internet of things markets.

The analysis of the topics elected will demonstrate that the transformations brought over the internet of things, especially the intense use of personal data, require the necessary adaptations in the design and use of traditional antitrust law tools, such as assessment of market power, merger notification thresholds, measurement of big data merger effects on consumer privacy and investigation of abuse of dominant position.

With such adaptations, enforcement of competition law can be useful to enhance the positive effects brought by the internet of things on the development and improvement of the digital market.

The provisional bibliography presented in the last item of the extended abstract will be expanded until the completion of the paper.

2. Internet of things and digital markets.

⁸ Banda, Carolina, “Enforcing Data Portability in the Context of EU Competition Law and the GDPR”. *MIPLC Master Thesis Series* (2016/17). https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3203289 and De Hert, Paul and Papakonstantinou, Vagelis and Malgheri, Gianclaudio and Beslay, Laurent and Sanchez, Ignacio. “The right to data portability in the GDPR: Towards user-centric interoperability of digital”. *Computer Law & Security Review*, v. 34, issue 2, April 2018: 193-203. <https://www.sciencedirect.com/science/article/pii/S0267364917303333#!>.

⁹ Brazilian law establishes the right of the holder of the personal data to request at any time the portability of the data to another service provider or product in accordance with the rules of the national authority, observing trade and industrial secrets.

¹⁰ Vanberg, Aysem Diker and Ünver, Mehmet Bilal. “The right to data portability in the GDPR and EU competition law: odd couple or dynamic duo? *European Journal of Law and Technology*, v. 8, n. 1, 2017. <http://ejlt.org/article/view/546>.

I indicate, in a summarized way, some of the findings already made in this item, which will be deepened in the completion of the paper.

The term internet of the things is used to designate the interconnection of several objects that act in an integrated way¹¹. The expression had its pioneering definition effected by Kevin Ashton, who used it to call for a presentation that took place to present supply chain optimization solutions¹².

The creation of the infrastructure to disseminate internet access, the improvement of products and computing systems, the development of artificial intelligence, the possibility of collecting and processing huge amounts of data, allowed the development of smart objects and thus the consolidation of the internet of things. It is estimated that currently in the world there are more than 20 billion internet-connected things, not including smartphones or computers.¹³

The article will explore the economic impact of the internet of things and its essential characteristics in order to demonstrate the fundamental importance of interconnection, as well as the necessary harmonization of various laws regulating the theme¹⁴, such as for the purposes of this paper, competition, personal data and intellectual property laws.

3. Importance of interoperability.

The main objective of the item is to highlight the importance of interoperability for the digital market, for consumers and for the competitive dynamics of the internet of things markets¹⁵.

The competitive interest of interoperability stems from the feasibility of objects manufactured by different producers communicate with each other.

¹¹ In Brazil, Federal Decree 9,854 defines internet of things as “the infrastructure that integrates the provision of value services added with physical or virtual connection capabilities of things with devices based on existing information and communication technologies and their evolutions, with interoperability”.

¹² Ashton, Kevin. The internet of things` thing. RFID Journal, June 22, 2009 <http://www.itrco.jp/libraries/RFIDjournal-that%20Internet%20of%20Things%20Thing.pdf>.

¹³ Hung, Mark. Leading the IoT: Gartner Insights on How to Lead in a Connected World. Gartner, 2017, p.2. <https://newbits.eu/leading-the-iot-gartner-insights-on-how-to-lead-in-a-connected-world/>.

¹⁴ Weber, Rolf H. and Weber, Romana. *Internet of Things: Legal Perspectives*. Springer: Verlag: Berlin, Heidelberg, 2010.

¹⁵ Kerber, Wolfgang and Schweitzer, Heike. Interoperability in the digital economy, op. cit.

Interoperability is a variable that the consumer usually takes into account in the decision of which trademark to acquire¹⁶.

Therefore, in the item will be examined to what extent the consumer takes into account interoperability. For example, if there is no interconnection between various branded devices and the consumer wishes such interoperability, he will probably be prisoner of the brand of the smart device he acquired for the first time.

Thus, there is a clear competitive advantage in the development of interoperating systems between smart objects. In this context, if a manufacturer can develop a system that is interoperable with everyone else, it will have a competitive differential.

But, on the other hand, the manufacturer of a smart product with a dominant position could have the incentive to develop mechanisms that prevent interoperability as a way to force consumers to purchase the other products of their brand.

In this context the paper will explore findings concerning the lock in effect, which is usually limiting competition¹⁷, although there are authors that relativize the deleterious aspects¹⁸.

