European Commission

Progress Report

Expert Group for the Observatory on the Online Platform Economy

Work stream on Measurement & Economic Indicators

Contents

Executive summary

Online platforms play an important role in many European industries, from media and advertising to travel and retail. They allow buyers and sellers of goods and services to find each other, trust each other, and trade with each other. They are likely to be significant gateways for many European small- and medium-sized enterprises (SMEs) to global markets. Due to their pivotal position, there is a risk that they may in some cases also misuse their gatekeeper position. As in any market, public policies could help maximize the benefits and minimize the harms of the online platform economy. The European Union and its Member States are already engaged in such policy making, in domains ranging from consumer protection and fair trading practices to competition and media law.

However, a challenge to policy makers and researchers is that there is a lack of data on many aspects of platform companies' economic role and behaviour. Traditional economic statistics, national accounts, and market data are not geared towards observing intermediaries that may produce no goods and hold no stocks themselves, yet still play a central role determining in how they are allocated. The **objective of this report** is to identify indicators that could be used to monitor the online platform economy for the purposes of policy making and, where considered necessary, further regulation, and to recommend corrective actions in areas where no indicators are available to ensure such data becomes available in the future.

We break down the problem of observation into three broad areas that cut across policy domains. The first area is the economic significance of platforms in the context of the broader economy. Within this area, three topics for measurement are considered: **the volume of trade mediated by platforms**; **platform size and importance**; and **data on data**. We recommend that statistical agencies should be empowered to collect data on trade mediated by platforms, for instance in travel and e-commerce. Platform size and "data on data" are active areas of research, where not just new data sources but also more conceptual development is needed; we offer some suggestions in this regard.

The second area of observation is the economic power that platforms have over their users. Within this area, three topics for measurement are considered: **business dependence on platforms**; **platform's share of consumer attention**; and **acquisitions as competitive strategy**. We find that, from a business strategy perspective, business dependence of platforms is conceptually quite well understood, but good data sources and data are lacking. We recommend that both industry associations and statistical agencies invest into collecting suitable data. Platforms' share of consumer attention is still an area for further research. Beside the standard approaches, we are suggesting more alternative ways, such as measurement via "big data" web traffic. Regarding acquisitions as competitive strategy, including "killer acquisitions" designed to pre-empt future competition, we suggest automated market intelligence data feeds such as an additional way to add puzzle to a jigsaw. However, such data is likely incomplete, and we recommend that the EU considers new obligations on major platforms to report M&A activity to the European Commission, for ex-post research and monitoring purposes, in particular when these M&A are not captured by thresholds in the applicable EU and national merger rules and may therefore never be assessed against their compliance with applicable competition rules. We also propose a number of research questions for furthering the understanding of acquisitions in platform competition and policy.

The final area of observation covered in this report relates to the considered consequences of platforms' economic power: how to measure **platform volatility**; **platform transparency**; and **other potentially problematic and thus policy-relevant practices**. The topic of platform transparency would benefit from further conceptual research to understand for instance the tradeoffs between a public's need for transparency of powerful actors vs. legitimate private business interests of a platform company. As for other potentially problematic practices, the new EU P2B Regulation that will apply as of 12 July 2020 will create new transparency obligations on platforms to disclose data on their internal complaint-handling systems; we recommend that this data be analysed with a view to identifying and assessing any need for further public policy intervention.

These initial findings and recommendations will next be tested in a **stakeholder consultation process**, **which will help us to verify the indicators** and the overall framework for monitoring the online platform economy for policy and regulation in the future.

1. Introduction

Online platforms allow buyers and sellers of goods and services to find each other, trust each other, and trade with each other. They play an important role in many European industries, from media and advertising to travel and retail, and are likely to be significant gateways for many European small- and medium-sized enterprises (SMEs) to global markets. Due to their pivotal position, there is a risk that they may in some cases also misuse their gatekeeper position. Public policy can play a role in maximizing the benefits and minimize the harms of this platform economy.[1] To this end, the European Union set up an *Observatory on the Online Platform Economy*, whose task is "to monitor the platform economy's evolution in order for policy-making to be more information-based and targeted."[2]

1.1 Objectives and outcomes of the measurement work stream of the Expert Group

In its first meeting, the Expert Group for the Observatory concluded that one of the activities required to meet its goal is to identify suitable quantitative measures or indicators on the platform economy. Without any indicators, monitoring is not possible. Established indicators such as those provided by economic statistics and national accounts are not necessarily sufficient or fit for the purpose, as they are not geared towards observing intermediaries that may produce no goods and hold no stocks themselves. Policy makers and researchers will require new indicators to make sense of this phenomenon.

By indicators, we refer not to data as such, but to conceptual constructs that are derived from or informed by applicable theory, and operationalized with data (Table 1). Thanks to their connections with theory, we are able to interpret the significance of the indicators' magnitudes or changes over time. Thanks to being operationalized or potentially operationalizable with data, the indicators are not merely theoretical constructs, but numbers that can be monitored in practice.

Table 1. Makeup of indicators

Indicator
Conceptual/theoretical grounding for interpretation + Data source for operationalization

Based on initial discussions and input from the plenary meeting of the Expert Group and the European Commission (EC), we broke down the problem of observation into three areas (Table 2). The first area is the **economic significance of platforms in the context of the broader economy**. Within this area, three topics for measurement were identified: *volume of trade mediated by platforms; platform size;* and *data on data.* The second area is the **economic power that platforms have over their users**. Within this area, three topics for measurement were identified: *business dependence on platforms; platform's share of consumer attention;* and *acquisitions as competitive strategy*. The final area is the **potential consequences of platforms' economic power** over their users: how to measure *platform volatility; platform transparency;* and *other policy-relevant practices.* Our work thus cuts

[1] Kenney, M., & Zysman, J. The Rise of the Platform Economy (2016). *Issues in Science and Technology* 32(3).

