# ONLINE SEARCH COMPETITION AND THE RISK OF UNINTENDED CONSEQUENCES OF DATA ACCESS

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Brennan Hawkings, an 11-year-old boy from Utah, was found after being lost for more than four days in rugged terrain at a Boy Scout camp.[2] Brennan's parents later discovered why it had taken so long to find him: he had avoided passers-by, including the search teams looking for him. The boy was afraid that someone would steal him, as he'd been told "not to talk to strangers."

Brennan's case is a textbook example of the so-called Law of Unintended Consequences. Not talking to strangers is a universal lesson taught by well-intentioned parents to protect their children. In the context of Brennan's disappearance, however, it had the unintended effect of leaving him unprotected.

This article discusses how data access regulation of online search aggregators may similarly result in unintended negative effects, risking a not so happy ending for consumers as in Brennan's story.

## I. UNDERSTANDING ONLINE SEARCH COMPETITION

The first challenge we face is in understanding the business models of individual platforms and aggregators and their implications for consumer welfare.[3] This is a critical question that is likely to determine whether one supports regulatory intervention at all and, if so, its form. Unfortunately, despite significant research, we are far from a consensus view on the features and impacts on competition and consumers of online search business models.

One view suggests that these markets are characterized by high barriers to entry, due to supply-side economies of scale, switching costs and demand-side network effects.[4] Accordingly, dominant firms' competitive advantage stems from the inherent features of the market in the form of entry barriers, making it all but impossible for other businesses to compete on the merits.

2 https://edition.cnn.com/2005/US/06/22/missing.scout/.

3 Caffarra C., Eto F., Scott Morton F. & Latham O. (2020), *Designing regulation for digital platforms: Why economists need to work on business models*, Voxeu, 4 June, https://voxeu.org/article/designing-regulation-digital-platforms.

4 See, for example, Zingales L., Rolnik G. & Lancieri F. M. (2019), *Stigler Committee on Digital Platforms*, Final Report, Stigler Center for the Study of the Economy and the State, https://research.chicagobooth.edu/stigler/media/news/committee-on-digital-platforms-final-report; Furman J. (2019), *Unlocking digital competition*, Report of the Digital Competition Expert Panel, 13 March, Furman Report, https://www.gov.uk/government/publications/unlocking-digital-competition-report-of-the-digital-competition-expert-panel; Competition and Markets Authority (2020), *Online platforms and digital advertising*, Market study final report, 1 July, https://www.gov.uk/cma-cases/online-platforms-and-digital-advertising-market-study#final-report; Crémer J., Montjoye Y.A. & Schweitzer H. (2019), *Competition policy for the digital era*, Special Advisers Report, https://ec.europa.eu/competition/publications/reports/kd0419345enn.pdf.

Another view, found in the research on "killer acquisitions" and platform envelopment suggests that dominant online search engines ("OSEs") are engaged in a myriad of acquisitions of potential entrants, which they acquire to avoid entry and competition in their core market(s).[5]

That a market could be characterized by entry barriers and at the same time the existence of many potential entrants, purchased by dominant firms to avoid entry and competition, seem in our view two propositions that are at least difficult to reconcile.

Conversely, some commentators argue that the scope for barriers to act as a deterrent of entry or expansion in online search markets may have been overstated.[6] First, the investments needed in physical assets are significantly lower than those required in industries typically associated with high barriers to entry, such as utilities. In fact, small online search engines such as DuckDuckGo, Ecosia, Yahoo, or even Microsoft's Bing (with market shares below 5 percent worldwide each) have managed to enter and remain viable.

Second, low user switching costs, combined with the same zero-pricing applied by virtually all OSEs, may explain why consumers have the incentives and ultimately switch in great proportions to the OSE that they consider offers the highest quality, providing an alternative explanation for the relatively high levels of concentration observed in these markets.