Therefore, the paper will examine the importance of interoperability for competitiveness in digital markets¹⁹, analyzing if regulatory authorities should establish measures to stimulate or even impose interoperability²⁰.

As many of the smart objects systems may be protected through the prerogatives of intellectual property legislation, the consequences of this fact for interoperability will also be studied. The approach to the issue will have to face the

¹⁶ Rossi, Gus and Slaiman, Charlotte. "Interoperability = Privacy + Competition", op. cit.

¹⁷ Farrell, Joseph and Klemperer, Paul, Coordination and Lock-In: Competition with Switching Costs and Network Effects, op. cit.

¹⁸ Dube, Jean-Pierre H. and Hitsch, Guenter J. and Rossi, Peter E., "Do Switching Costs Make Markets Less Competitive?" (September 1, 2008). *Kilts Center for Marketing at Chicago Booth – Nielsen Dataset Paper Series* 20-002. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=907227&rec=1&srcabs=875125&pos=1.

¹⁹ Surblyte, Gintare, Data-Driven Economy and Artificial Intelligence: Emerging Competition Law Issues (August 5, 2016). In: *Wirtschaft und Wettbewerb (WuW)*, Vol. 67, Issue 3, 2017, pp. 120-127. https://pure.mpg.de/pubman/faces/ViewItemOverviewPage.jsp?itemId=item_2343758.

²⁰ The interoperability is an issue that raises concerns, for example, to the European Commission. See: European Union Commission, A Digital Agenda for Europe, Brussels, 19.5.2010, COM(2010)245 fin., p. 3.

controversial and dynamic relationship between intellectual property and competition defense.²¹

There is also the issue of manufacturers with dominant position developing systems that are purposely incompatible with others in order to force consumers who wish interoperability to acquire all equipment from the same manufacturer . Would such conduct be harmful? Would it generate anti-competitive effects? To answer such questions the paper will analyze a possible capitulation of the conduct as an abuse of dominant position, an extremely controversial issue²².

4. Internet of things and data-driven economy.

The internet of things depends heavily on technological advances and the collection and processing of personal data for your development. Smart objects rely heavily on the collection and processing of the personal data of their acquirers and users to perform their functionalities.

Data collection and processing allows companies to improve their products and services, which makes it possible to consider the data as a productive input.²³

Of course, data-driven economy improves consumer welfare²⁴. However, there are many concerns that may arise, concerning for example, to decreased privacy and any distortions in competitive dynamics, which thus deserve to be analyzed²⁵.

The paper will focus on two issues derived from the intense use of data in the internet of things markets: data portability and privacy concerns.

²¹ Wrobel, Gregory G . “Connecting Antitrust Standards to the Internet of Things”. *Antitrust* 29 (1), 2014.

²² Kerber, Wolfgang and Schweitzer, Heike. Interoperability in the digital economy, MAGKS Papers on Economics, Philipps-Universität Marburg, 2017. <https://econpapers.repec.org/paper/marmagkse/201712.htm>.

²³ Federico Morando, Iemma Raimondo and Emilio Raiteri. “Privacy evaluation: What empirical research on users’ valuation of personal data tells us”, *Internet Policy Review* 3, no. 2 (2014), <https://policyreview.info/articles/analysis/privacy-evaluation-what-empirical-research-users-valuation-personal-data-tells-uu>.

²⁴ OECD. *Data-Driven Innovation for Growth and Well-Being Interim Synthesis Report* (2017), <http://www.oecd.org/sti/inno/data-driven-innovation-interim-synthesis.pdf>.

²⁵ Drexl. J. (2018), Data Access and Control in the Era of Connected Devices. Study on Behalf of the European Consumer Organization BEUC, Brussels, 2018. https://www.beuc.eu/publications/beuc-x-2018-121_data_access_and_control_in_the_area_of_connected_devices.pdf

5. Importance of data portability for the internet of things.

The first theme inserted in the relationship between competition defense and data driven economy to be addressed by paper is data portability.

The main objective of the chapter will be to investigate whether such a right is exclusively a prerogative of the holder of the personal data or whether there is also a competitive impact.

Such a question is very relevant in jurisdictions that have personal data protection legislation establishing the right to portability.

This is the case, for example, of the member countries of the European Union, since art. 20 of General Data Protection Regulation establishes the right to data portability²⁶.

Likewise, it is the example of Brazil, since art. 18 of Brazilian General Data Protection Law establishes the right of the data subject to obtain its portability²⁷.

I present some preliminary findings, the rationale of which will be deepened in the preparation of the paper.