[2] EC Decision of 26.4.2018 on setting up the group of experts for the Observatory on the Online Platform Economy.

across and integrates measurement issues traditionally considered under different fields such as national statistics, competition law, and consumer protection.

Table 2. Areas and indicators covered

Significance of platforms in the broader economy
1. Volume of trade mediated by platforms
2. Platform size
3. Data on data
Platforms' power over users
4. Business dependence on platforms
5. Platform's share of consumer attention
6. Acquisitions as competitive strategy
Potential consequences of platforms' power
7. Platform volatility
8. Platform transparency
9. Other policy-relevant practices

Within each of these areas, we considered both the conceptual and theoretical underpinnings of potential indicators, and examined the availability of data sources that could be used to operationalize them in practice. The outcomes from this exercise, as presented in this report, are essentially three-fold. First, in some cases, we can point to an existing data source that offers a good operationalization of the concept we discuss. In this case, our contribution is simply to highlight that the Observatory should continue to follow this data source, and to point to a framework for its interpretation. Second, in some cases we find that no satisfactory data source is available. In this case, we offer recommendations on how the EC and/or Member States could address the gap in data. Third, in some cases we find that the proposed topic is conceptually challenging to distill into an observable measure. In this case, we recommend investments into further research on the theory underpinning the area.

It is worth noting that the Commission has already done a significant amount of work collating and commissioning data collection on the platform economy. The Commission's P2B Impact Assessment[3] report draws on such data to present an excellent overview of how European business is intermediated by platforms, how this has grown over time, and what kind of market dynamics it entails – in particular, how markets tend to be concentrated to a handful of platforms, but also how this varies between countries. Our work goes beyond the Commission's work by introducing additional topics of measurement and additional interpretative frameworks for drawing policy conclusions. We also focus particularly on data sources that could be used to create longitudinal indicators suited for observing changes over time, in contrast to snapshot figures suited for one-off studies.

[3] https://ec.europa.eu/digital-single-market/en/news/impact-assessment-proposal--promoting-fairness-transparency-online-platforms

1.2 Existing efforts to measure the platform economy

Several previous initiatives have examined the issue of platform measurement, particularly within broader efforts to measure the digital economy; the following is a brief review of some of the most pertinent efforts.

The oldest and probably the largest stream of such work is situated in the area of macroeconomic measurement. It attempts to measure the value added by the digital economy and platforms to a national economy. For instance, the IMF (2018) provides some approximate figures for the United States National Accounts in 2015. [4] Services of online platforms, including distribution margins of e-commerce platforms, were estimated to amount to 1.5 percent of U.S. GDP, where platform-enabled services appear to amount to 0.2 percent. If we add to this estimate figures referring to products and/or services related to platforms that are conceptually not included in GDP (such as free goods or services), we could add 0.6 percentage points to the US GDP in 2015. Similarly, the OECD (2017) has developed a conceptual framework for measuring the digital economy. Through the development of the concept of a digital Satellite Account, they argue that an important characteristic of digitalisation is related to transactions intermediated by digital platforms. However, in terms of numbers, only an aggregate estimate of the whole digital economy and not specifically of the role of platforms is provided.[5] Eurostat has also made efforts to incorporate the role of platforms in their ICT surveys, but these have not yet materialised in Eurostat's statistical indicators. Other EU-level initiatives to measure the digital economy are the Digital Economy and Society Index (DESI) and the PREDICT study.[6]

For the purposes of the Observatory, the question of how much value platforms add to GDP is very relevant for understanding the significance of platforms in the broader economy. However, estimating the total added value is very difficult, as it consists not only of the platform companies' margins but also of their second-order effects on their users' revenues. Another practical difficulty is that the platform economy is highly transnational in nature: a platform in country A can facilitate trade between merchants in countries B and C, a detail that is lost in overall company accounts. Thus estimates on the national value-add differ widely depending on definitions and approaches adopted. Work in this area is ongoing and could eventually result in useful longitudinal indicators.

Other previous initiatives have focused simply on identifying firms that have adopted a platform business model. Approaches and definitions vary. For instance, Evans and Gawer (2016) produced one of the first attempts to enumerate platform companies. They focused on the most significant companies – those with at least $1 billion in market capitalization or valuation – and identified 176 companies worldwide. Through desk research, Fabo and colleagues (2017) identified 200 platforms active in the EU in different categories. However, due to the focus of their analysis, several well-known platforms were omitted. In their report on the economic analysis of platforms, IW (2018) identified 110 platforms included in a company dataset.[7] Annually the investment community publish

[4] IMF (2018), Measuring the Digital Economy. Staff Report, International Monetary Fund Washington, D.C.

[5] OECD (2017) Issue paper on a proposed framework for a satellite account for measuring the digital economy, STD/CSSP/WPNA(2017)10.