Third, there is an ongoing debate about the role played by network effects resulting from feedback loops in data, which allow to train and improve search algorithms. This is a technical issue on which we are still far from reaching a consensus in the literature.[7] Consider that a small online search engine such as DuckDuckGo (with a 0.5 percent market share worldwide) received as many as 60 million daily queries in 2020.[8] Thus, it would seem that even small OSEs gather very large samples of queries that they can use to train their algorithms.

As digital businesses are built upon large investments in innovation, it would seem reasonable to pay particular attention to the role played by innovation in explaining market outcomes. In online search, as businesses do not differentiate in price, quality and innovation are likely to be important determinants of competitive advantage. Accordingly, dominant positions may not be the result of differences in the *amount of data* that search engines collect, but rather of the difference in the *amount of research and innovation* that they conduct to train their search algorithms with the data collected.

Consider that Google is the worldwide leader in R&D, with more than 27,000 employees dedicated exclusively to this activity. Compare this to DuckDuckGo's total workforce of around 100 employees. Even a large company such as Microsoft had R&D investments in 2019 that were 40 percent lower than those of Google, and potentially focused to a much lesser degree on online search. Yet Microsoft's Bing has been able to attract an increasing number of users, particularly in the US, and to remain viable.

If one accepts that innovation is an important parameter of competition in online search, then the high and increasing levels of innovation by dominant online search firms is another observation that is difficult to reconcile with a finding of a lack of competition due to high barriers to entry. In markets characterized by entry barriers, market forces do not typically constrain dominant players to continuously re-invest in innovating. Yet, well-known dominant OSEs such as Google, Yandex (Russia) or Baidu (China) have done precisely that, as shown in Table 1: R&D expenses ($ millions) by major online search engines (2013-2019) below.

5 See, for example, Condorelli D. & Padilla J. (2020), *Harnessing Platform Envelopment in the Digital World*, Journal of Competition Law and Economics, 1-45, https://www.condorelli.science/ENVELOP.pdf; Zingales L., Rajan R.G. & Kamepalli S.K. (2020), *Kill zone*, CEPR Discussion Paper No. DP14709, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3594344.

6 For a review of the literature, see Casanova (2020), *Online Search Engine Competition with First-Mover Advantages, Potential Competition and a Competitive Fringe: Implications for Data Access Regulation and Antitrust*, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3647092.

7 *Idem*.

8 https://duckduckgo.com/traffic.

Table 1: R&D expenses ($ millions) by major online search engines (2013-2019)

| | | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
|---|---|---|---|---|---|---|---|---|
| Google | R&D expenses | 7,137 | 9,832 | 12,282 | 13,948 | 16,625 | 21,419 | 26,018 |
| | % YoY increase | *24%* | *38%* | *25%* | *14%* | *19%* | *29%* | *21%* |
| | % earnings | *13%* | *15%* | *16%* | *15%* | *15%* | *16%* | *16%* |
| Yandex | R&D expenses | 84 | 127 | 193 | 228 | 272 | 325 | 421 |
| | % YoY increase | *36%* | *52%* | *52%* | *18%* | *19%* | *20%* | *29%* |
| | % earnings | *15%* | *17%* | *22%* | *21%* | *20%* | *18%* | *17%* |
| Baidu | R&D expenses | 575 | 977 | 1,425 | 1,421 | 1,810 | 2,208 | 2,568 |
| | % YoY increase | *78%* | *70%* | *46%* | *0%* | *27%* | *22%* | *16%* |
| | % earnings | *13%* | *14%* | *15%* | *14%* | *15%* | *15%* | *17%* |

Source: Casanova (2020)[9] from companies' income statements.

There are at least several factors that may explain this behavior by dominant search engines. The first is that entry by fringe competitors is viable in the long term: DuckDuckGo, Bing or Ecosia are examples of small search engines that have entered the market and remained viable over the long term. The evidence from Russia, China, the Czech Republic or South Korea also seem to suggest that entry and viable competition against large players such as Google is possible.