It seems clear that the original design of the portability was to entitle the data subject with a personal right. Notwithstanding, there is also a competitive dimension drawn from the right to portability, mainly from the fact that it lowers consumer exchange costs, which may have access to data collected by the former controller (the company that manufactured the smart product) in order to make them available to the new controller (the company that manufactures the purchased product). Thus, portability helps mitigate the lock in effect ²⁸.

²⁶ Article 20,1 of GDPR determines that: “The data subject shall have the right to receive the personal data concerning him or her, which he or she has provided to a controller, in a structured, commonly used and machine-readable format and have the right to transmit those data to another controller without hindrance from the controller to which the personal data have been provided”.

²⁷ See: Cravo, Daniela Copetti. *Direito à portabilidade de dados: necessidade de regulação ex ante e ex post*. Tese (Doutorado) - Universidade Federal do Rio Grande do Sul. Porto Alegre, 2018. <https://lume.ufrgs.br/handle/10183/180184> and Frazão, Ana. Nova LGPD: direito à portabilidade. JOTA Info. 07/11/2018. <https://www.jota.info/opiniao-e-analise/colunas/constituicao-empresa-e-mercado/nova-lgpd-direito-a-portabilidade-07112018>.

²⁸ Janal, Ruth. “Data Portability - A Tale of Two Concepts”. *Journal of Intellectual Property, Information Technology and Electronic Commerce Law*, 8 (2017): 59–69.

This conclusion makes even more complex questions that are commonly made in relation to the right of portability, especially those related to exactly what data can be made available (only those collected or also the processed, for example), which will be analyzed in depth in the paper.

There will also be an analysis of whether it would be possible on the basis of competition protection legislation to require data portability²⁹, as well as if it would be possible to capitulate as abuse of dominant position the refusal to comply with the right of portability by company with market power³⁰.

6. Data privacy as a competitive concern.

The last session of the article will be dedicated to the study of the impact of the data-driven economy on techniques, instruments and the enforcement of competition law³¹. The paper will highlight two controversial themes.

The first one is whether the analysis of the effects on consumer privacy should integrate the review of mergers involving big data companies.

In other words, the paper will investigate if in merger reviews involving big data companies it would be important to analyse not only the possible effects on the price alone, but also the consequences to privacy policies³².

There is a wide divergence over the scope of the analysis of antitrust authorities in merger review involving big data companies. Should the investigation of competition authorities reach concerns related to consumer privacy³³? Alternatively,

²⁹ Swire, Peter and Lagos, Yianni. "Why the Right to Data Portability Likely Reduces Consumer Welfare: Antitrust and Privacy Critique". *Maryland Law Review*, n. 2, p. 335–380, 2012.

³⁰ Vanberg, Aysem Diker and Ünver, Mehmet Bilal. "The right to data portability in the GDPR and EU competition law: odd couple or dynamic duo? *European Journal of Law and Technology*, v. 8, n. 1, 2017. <http://ejlt.org/article/view/546>.

³¹ For an extensive study of the theme see: Pfeiffer, Roberto Augusto Castellanos. "Digital Economy, Big Data and Competition Law". *Market and Competition Law Review* 3(1), 2019: 53-89. <https://doi.org/10.7559/mclawreview.2019.315>.

³² Rubinfeld, Daniel L. and Michal S. Gal. "The hidden costs of free goods: Implications for antitrust enforcement". *Antitrust Law Journal* 80 (2016): 521-562.

³³ Grunes, Allen P. and Maurice E. Stucke. "No Mistake About It: The Important Role of Antitrust in the Era of Big Data". *University of Tennessee Legal Studies Research Paper* no. 269 (2015). https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2600051

should merger control analyse only possible effects of the merger on the price³⁴ of services or products of big data companies?

In this context, the article studies decisions of competition agencies which reviewed mergers in big data-driven markets, such as Facebook/WhatsApp³⁵ and Microsoft/LinkedIn³⁶.

The second theme is the controversial possibility of consider as abuse of a dominant position the imposition of terms and conditions of use that are harmful to the holders of personal data by a company with market power.

The article will analyze investigations of alleged abuse of dominant position associated with big data, in particular the proceeding opened by the Bundeskartellamt against Facebook³⁷, in which the German antitrust authority prohibited the data processing policy imposed by Facebook on its users. The paper will study the academic articles that analyzed both the final decision³⁸ and the preliminary findings³⁹ of Bundeskartellamt investigation, as well as the decision of the Higher Regional Court of Düsseldorf, which granted temporary injunction and ordered the suspensive effect of the Facebook complaint⁴⁰.