[6] See https://ec.europa.eu/digital-single-market/en/desi and https://ec.europa.eu/jrc/en/predict

[7] Evans, P. C and a. Gawer (2016) The Rise of the Platform Enterprise: A Global Survey. The Emerging Platform Economy Series, The Center for Global Enterprise.
Fabo, B., M. Bevlavy, Z. Kilhoffer and K. Lenaerts (2017), An Overview of European Platforms: scope and Business Models. JRC Science for Policy Report.
IW (2018) The Economics of Platforms. Institut der Deutschen Wirtschaft.

reports on market trends, combining industry data sources – that from Mary Meeker's[8] or Statista Digital Economy Outlook[9] belong to the best renovated. A recent KPMG study identified 242 platform companies valued over €100 million globally.[10] The study acknowledges that it lacks data on important B2B(2B) platforms that are being developed in-house by 'incumbent' industrial firms. Cisco has introduced a notion of 'hyperscale cloud operators', in order to identify the most important cloud-based services, which includes online platforms.[11]

The aforementioned efforts typically use company financial information to construct aggregate figures of the platform economy, such as the total size of platform companies by geographic area or vertical. For the purposes of the Observatory, the lists produced by these efforts can be very useful starting points for constructing more specific indicators on issues such as platforms' power over their users. How much the topic is vivid and active area of research is also apparent from events newly taking place to discuss and elaborate ways forward of internet measurement.[12]

1.3 Scope of platforms covered

The Expert Group's terms of reference define the platform economy in broad terms:

> "[T]he notion of the online platform economy should be understood to cover all economic activity arising out of actual or intended commercial transactions in the internal market and facilitated directly or indirectly by online platforms, in particular online intermediation services and online search engines".[13]

At a certain level of abstraction, theoretical concepts such as economic power are applicable across a full range of what can be understood as platforms. But for the purposes of practical operationalization via data, it is necessary to define a more specific scope. This can entail simply picking a number of verticals where policy-relevant issues have been identified. The Commission's P2B Impact Assessment focused especially on five interconnected verticals: retail, app stores, social media/content, travel, and search engines. A typical characteristic of platform markets that often sets them apart from non-platform markets is the presence of winner-takes-all/most dynamics, where market is concentrated around a handful of platforms or even a single platform. Thanks to this, it can often be enough to obtain data on a small number of leading platforms in each vertical to develop a reasonably accurate indicator. For the purposes of this report, we are presenting some example numbers selected in this way, but we have not performed any rigorous scoping exercise.

[8] Reports from 1995 to 2019 are available at https://www.bondcap.com/report/itr19/.

[9] Digital Economy Compass 2019: https://www.statista.com/study/52194/digital-economy-compass/.

[10] KPMG (2018), Unlocking the value of the platform economy, available at: https://dutchitchannel.nl/612528/dutch-transformation-platform-economy-paper-kpmg.pdf.

[11] Cisco (2018), 'Cisco Global Cloud Index: Forecast and Methodology, 2016–2021 White Paper', available at: https://www.cisco.com/c/en/us/solutions/collateral/service-provider/global-cloud-index-gci/white-paper-c11-738085.html

[12] See e.g. an annual Internet Measurement Conference: https://conferences.sigcomm.org/imc/2019/#.

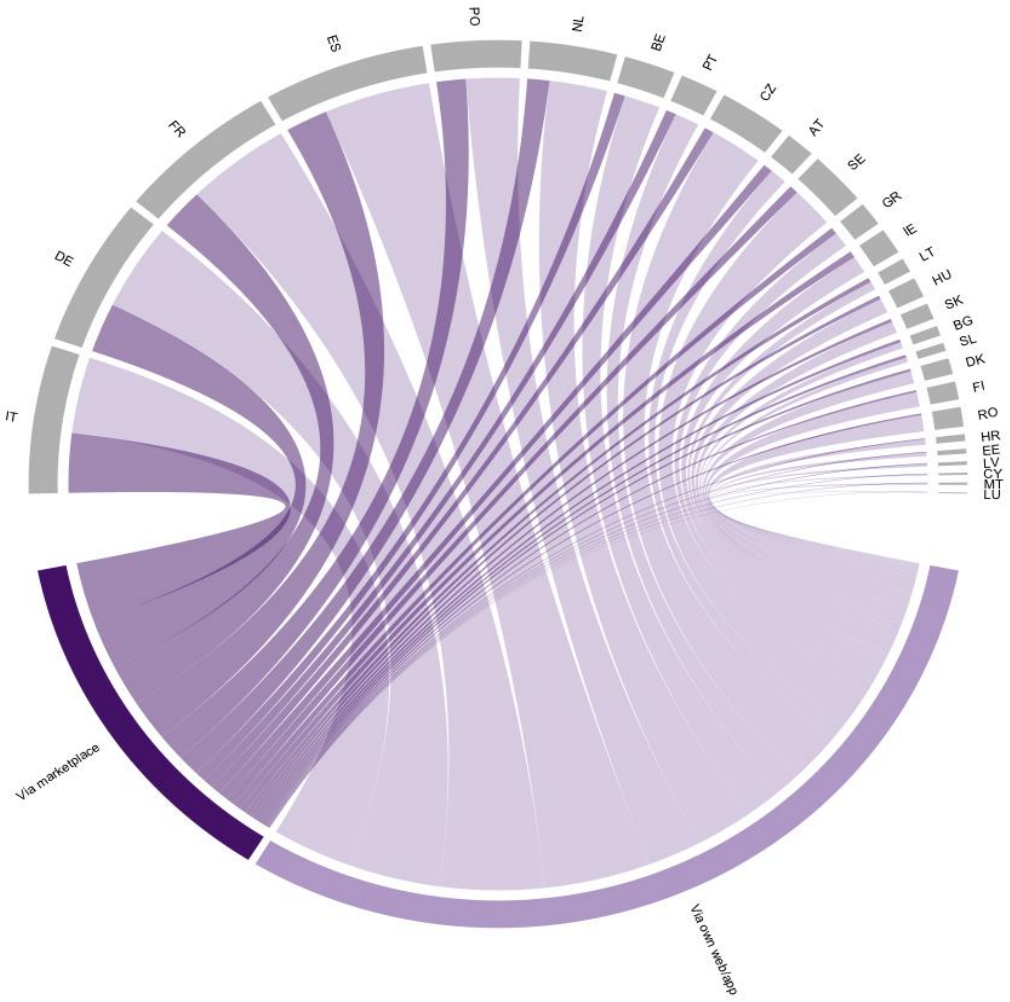
[13] EC Decision of 26.4.2018 on setting up the group of experts for the Observatory on the Online Platform Economy