The second factor has to do with the way competition works in sectors characterized by technological innovation and low end-user switching costs. In technology-driven markets, late movers are able to "free-ride" on pioneering firms. First, because "imitation costs" are considerably lower than the "innovation costs" of the first mover. Second, because innovations are subject to "inter-firm diffusion."[10] This can be seen in how smaller OSEs largely compete with incumbents by copying their innovations and investing less than the dominant players, as shown by the example of Microsoft's Bing.

Furthermore, shifts in technology or customer needs may be exploited by new entrants to displace existing incumbents,[11] as Google itself did with Altavista and Yahoo. Due to low costs, user switching can be quick, and because platforms and aggregators have a tendency to tip in short time, growth of new businesses can be exponential, with limited ability for incumbents to react. There are many past examples of incumbents being displaced by new competitors through technology shifts. Think of how IBM lost its dominance in the 90s due to its failure to foresee the relevance of software and the personal computer; how Microsoft misjudged the importance of mobile operating systems, leading to the appearance of new global players in that market; how Microsoft lost its dominance in web browsers to new players such as Firefox and Chrome; or more recently the rapid success of Zoom in video-conferencing services and TikTok in social media.

A third factor has to do with potential competition or, alternatively, the way we define the markets in which we assume these businesses compete. In the case of Google, several factors suggest that there is at least a large business that is already competing with Google to some extent[12] and that could enter its core online search market with relatively low incremental costs: Amazon.[13] Amazon is already an online (product) search engine; it has the computer scientists needed; data center capabilities (it is the worldwide leader in that market); it is the fourth largest company worldwide in digital ad revenues, including with its own ad tech business; and it owns Alexa, its window to website insights only com-

9 Casanova (2020), *supra* note 6.

10 See Ghenawat P. & Spence A.M. (1985), *Learning curve spillovers and market performance', Quarterly Journal of Economics, 100, pp. 839-852; Lieberman M. (1987), The learning curve, barriers to entry, and competitive survival in the chemical processing industries*, Graduate School of Business, Stanford University, March; Lieberman M.B. and Montgomery D.B. (1988), *First-mover advantages*, Strategic Management Journal 9 (Special Issue: Strategy Content Research): 41–58.

11 See, for example, Foster R. N. (1986), *The Attacker's Advantage*, Summit Books, New York; Scherer F. M. (1980), *Industrial Market Structure and Economic Performance*, Rand McNally, Chicago, pp. 431-438; Gomez J., Lanzolla G. & Maicas J. P. (2016), The Role of Industry Dynamics in the Persistence of First Mover Advantages, Long Range Planning, 49(2), pp. 265-281; Varadarajan R., Yadav M.S. & Shankar V. (2013), *First-Mover Advantage in the Internet-Enabled Market Environment*, Handbook of Strategic e-Business Management, pp. 157-185.

12 Business Insider (2020), *Google may cut commission fees for sellers, attempting to compete with Amazon for ecommerce-related search dollars*, July 27, https://www.businessinsider.com/google-beefs-up-ecommerce-to-compete-with-amazon-2020-7?r=US&IR=T.

13 For a more detailed description see Casanova (2020), supra 7.

parable to those obtained by Google from being the most visited website worldwide. Furthermore, China's Amazon equivalent (Alibaba) entered Baidu's core online search market in China in 2014 with Shenma, a hybrid OSE.[14]

These combined features could explain why dominant online search aggregators are constrained to continue to deliver for consumers through ever greater investments in innovation. They also distinguish them from the network industries that we typically regulate, such as telecoms, water or railway. Namely, the viability of entry at lower scale and cost and the scope for technological discontinuities and inter-firm diffusion to displace incumbents through exponential growth in short time, with limited ability for reaction by incumbents. Overall, these factors seem to suggest that we should carefully consider the need for and the potential impact of regulation on the high levels of innovation that we observe in online search markets.