³⁴ Sokol, D. Daniel and Roisin E. Comerford, “Antitrust and Regulating Big Data”. *George Mason Law Review* 23, no. 5 (2016): 1129-1162.

³⁵ European Commission. Case M.7217. *Facebook/ WhatsApp*. October 3, 2014 http://ec.europa.eu/competition/mergers/cases/decisions/m7217_20141003_20310_3962132_EN.pdf.

³⁶ European Commission. Case M.8124. *Microsoft/LinkedIn*. December 6, 2016. http://ec.europa.eu/competition/mergers/cases/decisions/m8124_1349_5.pdf.

³⁷ Bundeskartellamt. *Case Summary*. B6-22/16. Facebook, Exploitative business terms pursuant to Section 19(1) GWB for inadequate data processing. 15 February 2019. <https://www.bundeskartellamt.de/SharedDocs/Entscheidung/EN/Fallberichte/Missbrauchsaufsicht/2019/B6-22-16.html?nn=3600108>.

³⁸ See, among others: Pfeiffer, Roberto Augusto Castellanos. “Digital Economy, Big Data and Competition Law”, op. cit.; Haucap, Justus. Data Protection and Antitrust: New Types of Abuse Cases? An Economist’s View in Light of the German Facebook Decision. In: CPI Antitrust Chronicle February 2019: 1-8. <https://www.competitionpolicyinternational.com/data-protection-and-antitrust-new-types-of-abuse-cases-an-economists-view-in-light-of-the-german-facebook-decision/>; and Nazzini, Renato. Privacy and Antitrust: Searching for the (Hopefully Not Yet Lost) Soul of Competition Law in the EU after the German Facebook Decision. In: CPI EU News: FCO Facebook Quadriptych. March, 2019: 1-8. https://www.competitionpolicyinternational.com/cpi-eu-news-fco-facebook-quadriptych/#_edn1.

³⁹ For example: Colangelo, Giuseppe and Mariateresa Maggiolino. “Data accumulation and the privacy-antitrust interface: Insights from the Facebook case for the EU and the U.S.”. *TTLF Working Paper* no. 31 (2018): 1-48, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3125490, and Schneider, Giulia. “Testing art. 102 TFEU in the digital marketplace: Insights from the Bundeskartellamt’s investigation against Facebook”. *Journal of European Competition Law & Practice* 9, no. 4 (2018): 213-225. <https://doi.org/10.1093/jeclap/lpy016>.

⁴⁰ Higher Regional Court of Düsseldorf . VI-Kart 1/19 (V). https://www.olg-duesseldorf.nrw.de/behoerde/presse/Presse_aktuell/20190826_PM_Facebook/20190826-Beschluss-VI-Kart-1-19-_V_.pdf.

7. CONCLUSION

I present preliminary conclusions, which will be refined throughout the development and completion of the paper.

There is a mutual benefit in the joint study of competition law, the internet of things and the protection of personal data. Indeed, innovations brought by the Internet of Things and data-driven economy require modifications and adaptations of traditional competition law standards, like, for example, measurement of merger effects on consumer privacy.

In this context, enforcement of competition law contributes to the enhancement of the positive effects brought by the internet of things and the data-driven economy to improve the digital market.

8. PROVISIONAL BIBLIOGRAPHY

Armstrong, Mark. “Competition in two-sided markets”. *RAND Journal of Economics* 37, no. 3 (2006): 668–691.

Article 29 Data Protection Working Party. *Guidelines on the right to data portability*. 13.12.2016. Rev. 05.05.2017. https://ec.europa.eu/newsroom/article29/item-detail.cfm?item_id=611233.

Ashton, Kevin. The internet of things` thing. *RFID Journal*, June 22, 2009 <http://www.itrco.jp/libraries/RFIDjournal-that%20Internet%20of%20Things%20Thing.pdf>

Autorità Garante della Concorrenza e del Mercato. *PS10601 CV154 - Sanzione da 3 milioni di euro per WhatsApp, ha indotto gli utenti a condividere i loro dati con Facebook*. May 12, 2017. <http://www.agcm.it/media/comunicati-stampa/2017/5/alias-8754>.

Autorité de la concurrence and Bundeskartellamt. *Competition Law and Data* (2016). https://www.bundeskartellamt.de/SharedDocs/Publikation/DE/Berichte/Big%20Data%20Papier.pdf?__blob=publicationFile&v=2.

Banda, Carolina, “Enforcing Data Portability in the Context of EU Competition Law and the GDPR”. *MIPLC Master Thesis Series* (2016/17). https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3203289.