2. Findings on indicators

2.1 Volume of trade mediated by platforms

Our first concern is the significance of platforms in the overall economy. As discussed above, previous research has focused on the question of value added. We suggest that it may be useful to also examine another macroeconomic analogy: trade flows. Just as there are statistics on the flow of goods and services between countries, we ask what volume of goods and services are flowing through different platforms. Such information would be useful for observing the extent of platforms' role in economic exchange in different countries, industry verticals, or other domains of aggregation. Moreover, it would be important for understanding the incidence of any new policies aimed at platform companies, such as those included in the new P2B Regulation[14]: what amount of trade in Europe is affected by its provisions?

Figure 1. E-sales via marketplaces and own website/app: number of enterprises, 2019
(source of data: Eurostat [isoc_ec_evaln2]. Note: data on e-sales is for 2019, total turnover value in each country is for 2017; no data were available on LU web sales; CY – used 2016 data)



[14] Regulation (EU) 2019/1150 of the EP and of the Council on promoting fairness and transparency for business users of online intermediation services.

Indicators on the volume of trade mediated by platforms could also be used to understand the role of platforms in facilitating international trade, by looking at the size of platform-mediated trade flows in specific country corridors. For instance, as the United Kingdom is negotiating to leave the EU, it is pertinent to ask how much of its trade with the continent is currently facilitated by large e-commerce and service trade platforms, to assess the impacts of the changing trading environment and any policy interventions to manage it. This research would be also relevant to have better overview about the of global trade flow.

2.1.1 Data sources on volume of trade

A natural measurement unit for trade volume is its monetary value, but other measures, such as Internet traffic flows or advertising impressions could be relevant in specific verticals. An ideal data source would provide some historical time series data, but even data whose collection starts only now would be very useful in the future. The following are some possible existing data sources:

- There are some data points in the Euromonitor database, in particular on Amazon (including third-party sales), but only for e-commerce platforms.
- Web traffic data sources such as SimilarWeb, Mavens or Alexa can provide data on search intensity, for search engines for instance.
- In case of social media metrics, BuzzSumo or Brandwatch should be mentioned as representatives of possible data sources.
- Regarding user-traffic tracking, tools facilitated by cookies or elaborated analytical approaches – Google Analytics or Adobe Analytics - are available.
- Also in case of general statistics about websites, Alexa rankings but other tools are accessible.[15]
- Concerning measurement of data of internet traffic, also here several sources are available: among others, data published by the network equipment makers – e.g. Sandvine[16] or Akamai[17], and the academic network Measurement lab.[18]
- Some industry associations collect data on how much of their members' trade passes through platforms. For instance, the European Hotel Forum has collected data on the volume of bookings and money flows that pass through online travel agencies (OTAs) covering some of their members.
- The Future of Business Survey compiles monthly data from 200 000 Facebook business pages (cf. 2017 trade report: "Moreover, nearly half of exporters (45%) report that more than 75% of their international sales are reliant on online tool").
- Annual financial filings from large cross-border platforms such as Etsy and Amazon, though these are limited in detail.
- Platform companies themselves are likely to have detailed data or the ability to produce detailed data on the trade flows that they facilitate, but currently they are not required to disclose this for administrative purposes and it is not collected in surveys used in national statistics production. Some of the data is of a competitively sensitive nature, but statistical agencies have facilities for dealing with sensitive data.

[15] See for example https://internet-map.net/, or https://labs.mapbox.com/labs/twitter-gnip/brands/#3/26.35/-20.21.