## II. REGULATING ONLINE SEARCH AGGREGATORS: THE RISK OF UNINTENDED CONSEQUENCES

It could be argued that online search markets represent the perfect conundrum. They tend to be highly concentrated markets, at least when the market is defined without taking into account potential competition. Yet, they exhibit high levels of innovation,[15] quality and low prices.[16] Arguably, the opposite outcomes that one would expect from a highly concentrated market.

This paradox has driven some economists to recognize the large consumer benefits of digital platforms, yet to presume that a regulatory framework can be engineered that would deliver "even greater benefits for consumers." However, there is an inherent risk in this presumption at a time where we still have relatively little certainty on digital platforms' business models and their impact on consumers. As eloquently put by US Judge Stephen Breyer (now Justice Breyer) in a different context, "antitrust laws very rarely reject […] 'beneficial birds in hand' for the sake of more speculative […] 'birds in the bush.'"[17]

One potential risk is that we elevate the achievement of lower market concentration to such a pivotal objective of regulatory policy that it should be attained at any cost, discounting the potential for unintended consequences for innovation, competition and ultimately consumers. As the example of Brennan shows, there are rarely universally valid rules. Thus, we shouldn't assume that the achievement of lower market concentration will always deliver net benefits for consumers independently of the costs, particularly if such objective is attained by law rather than market forces. Instead, it would seem preferable to assess policy proposals on a case-by-case basis and to act with restraint, recognizing that our relative ignorance is likely to be prone to unintended consequences.

In this sense, we focus on two areas in which regulatory intervention in online search should carefully balance potential trade-offs: (i) trade-offs between competition *for* data and competition *with* data and (ii) trade-offs between data access and competition *with* data.

14 Tait Lawton (2018), *What is Shenma Search? China's Lesser-Known Mobile Chinese Search Engine*, Nanjing Marketing Group, https://www.nanjingmarketinggroup.com/blog/what-is-shenma-search#:~:text=Shenma%20comes%20with%20UC%20Browser,to%20search%20via%20the%20PC accessed June 30, 2020.

15 A recent study by the Boston Consulting Group of the 50 most innovative companies worldwide ranked Apple first, Google second, Amazon third, Microsoft fourth and Facebook tenth, see Boston Consulting Group (2020), *The Most Innovative Companies 2020 – The Serial Innovation Imperative*, June, https://image-src.bcg.com/Images/BCG-Most-Innovative-Companies-2020-Jun-2020-R-4_tcm9-251007.pdf accessed July 28, 2020.

16 For a discussion of the levels of innovation, quality and prices in online search markets, see Casanova (2020), *supra* note 6.

17 *Barry Wright Corp. v. ITT Grinnell Corp.*, 724 F.2d 227, 1984, para 24, https://law.resource.org/pub/us/case/reporter/F2/724/724.F2d.227.83-1292.html.

### *A. Trade-Offs Between Competition for Data and Competition with Data*

Dominant OSEs compete *for* data by offering multiple services to consumers for free. Google invested in Android to compete with Apple, provided a free Gmail service to compete with Microsoft's Outlook and Hotmail, a free web browser Chrome to compete with Microsoft's Internet Explorer and Apple's Safari, a free Sheets and Docs service to compete with Microsoft's Office, a Google Shopping e-commerce aggregator and drone delivery service[18] to compete with Amazon, and more recently is aiming to acquire Fitbit to compete with Apple's wearables.

Additionally, dominant OSEs compete *with* data by offering mainly online search services and digital ads. The most likely outcome of an obligation of access to a dominant online search engine's data, if successful, is that it would increase competition in prices from alternative OSEs in search advertising. This could have a significant impact on these businesses: consider that out of all the services it provides, Google derives around 70 percent of its earnings from online advertising through Google Search.[19] Thus, mandatory access to data is likely to impact the regulated OSE's incentives to compete for data by offering free services to consumers, because any competing OSE could now request access to the user data obtained from those services, and use it to undercut its prices in online advertising.