Bourreau, Marc, Alexandre de Streel and Inge Graef. “Big Data and Competition Policy: Market Power, Personalised Pricing and Advertising”. *Centre on regulation in Europe* (February 16, 2017): 7-61. <https://ssrn.com/abstract=2920301>.

Bundeskartellamt. *Background information on the Facebook proceeding*, December 19, 2017, 1-6.
https://www.bundeskartellamt.de/SharedDocs/Publikation/EN/Diskussions_Hintergrundpapiere/2017/Hintergrundpapier_Facebook.html.

Bundeskartellamt. *Case Summary*. B6-22/16. Facebook, Exploitative business terms pursuant to Section 19(1) GWB for inadequate data processing. 15 February 2019.
<https://www.bundeskartellamt.de/SharedDocs/Entscheidung/EN/Fallberichte/Missbrauchsaufsicht/2019/B6-22-16.html?nn=3600108>.

Bundeskartellamt. *Preliminary assessment in Facebook proceeding: Facebook's collection and use of data from third-party sources is abusive*. December 19, 2017.
https://www.bundeskartellamt.de/SharedDocs/Meldung/EN/Pressemitteilungen/2017/19_12_2017_Facebook.html.

Burkhardt, Beiten. "The New German Competition Law in a Nutshell". *Lexology*. June 26, 2017. <https://www.lexology.com/library/detail.aspx?g=535d2bda-4598-413d-86c6-05b592b1c7b5>.

Chen, F., Deng, P., Wan, J., Zhang, D., Vasilakos, A.V., Rong, X.: Data mining for the internet of things: literature review and challenges. *Int. J. Distrib. Sens. Netw.* 11(8), 431047(2015). <https://journals.sagepub.com/doi/full/10.1155/2015/431047>.

Colangelo, Giuseppe and Mariateresa Maggiolino. "Data Accumulation and the Privacy-Antitrust Interface: Insights from the Facebook Case for the EU and the U.S.". *TTLF Working Paper* no. 31 (2018): 1-48,
https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3125490.

Crabtree, Andy and Mortier, Richard. (2017). Personal Data, Privacy and the Internet of Things: The Shifting Locus of Agency and Control. https://www.researchgate.net/publication/311311186_Personal_Data_Privacy_and_the_Internet_of_Things_The_Shifting_Locus_of_Agency_and_Control.

Cravo, Daniela Copetti. *Direito à portabilidade de dados: necessidade de regulação ex ante e ex post*. Tese (Doutorado) - Universidade Federal do Rio Grande do Sul. Porto Alegre, 2018. <https://lume.ufrgs.br/handle/10183/180184>.

De Hert, Paul and Papakonstantinou, Vagelis and Malgheri, Gianclaudio and Beslay, Laurent and Sanchez, Ignacio." The right to data portability in the GDPR: Towards user-centric interoperability of digital". *Computer Law & Security Review*, v. 34, issue 2, April 2018: 193-203.
<https://www.sciencedirect.com/science/article/pii/S0267364917303333#!>.

Department for Digital, Culture, Media & Sport and Ctrl Shift, *Data mobility: the personal data portability growth opportunity for the UK economy*. 2018.
https://www.ctrl-shift.co.uk/reports/DCMS_Ctrl-Shift_Data_mobility_report_full.pdf.

Digital Competition Expert Panel. *Unlocking Digital Competition*. Report of the Digital Competition Expert Panel. London, 2019.
<https://www.gov.uk/government/publications/unlockingdigital->

Drexl, J. (2018), *Data Access and Control in the Era of Connected Devices*. Study on Behalf of the European Consumer Organisation BEUC, Brussels, 2018.
https://www.beuc.eu/publications/beuc-x-2018-121_data_access_and_control_in_the_area_of_connected_devices.pdf.

Dube, Jean-Pierre H. and Hitsch, Guenter J. and Rossi, Peter E., Do Switching Costs Make Markets Less Competitive? (September 1, 2008). Kilts Center for Marketing at Chicago Booth – Nielsen Dataset Paper Series 20-002. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=907227.

Egan, Erin. *Charting a way forward: data portability and privacy*. Facebook. Set. 2019, p. 8. Disponível em: <https://fbnewsroomus.files.wordpress.com/2019/09/data-portability-privacywhite-paper.pdf>.

Eilmansberger, Thomas. “How to distinguish well from bad competition under article 82 EC: in search of clearer and more coherent standards for anti-competitive abuses”. *Common Market Law Review* 42 (2005): 129–177.

Engels, Barbara. Data portability among online platforms. *Internet Policy Review*, v. 5, n. 2, 2016. <https://policyreview.info/articles/analysis/data-portability-among-online-platforms>.