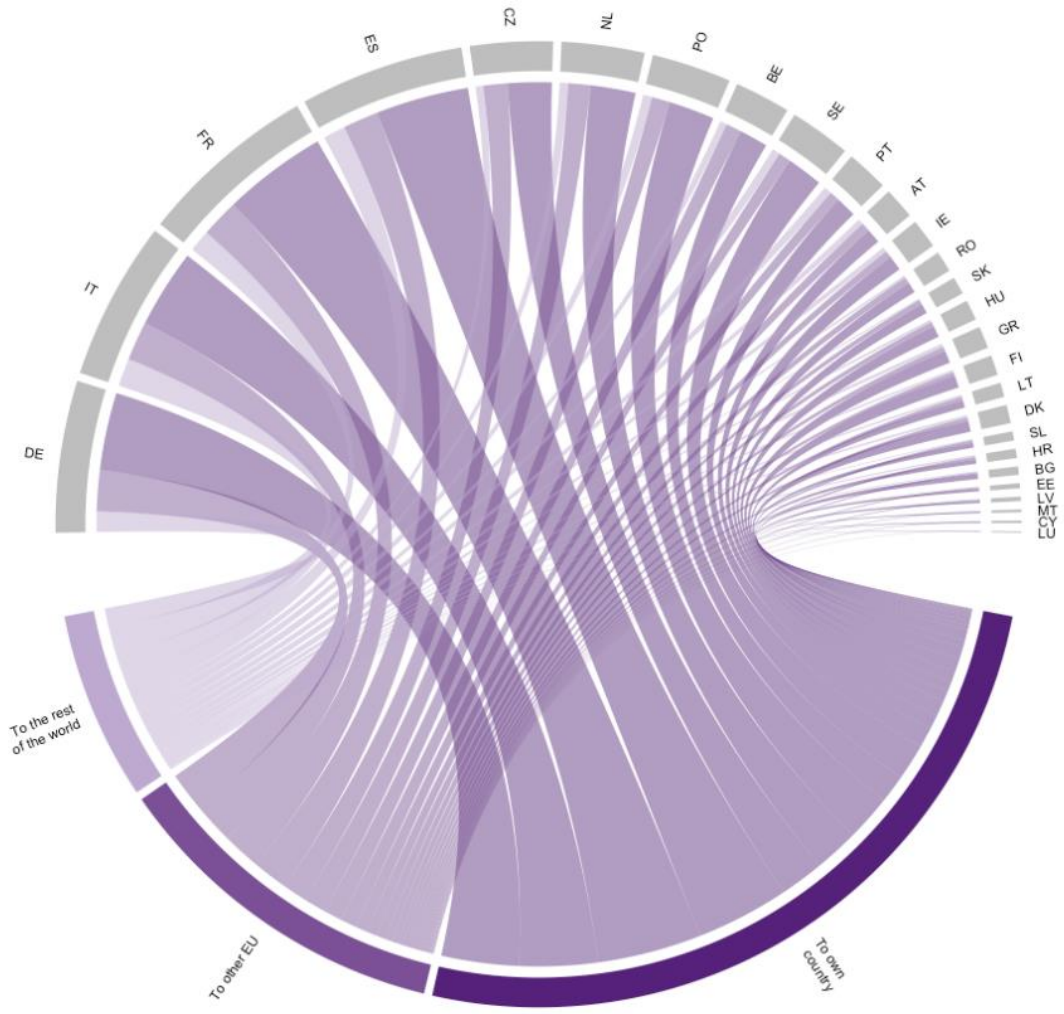
[16] Sandvine website: https://www.sandvine.com/phenomena

[17] Akamai Real-Time Web Monitor: https://www.akamai.com/us/en/resources/visualizing-akamai/real-time-web-monitor.jsp

[18] Measurement lab: https://www.measurementlab.net/

Figure 2. Enterprises having done electronic sales to own country, to other EU countries, to the rest of the world in 2019 (number of enterprises)

(source of data: Eurostat [isoc_ec_evaln2]. Note: data on the share of enterprises selling via web/app is for 2019, total number of active enterprises is for 2017; for CY used 2016 data)



ABBR	TO OWN COUNTRY	TO OTHER EU	TO THE REST OF THE WORLD		ABBR	TO OWN COUNTRY	TO OTHER EU	TO THE REST OF THE WORLD
DE	532339,53	280178,7	140089,35		HU	77837,2	33358,8	16679,4
IT	537433,96	268716,98	191940,7		GR	84700,22	30800,08	23100,06
FR	712530,4	262511,2	150006,4		FI	83853,28	26952,84	14973,8
ES	637179,27	242734,96	151709,35		LT	49093,2	26592,15	14318,85
CZ	300631,69	165865,76	51833,05		DK	73669,76	25323,98	16115,26
NL	306988,76	153494,38	59036,3		SL	31427	18570,5	7142,5
PO	312533,1	125013,24	62506,62		HR	29823,6	16402,98	11929,44
BE	195170	107680	47110		BG	34773	10431,9	6954,6
SE	246371,84	84690,32	53893,84		EE	17945,8	8972,9	4486,45
PT	140514,08	70257,04	52692,78		LV	14788,02	7962,78	4550,16
AT	98745,84	61716,15	37029,69		MT	8327,66	4920,89	3785,3
IE	103043,08	48809,88	32539,92		CY	6802,25	4709,25	3662,75
RO	73378,1	44026,86	14675,62		LU	4031,28	2687,52	1007,82
SK	67394,46	33697,23	9627,78					

2.2 Platform size and importance

There is a growing interest in the size and importance of digital platforms and platform companies, reflected by recent terms such as "*superdominance*", "*digital conglomerates*" or "*gatekeepers of the Internet*". Platform size matters for several reasons. One reason is that proposed policy interventions are often explicitly or implicitly targeted at "big" platforms. This might be justified on the basis that, for instance, bigger platforms wield disproportionately more power in markets characterized by network effects and "winner-takes-all/most" competitive dynamics. The report of the Digital Competition Expert Panel to the UK government mentions the notion of "*strategic market status*", and the Stigler Center report on digital platforms proposes asymmetric regulation for companies having "*bottleneck power*". Security and stability implications are naturally also much more pronounced with particularly large, centrally positioned intermediaries. Conversely, policy makers might wish to avoid policies that place undue burdens on "small" platforms and thus hold back entrepreneurship and innovation. Either way, there needs to be some conceptual and empirical basis for assessing platform size.