Faced with decreasing online advertising revenues in search, dominant online search businesses are most likely to either reduce their investments in free-of-charge services or to rebalance their tariffs through higher prices for the other services they provide. That would be similar to what Google proposed to do following the European Commission's *Android* remedies: charge a $40 fee for licensing Android in the EEA, combined with an auction process amongst online search engines.[20]

Access to dominant OSE's data will also alter the incentives of other platforms and startups to provide valuable end user services in exchange for user data only. Why would other platforms and startups risk their capital in competing on the merits for data by providing valuable end user services, if they will have access to the best dataset out there, that of dominant OSEs?

Consider that Microsoft developed its own Windows Mobile/Phone and lost ignominiously the battle for a successful mobile operating system, with its CEO laughing at iPhone's launch because it did not have a keyboard.[21] Only in 2015, Microsoft had to write-off more than $7bn invested in Nokia before completely exiting the market.[22] Through mandatory data access, Microsoft's Bing could be able to require access to user location data obtained by Google through Android and use this to undercut Google in search advertising – the market in which it recovers the vast majority of the costs of investing in Android. It is hard to see how that could qualify as "competition on the merits." Furthermore, it could distort the incentives of other firms to compete for the data that Google gathers through Android – remember that not only Microsoft but also Amazon, another business active in digital advertising, could give another shot in the future to the smartphone market after the failure of its Fire phone.

The concerns above would be greatly accentuated if access to a dominant OSE's data was imposed at a zero price, because the dominant OSE did not acquire that data at zero cost. To balance this, regulators could set a "reasonable price" for access to data, as they do for access to utilities' networks. The challenge is that economists have the right tools to set the prices for access to the physical infrastructure of mature businesses such as network industries, but we are not well equipped to assess the reasonable return on services of highly innovative companies, such as Google.[23] Let alone of new services that these companies may offer in the future to compete for data. Therefore, the answer to whether

18 Luke Dormehl (2020), *When it comes to delivery drones, Google's Wing is miles above the competition*, Digital Trends, January 27, https://www.digitaltrends.com/cool-tech/google-wing-drone-deliveries/ accessed June 30, 2020; Isabella Lee (2019), *Google Overtakes Amazon in Race to Make Consumer Drone Deliveries a Reality*, UAV Coach, April 10, https://uavcoach.com/google-wing-drone-delivery/ accessed June 30, 2020 and Urban Air Mobility (2020), *Google's Wing drone deliveries soar during pandemic with 500% volume increase*, May 26, https://www.urbanairmobilitynews.com/express-delivery/googles-wing-drone-deliveries-soar-during-pandemic-with-500-volume-increase/ accessed June 20, 2020.

19 CMA (2020), *supra* note 4, Appendix D, page D11.

20 Simonetta Vezzoso (2018), *Android Remedies: Tearing Down the Wall?*, CPI International, November 19, 2018 https://www.competitionpolicyinternational.com/android-remedies-tearing-down-the-wall/#_edn12 accessed July 28, 2020.

21 https://9to5mac.com/2016/11/04/microsoft-versus-apple-smartphones/.

22 Tom Warren (2015), *Microsoft writes off $7.6bn from Nokia deal, announces 7,800 job cuts*, The Verge, July 8, https://www.theverge.com/2015/7/8/8910999/microsoft-job-cuts-2015-nokia-write-off accessed July 20, 2020.

23 See Jordi Casanova (2020), *Estimating Reasonable Prices for Access To Digital Platform's Data: What Are the Challenges?*, European Competition and Regulatory Law Review, Volume 4, Issue 3, https://core.lexxion.eu/article/CORE/2020/3/4.

we should or should not mandate access to data should depend on whether regulators can set an appropriate price for it, one that does not undermine incentives to offer free-of-charge services to collect it.