European Commission. *Towards a thriving data-driven economy*, COM (2014) 442, July 2, 2014, 4. <https://ec.europa.eu/transparency/regdoc/rep/1/2014/EN/1-2014-442-EN-F1-1.Pdf>.

European Commission. Case M.7217. Facebook/ WhatsApp. October 3, 2014 http://ec.europa.eu/competition/mergers/cases/decisions/m7217_20141003_20310_396_2132_EN.pdf.

European Commission. Case M.7217. Facebook/ WhatsApp. October 3, 2014 http://ec.europa.eu/competition/mergers/cases/decisions/m7217_20141003_20310_396_2132_EN.pdf.

European Commission. Case M.8124. Microsoft/LinkedIn. December 6, 2016. http://ec.europa.eu/competition/mergers/cases/decisions/m8124_1349_5.pdf.

European Commission. *Internet of Things the next revolution: A strategic reflection about a European approach to the Internet of Things*. Brussels: CONNECT Advisory Forum, 2014.

European Commission. *The EU Data Protection Reform and Big Data*. March 2016. https://ec.europa.eu/epsc/publications/strategic-notes/enter-data-economy_en.

European Data Protection Supervisor. *Privacy and competitiveness in the age of big data*. 2014. https://edps.europa.eu/data-protection/our-work/publications/opinions/privacy-and-competitiveness-age-big-data_en.

European Commission, *A Digital Agenda for Europe*, Brussels, 19.5.2010, COM(2010)245 fin., p. 3.

Evans, David S. "Attention to Rivalry among Online Platforms and Its Implications for Antitrust Analysis". *Coase-Sandor Institute for Law & Economics Working Paper* no. 627, (2013): 1- 42. https://chicagounbound.uchicago.edu/law_and_economics/68/.

Facebook. *Charting a Way Forward on Data Portability and Privacy*, 2019. <https://about.fb.com/wp-content/uploads/2019/09/data-portability-privacy-white-paper.pdf>

Farrell, Joseph and Klemperer. Paul, *Coordination and Lock-In: Competition with Switching Costs and Network Effects* (May 2006). https://papers.ssrn.com/sol3/papers.cfm?abstract_id=917785.

Federal Trade Commission. Privacy & Security in a Connected World. FTC Staff Report, January, 2015. <https://www.ftc.gov/system/files/documents/reports/federal-trade-commission-staff-report-november-2013-workshop-entitled-internet-things-privacy/150127iotrpt.pdf>.

Finck, Michèle. “Blockchain and the general data protection regulation: Can distributed ledgers be squared with European data protection law?” *European Parliamentary Research Service*, July 2019. [https://www.europarl.europa.eu/RegData/etudes/STUD/2019/634445/EPRS_STU\(2019\)634445_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/STUD/2019/634445/EPRS_STU(2019)634445_EN.pdf)

Frazão, Ana. Nova LGPD: direito à portabilidade. JOTA Info. 07/11/2018. <https://www.jota.info/opiniao-e-analise/colunas/constituicao-empresa-e-mercado/nova-lgpd-direito-a-portabilidade-07112018>.

Geradin, Damien and Kuschewsky, Monika, Competition Law and Personal Data: Preliminary Thoughts on a Complex Issue (February 12, 2013). https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2216088.

Giannino, Michele, *Microsoft/LinkedIn: What the European Commission Said on the Competition Review of Digital Market Mergers* (2017): 1-17, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3005299.

Graef, Inge and Husovec, Martin and Purtova, Nadezhda. “Data portability and data control: Lessons for an emerging concept in EU law”. *German Law Journal*, v. 19, n. 6 (2018): 1359–1398.

Graef, Inge and Verschakelen, Jeroen and Valcke, Peggy. “Putting the right to data portability into a competition law perspective”. *Law: The Journal of the Higher School*, 2013. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2416537.

Grunes, Allen P. and Maurice E. Stucke. “No Mistake About It: The Important Role of Antitrust in the Era of Big Data”. *University of Tennessee Legal Studies Research Paper* no. 269 (2015). https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2600051

Harbour, Pamela Jones and Tara Isa Koslov. “Section 2 in a Web 2.0 World: An Expanded Vision of Relevant Product Markets”, *Antitrust Law Journal* 76 (2010): 769-797.

Haucap, Justus. Data Protection and Antitrust: New Types of Abuse Cases? An Economist’s View in Light of the German Facebook Decision. In: *CPI Antitrust Chronicle* February 2019: 1-8. <https://www.competitionpolicyinternational.com/data-protection-and-antitrust-new-types-of-abuse-cases-an-economists-view-in-light-of-the-german-facebook-decision/>.