On the conceptual side, established measures of firm size may not always be adequate. Revenues may not be a meaningful measure in markets where services are provided for free, or in exchange for data. Market share is often difficult to establish in fast-moving and nested vertical markets. The largest platform companies tend to be active across many different markets, creating extended data-driven ecosystems around their core activities, often cross-subsidizing one service with data or revenues from another. The challenges that this creates for defining platform size or establishing dominance are especially relevant to competition policy, and are being actively researched and debated in that domain.[19] This is not to say that the same questions may not be also very relevant in the context of a reflection of whether further ex ante regulatory intervention may be required in case of some "big" platforms. In this subsection we simply contribute some practical ideas on potential parameters and data sources for measuring platform size. We further discuss the conceptual issues in subsequent subsections on data, business dependence on platforms, and platforms' share of consumer attention.

2.2.1 Conceptualizing platform size and importance

The P2B Regulation establishes the notion of possible 'economic dependency' of EU-based businesses on platforms – a notion distinct from that of 'dominance' under EU competition law. The Regulation assumes that even relatively 'small' platforms can constitute unavoidable trading partners for businesses seeking to address specific niches. It also seeks to avoid cementing startup platforms into the business model of the very largest online platforms, and therefore applies principles-based transparency obligations to all platform companies currently active in the EU. It is however clear that the absolute size and importance of the platforms captured varies greatly, with the large majority of these companies being startups. Similarly, the EU Copyright Directive[20] includes a special regime for startup online content-sharing services, acknowledging that such firms can have significant user bases (>5 million unique visitors per month) even when they have existed for less than three years and still earn less than €10 million per year in revenue.

[19] Eg., Report on 'Competition policy for the digital era', April 2019, p. 110-124 and M. Bourreau & A. De Streel,'Digital Conglomerates and EU Competition Policy, March 2019, p. 31-33, available at http://www.crid.be/pdf/public/8377.pdf.

[20] Directive (EU) 2019/790 on copyright and related rights in the Digital Single Market and amending Directives 96/9/EC and 2001/29/EC (OJ L 130/92)

A different regulatory approach aimed at capturing large digital platforms has been suggested in the tax domain by the Commission. A digital services tax[21] would have been applied to revenues created from activities where users play a major role in value creation and which are the hardest to capture with current tax rules, such as revenues created from selling online advertising space, digital intermediary activities which allow users to interact with other users and which can facilitate the sale of goods and services between them, or from the sale of data generated from user-provided information. These tax revenues would be collected by the Member States where the users are located, and would only apply to companies with total annual worldwide revenues of €750 million and EU revenues of €50 million.[22] As this proposal was not agreed by the Member States,[23] some of them contemplate or already introduced a national digital tax based on the Commission proposals.[24]

These examples show the relative nature of the notions of size and importance, suggesting that specific regulatory objectives may require different scoping parameters. An analysis of scoping parameters that have previously been used or considered for (possible) regulation of digital services may help us obtain a complete picture of possible indicators that may, separately or jointly, allow us to conceptualize and thus monitor the size and importance of online platforms. Table 3 below provides an indicative overview of such scoping parameters.

[21] Proposal for a Directive on the common system of a digital services tax on revenues resulting from the provision of certain digital services. COM(2018) 148 final.
[22] Fair Taxation of the Digital Economy. European Commission.
[23] Digital taxation. Council of the EU.
[24] For example the United Kingdom, Spain, France, Italy, Austria or the Czech Republic.

Table 3. EU legal framework for digital services – scoping parameters

Instrument(s)	E-commerce Directive	P2B Regulation	CRS Code of conduct	Telecoms code	Net Neutrality Regulation	NIS Directive	Open data Dir	102 TFEU	*E-evidence Regulation (proposal)*	*Corporate taxation digital presence (proposal)*
Conditions for applicability	Remote commercial capacity	Economic dependency (inherent in platform business model)	Vertical integration & imbalanced bargaining power	Significant market power	Connectivity to all Internet end points	'substantial incident' depending on number of users & geo spread	'high-value datasets'	Dominance	*Decentralised data storage*	*'Significant digital presence' (EUR 7 mn; >100 000 users; 3000 business contracts*
Scope	At least all " information society services", ranging from ISPs to cloud hosts, to platforms (millions)	All B2C online intermediation services (thousands)	All computerised reservation systems few	Selected infrastructures , overlapping footprints possible (joint dominance)	All Internet Access Service providers (dozens)	All cloud computing, search engine as well as B2C marketplace services (hundreds)	Public sector bodies (hundreds)	Individual abuses in relevant markets, e.g. provision of general search services (Google)	*All ECSs, social networks, market places, domain name services (thousands)*	*Cross-border digital services; covers websites, interactive software, etc. (hundreds)*

2.2.2 *Data sources on platform size and importance*

The following are some existing data sources that could possibly be used to operationalize concepts of platform size and importance:

- User numbers can be estimated[25] with data from traffic data providers such as SimilarWeb.
- The Dealroom database provides data on (i) the number of digital marketplaces in the EU; (ii) venture capital investment levels; (iii) specifics for 'verticals' such as hospitality; (iv) employee figures.
- To identify platform startups, an EC study on innovation used grants provided by H2020 SMEi to digital platform companies ("Taken together, this preliminary piece of evidence suggests that applicants to the SME Instrument with proposals concerning digital platform innovation are knowledge-intensive service providers. On average, they have a high ratio of intangible assets and count almost one patent each.")
- Interviews with VC funds. Following are most active in EU marketplace investments: Eurostars SME programme, EUREKA Network Projects, Kima Ventures, Sequoia Capital, SV Angel, Accel Partners, Bpifrance.