Overall, given the trade-off described, it would seem that an important question facing regulators wishing to impose an access to data remedy is whether consumers will be better-off by trading more competition with data in online search and advertising, relatively immature markets that are experiencing increasing levels of innovation and decreasing prices, for potentially less competition for data.

### *B. Trade-Offs Between Data Access and Competition with Data*

There will also be important trade-offs in terms of the data that is allowed to be accessed and the extent by which alternative OSEs will be able to effectively compete with it. Greater anonymization of user data will be more respectful of privacy. However, there will be a trade-off between privacy and the value for alternative OSEs of the data shared. This is because anonymized user data is of relatively little value to perform search engine analytics and to personalize advertising.

Conversely, it is likely that an effective remedy will require sharing as much personal information as possible. As noted by the CMA, search query data alone is unlikely to be particularly valuable for alternative OSEs, unless it is shared combined with other information such as the click-through behavior of the user.[24] However, the greater the amount of data shared, the easier it will become for competitors to understand the workings of the dominant OSE's search algorithm. In turn, the easier it will be for alternative OSEs to reverse-engineer it.

In sectors characterized by a high degree of innovation that is subject to inter-firm diffusion, such as pharmaceutical companies or technology equipment vendors, we typically guarantee these companies' exclusivity to their innovations through a patent protection system, in order to maintain their incentives to continue innovating. Instead, the proposal to mandate access to data could result in the opposite extreme, by further facilitating inter-firm diffusion in a sector that is similarly characterized by high levels of innovation and inter-firm diffusion.

Just like with patented drugs, the risk is that cash-restricted alternative OSEs will spend their resources in cheaper reverse-engineering of the dominant OSE's algorithm, rather than in considerably more costly and risky innovation. This could in turn distort the incentives for dominant OSEs to dedicate resources to improving their online search service. Ultimately, we could end up with a system that resulted in a "level-playing-field-to-the-bottom" which reduced both, competition for data and the incentives of dominant OSEs to compete in improving their OSEs with that data.

Thus, even if regulation resulted in the desired lower market concentration over time, it could come at the cost of lower innovation and quality. Particularly, if this greater competition was not on the merits but rather triggered by regulation that artificially facilitated inter-firm diffusion, diminished the incentives of successful dominant firms to invest, and resulted in "imitators" competing away "innovators" in the market.

## III. CONCLUSION

The important and complex trade-offs involved in regulating access to data require careful consideration to avoid unintended consequences. As OSE markets are characterized by relatively low switching costs and competitive advantages that are contestable by both a competitive fringe and potential competitors, our focus should not be on undermining a dominant players' earned market position through access regulation, but rather on ensuring that competition is on the merits and not maintained through anti-competitive foreclosure. Compared to access regulation, which involves significant trade-offs, focusing on prohibiting exclusionary practices is unlikely to risk undermining competition and investment incentives. There may be a need for an ex ante regulator that monitors dominant OSEs' behavior to avoid exclusionary practices and to ensure that intervention is timely.

These proposals would be in line with the objectives of competition authorities of ensuring that online search markets remain fair and contestable. As mentioned by Professor Philip Marsden, "competition authorities do not try to take the crown from a victor in any competition on the merits – but try to stamp out illegal behavior so that legitimate competition and innovation can thrive."[25]

24 This is recognized by the CMA (2020), Appendix V, paragraph 96, *supra* note 4, where the CMA states that "other stakeholders suggested that without associated insights into users' behaviours on the search engines, such as which websites they choose to visit after making such a query, the provision of access to user queries may limit the ability of search engines to train their algorithm and improve the relevance of their search results."

25 Ahron Peskin (2020), *Tech & Competition – A Conversation with Professor Philip Marsden*, LinkedIn, 8 June, https://www.linkedin.com/pulse/tech-competition-conversation-professor-philip-marsden-ahron-peskin/ accessed June 30, 2020.

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