Higher Regional Court of Düsseldorf . VI-Kart 1/19 (V). https://www.olg-duesseldorf.nrw.de/behoerde/presse/Presse_aktuell/20190826_PM_Facebook/20190826-Beschluss-VI-Kart-1-19-V.pdf.

Hilbert, Martin and Priscila López. “The World’s Technological Capacity to Store, Communicate, and Compute Information”, *Science* 332, no. 6025 (2011): 60-65, <http://science.sciencemag.org/content/332/6025/60.full>.

Hung, Mark. Leading the IoT: Gartner Insights on How to Lead in a Connected World. Gartner, 2017, p.2. <https://newbits.eu/leading-the-iot-gartner-insights-on-how-to-lead-in-a-connected-world/>.

Janal, Ruth. “Data Portability - A Tale of Two Concepts”. *Journal of Intellectual Property, Information Technology and Electronic Commerce Law*, 8 (2017): 59–69.

Kerber, Wolfgang and Schweitzer, Heike. Interoperability in the digital economy, MAGKS Papers on Economics, Philipps-Universität Marburg, 2017. <https://econpapers.repec.org/paper/marmagkse/201712.htm>.

Lundqvist, Bjorn, Big Data, Open Data, Privacy Regulations, Intellectual Property and Competition Law in an Internet of Things World (December 29, 2016). Faculty of Law, University of Stockholm Research Paper No. 1. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2891484

Madhani, Bijan. Uma aposta na portabilidade de dados: por que você deveria ser capaz de levar seus dados aonde quer que vá. *JOTA Info*. 15.10.2019. Disponível em: <https://www.jota.info/opiniaoe-analise/artigos/uma-aposta-na-portabilidade-de-dados-15102019>.

Malek, Y. and Kharbouch, A. and ElKhoukhi, H. and Bakhouya, M. and DeFlorio, V. and El Ouadghiri, D. and Latre, S. and Blondia, C. “On the use of IoT and Big Data Technologies for Real-time Monitoring and Data Processing”. *Procedia Computer Science*, V. 113 (2017): 429-434. https://www.researchgate.net/publication/319938193_On_the_use_of_IoT_and_Big_Data_Technologies_for_Real-time_Monitoring_and_Data_Processing.

Marco Ricolfi. IoT and the Ages of Antitrust. The Nexa Center for Internet & Society Working paper nr 4/2017. <https://nexacenter.org/nexacenterfiles/4.%20ricolfi.pdf>

McAfee, Andrew and Erik Brynjolfsson, “Big Data: The Management Revolution”. *Harvard Business Review* 90, no.10 (2012): pp. 60-68.

Miller, H. Gilbert and Peter Mork. "From Data to Decisions: A Value Chain for Big Data". *IT Professional* 15, no. 1 (2013): 57-59, https://www.researchgate.net/publication/260305818_From_Data_to_Decisions_A_Value_Chain_for_Big_Data.

Modrall, Jay. “Big Data and Merger Control in the EU”. *Journal of European Competition Law & Practice* 9, no. 9 (2018): 569–578.

Moncuit, Aymeric de. “Connecting competition law standards to the Internet of things”, November 2018, *Concurrences Review* n° 4-2018, Art. N° 88131, pp. 85-94.

Nazzini, Renato. Privacy and Antitrust: Searching for the (Hopefully Not Yet Lost) Soul of Competition Law in the EU after the German Facebook Decision. In: *CPI EU News: FCO Facebook Quadriptych*. March, 2019: 1-8. https://www.competitionpolicyinternational.com/cpi-eu-news-fco-facebook-quadriptych/#_edn1

Newman, John M. “Antitrust in Zero-Price Markets: Foundations”. *University of Pennsylvania Law Review* 164, no. 1 (2015): 149-206.

Nilanjan Dey and Aboul Ella Hassanien and Chintan Bhatt and Amira S. Ashour and Suresh Chandra Satapathy. *Internet of Things and Big Data Analytics Toward Next-Generation Intelligence*. Springer, Cham, 2018.

Office of Fair Trade, *Assessment of market power*. December 1st, 2004. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/284400/oft415.pdf.

Opsahl, Gennie Gebhart, Bennett Cyphers, and Kurt. What We Mean When We Say Data Portability. Electronic Frontier Foundation. <https://www.eff.org/deeplinks/2018/09/what-we-mean-when-we-say-data-portability>.

Organization for Economic Cooperation and Development. *Data-driven Innovation for Growth and Well-being Interim Synthesis Report*, 2017. <http://www.oecd.org/sti/inno/data-driven-innovation-interim-synthesis.pdf>.