2.3 Data on data[26]

Data is now commonly regarded as a crucially important element of the digital economy. Among other things, it is used to innovate, optimize, and personalise products and services; train artificial intelligence systems; target advertising; and sustain competitive advantage over rivals.[27] Platforms, by virtue of connecting multiple parties to each other, offer the environment where a variety of data is generated, and are in a key position to facilitate flows of data from one party to another, and also to accumulate data for themselves.[28] In a recent roadmap, the OECD accordingly identifies the need to "make sense of data and data flows" as a priority area in dealing with the digital transformation,[29] and we also consider it an important area for monitoring developments in the platform economy.

2.3.1 *Conceptualizing data*

Despite its importance, data remains a nebulous concept, difficult to both define and measure. For instance, unlike oil, data is highly heterogeneous, and its value highly contextual.[30] There is no clarity in the economic literature on whether data should be conceptualized as raw material, capital, labour, service, or something else altogether.[31] There is likewise no uniform way of measuring

[25] The notion "estimation" is important regarding the fact that some technological companies self-report "monthly active users" (MAUs), and number of large platforms' annual reports contain data on MAUs. The notion is also used e.g. in French legislation as a regulatory parameter.

[26] This chapter is complementary to the Data report.

[27] Mayer-Schönberger, V., & Cukier, K. (2013). *Big data: A revolution that will transform how we live, work and think.* London: Murray.

[28] Srnicek, N. (2017). *Platform capitalism.* Cambridge, UK: Polity.

[29] OECD, 'Measuring the Digital Transformation A Roadmap for the Future', of March 2019, available at: https://www.oecd-ilibrary.org/docserver/9789264311992-en.pdf

[30] Lehdonvirta, V., Mittelstadt, B. D., Taylor, G., Lu, Y. Y., Kadikov, A., and Margetts, H. (2016) Data Financing for Global Good: A Feasibility Study. University of Oxford: Oxford Internet Institute. https://www.oii.ox.ac.uk/wp-content/uploads/2016/10/Oll-Rockefeller-Data-Financing-for-Global-Good.pdf

[31] Goos, M. et al. (2019). The report of the High-Level Expert Group on the Impact of the Digital Transformation on EU Labour Markets. https://ec.europa.eu/newsroom/dae/document.cfm?doc_id=58412

data: the number of petabytes, transactions, records, or users, or the market value of a given data set all make sense in some context, but not in another. Existing indicators that are used to measure the digital economy, such as Internet traffic and numbers of users, do not reflect for instance the type, quantity, quality or value of the data concerned[32] and are unfit for shedding light in types of policy questions emerging around the data ecosystem in the platforms' economy. There are also practical difficulties: a 2017 MIT report suggests that 80% of data is 'dark data' locked within enterprises and unobservable from the outside.[33] Thus, despite it being commonly accepted that data is economically important and that platforms play a key role in the data economy, there is a distinct lack of *data on data*, or ways of measuring and monitoring data and its economic significance.

A potential way forward is to move away from trying to observe the data itself, and instead shift focus to observing the characteristics of the processes that generate, distribute and valorize data.[34] In other words, instead of trying to determine which of the petabytes held in a company's data centre are valuable and whether they might still be valuable tomorrow, we should ask which actors in a given domain are in a position to collect data, and in what ways they distribute that data (or don't) to derive economic value from it. For instance, innovative artificial intelligence research often requires data sets that don't exist yet, so it is not necessarily just platform companies' existing data sets that make them good at such research, but the fact that they are well positioned to rapidly collect whatever new data may be required. Such a conceptualization of data that focuses on process rather than outcome suggests more qualitative and network-oriented approaches to measurement instead of simple numbers.

2.3.2 Measuring data

It is possible that in the future it becomes more feasible to measure the market value outcomes of data directly, if efforts to increase the tradability of data bear fruit. For instance, on-going efforts to establish a futures market for digital media inventory could provide an interesting parallel in this regard.[35] The OECD likewise proposes several possible tools for estimating the value of data, including pricing data obtained from data brokers as well as valuations made in the context of data-related mergers and acquisitions.[36]

If instead of outcome we focus on observing process, then one starting point to observation are application programming interfaces (APIs) that provide third-party software developers with access to platforms' features, thus facilitating day-to-day data flows in the digital economy. As increasing numbers of services and markets are built on top of different platforms' APIs, this gives rise to data-related dependencies. To help software developers navigate such dependencies, Uri Sarid has suggested the creation of a map ('topograph') of interconnected APIs.[37] A similar map could also be useful for monitoring the overall structure, stability and competitiveness of the

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[32] See, for example: https://www.forbes.com/sites/gilpress/2019/06/30/why-has-mary-meeker-missed-the-most-important-internet-trend-data-is-eating-the-world/#37eb04785bbe.

[33] 2017 Platform Strategy Summit, MIT initiative on the digital economy, available at: http://ide.mit.edu/sites/default/files/2017-MIT-Platform-Summit-Report.pdf.

[34] Lyon, D. (2007). *Surveillance studies: An overview.* Cambridge, UK: Polity.

[35] See, for example: https://www.adweek.com/programmatic/nyiax-and-iponweb-bring-upfront-trading-to-display-advertising-in-new-partnership/.