Personal Data Protection Commission of Singapore. *Discussion Paper on Data Portability 20* (25.02 2019). Disponível em: <https://www.pdpc.gov.sg/-/media/Files/PDPC/PDF-Files/Resourcefor-Organisation/Data-Portability/PDPC-CCCS-Data-Portability-Discussion-Paper---250219.pdf>.

Petit, Nicolas, “From Formalism to Effects? – The Commission’s Communication on Enforcement Priorities in Applying Article 82 EC”, *World Competition: Law and Economics Review*, Forthcoming (2009): 1-19.

Pfeiffer, Roberto Augusto Castellanos. “Digital Economy, Big Data and Competition Law”. *Market and Competition Law Review* 3(1), 2019: 53-89. <https://doi.org/10.7559/mclawreview.2019.315>.

Rossi, Gus and Slaiman, Charlotte. Interoperability = Privacy + Competition. Public Knowledge. <https://www.huntonak.com/images/content/3/1/v3/3122/The-new-right-to-data-portability-Bapat.pdf>.

Rubinfeld, Daniel L. and Michal S. Gal. “The hidden costs of free goods: Implications for antitrust enforcement”. *Antitrust Law Journal* 80 (2016): 521-562.

Schneider, Giulia. “Testing art. 102 TFEU in the digital marketplace: Insights from the Bundeskartellamt’s investigation against Facebook”. *Journal of European Competition Law & Practice* 9, no. 4 (2018): 213-225. <https://doi.org/10.1093/jeclap/lpy016>.

Schweitzer, Heike, Justus Haucap, Wolfgang Kerber, and Robert Welker. *Modernising the Law on Abuse of Market Power: Report for the Federal Ministry for Economic Affairs and Energy*. September 17, 2018. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3250742.

Sokol, D. Daniel and Roisin E. Comerford, “Antitrust and Regulating Big Data”. *George Mason Law Review* 23, no. 5 (2016): 1129-1162.

Stucke, Maurice E. and Allen P. Grunes. *Big data and competition policy*. Oxford: Oxford University Press, 2016.

Stucke, Maurice E. and Ariel Ezrachi, “Looking Up in the Data-Driven Economy”. *University of Tennessee Legal Studies Research Paper* no. 333 (2017): 1-6.

Swire, Peter and Lagos, Yianni. “Why the Right to Data Portability Likely Reduces Consumer Welfare: Antitrust and Privacy Critique”. *Maryland Law Review*, n. 2, p. 335–380, 2012.

Urquhart, L., Sailaja, N., McAuley, D. “Realising the right to data portability for the domestic Internet of things”. *Pers Ubiquit Comput* 22 (2018): 317–332. <https://link.springer.com/article/10.1007/s00779-017-1069-2>.

Urquhart, L., Sailaja, N., McAuley, D. Realising the right to data portability for the domestic Internet of things. *Pers Ubiquit Comput* 22, 317–332 (2018). <https://link.springer.com/article/10.1007/s00779-017-1069-2>.

Vanberg, Aysem Diker and Ünver, Mehmet Bilal. “The right to data portability in the GDPR and EU competition law: odd couple or dynamic duo? *European Journal of Law and Technology*, v. 8, n. 1, 2017. <http://ejlt.org/article/view/546>.

Vezzoso, Simonetta, “Competition Policy in a World of Big Data”. In *Research Handbook on Digital Transformations*, edited by F. Xavier Olleros and Majlinda Zhegu, 400-420. Cheltenham: Edward Elgar, 2016.

Weber, Rolf H. “Internet of Things: New security and privacy challenges”. *Computer law & security review* 26 (2010): 23-30.

Weber, Rolf H. and Weber, Romana. *Internet of Things: Legal Perspectives*. Springer: Verlag: Berlin, Heidelberg, 2010.

Wrobel, Gregory G. “Connecting Antitrust Standards to the Internet of Things”. *Antitrust* 29 (1), 2014.

Wu, Tim. It’s time to break up Facebook. *The verge*. April 9th, 2018. <https://www.theverge.com/2018/9/4/17816572/tim-wu-facebook-regulation-interview-curse-of-bigness-antitrust>.

Yoo, Christopher. When Antitrust Met Facebook. Faculty Scholarship at Penn Law, 2012. https://scholarship.law.upenn.edu/faculty_scholarship/422/

Zanfir-Fortuna, Gabriela, “The Right to Data Portability in the Context of the EU Data Protection Reform”. *International Data Privacy Law*, 2 (3), 2012. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2215684.