[36] OECD, 'Measuring the Digital Transformation A Roadmap for the Future', of March 2019, available at: https://www.oecd-ilibrary.org/docserver/9789264311992-en.pdf?expires=1565616907&id=id&accname=id24042&checksum=D423295E0FB1E3F365436EA29ECCD0DB.

[37] 2018 Platform Strategy Summit, MIT initiative on the digital economy, p. 19, available at: http://ide.mit.edu/sites/default/files/platform-2018-v05_0.pdf.

platform economy – are some APIs occupying systemically important positions, for instance? Thus one approach to observing the structure of data flows in the platform economy would be to create a dynamic map of this type. Qualitative indices of platform companies' data-related business models, sharing practices (eg. open data), and control afforded to users (privacy settings) could also be used as an approach.

2.3.3 Sources of data on data

Existing data sources on data include the EU's Digital Economy and Society Index, which now also tracks the use of big data by industry.[38] The OECD has similarly developed a Going Digital Toolkit which, amongst other elements, indexes business' security and data protection capabilities as a trust measure.[39] As trust can be key to unlocking value from data, statistics on big data uptake combined with those on security capabilities and incidents can be valuable for policy-making in the online platform economy. As an example of a more qualitative and network-oriented approach, Keiichiro Nabeno has published a map of IoT platform vendors' interconnectedness.[40]

2.4 Business dependence on platforms

Platforms generate value for businesses by providing them with access to demand for their products, or to factors of production such as labour or capital. A business can become to varying extents dependent on (or even "locked in" to) such a platform. This makes the business vulnerable to possible unfair and distortive practices by the platform.

Conceptually, dependence occurs if and to the extent that the business faces a high cost from switching away from the platform to a substitute. Such switching costs can arise for instance if a business has made significant platform-specific investments, such as building its technology to be compatible with the platform's specification; these investments would have to be written down ("sunk costs") and new investments made if the business were to switch to a substitute. Switching costs can also arise from the fact that any substitutes are far inferior, such as when a single platform is a gatekeeper to a given market or market segment, and there are few other means of reaching that market or segment. For instance, there are many social media platforms, but each may reach different segments of the audience, so that for addressing any given segment there may not be much choice. Indeed, the European Commission has previously found that platforms rely on all successful platforms in order to maximize sales.[41]

Business dependence on a platform makes it theoretically possible for the platform to extract value from the business (to "hold up" the business) up to the value of the switching cost. This value extraction could take place in many ways, from charging high fees to unfavorable treatment in search results.

A platform might also inadvertently cause serious harm to a small business that has become very dependent on the platform, for instance due to an honest error in enforcing its terms and conditions, resulting in a de-listing ("bull in a china shop" phenomenon).

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[38] Under its measure 4a3, see: https://ec.europa.eu/digital-single-market/en/desi.

[39] https://goingdigital.oecd.org/en/.

[40] https://www.slideshare.net/knabeno/iot-platform-vendors-alliance-map-2019-march-rev

[41] P2B Regulation impact assessment, discussed in the next subsection.

For these reasons it is important to have some means of assessing how dependent European businesses are on some of the largest platforms.

2.4.1 Measuring business dependence on platforms

One approach to assessing how dependent businesses are on platforms would be to measure how large a share of the businesses' revenues are coming through a platform or platforms, as opposed to the businesses' own websites and brick-and-mortar sales channels. For instance, if businesses in a given vertical or sector (e.g. hotels) get 50% of their revenues through a platform, then this strongly suggests that the vertical may be considerably dependent on the platform. However, it is not a definite indicator, because in theory the businesses might be multi-homing to maximize sales or they might have cheap substitutes that they are simply choosing not to use for the time being.

A complementary approach would be to measure "multi-homing", or how many other platforms/channels the businesses are simultaneously using, regardless of their current revenue shares. For instance, if businesses in a given market use on average three other channels besides the platform in question to sell their products, then this suggests that they may not be very dependent on the platform, as they could switch the weight of their sales efforts to the other channels if threatened by the platform. However, this is not a definite indicator either, because the other channels might in fact reach different segments of the market, or be inferior substitutes other ways (e.g. quality of the service; users' awareness).

2.4.2 Data sources on business dependence

Both of the measures outlined above could be calculated from data on firm revenues by sales channel. We don't believe such data is usually collected by statistical agencies in their establishment surveys. However, a set of surveys conducted by Ecorys[42] for the Commission's Impact Assessment accompanying the P2B Regulation allows us to present some illustrative numbers, as follows.

The source of information is a survey directed to firms participating in platforms. The main focus of the questionnaire was to assess to what extent firms have been facing problems in their relationships with platforms. The project "Business-to-Business relations in the online platform environment" was carried out by a consortium led by Ecorys under a specific contract with DG CNECT and DG GROW. The survey was based on a panel of enterprises by TNS. In total 2553 firms replied to the questionnaire. The panel includes data for firms from 1 to 250 employees in 7 countries (Germany, France, Spain, Sweden, Lithuania, Greece, and Slovakia), from 21 sectors of economic activity. One question was oriented to gather information about the importance of platforms for businesses. The results indicate that 42% of companies surveyed declare that platforms play a significant role for turnover and that they are important for the business (Table 4). Of these 42% of companies, almost a third obtained more than half of their revenues via platforms (Figure 1). The same data can also be used to provide illustrative figures on multi-homing (Table 5). More detailed figures on multi-homing among European companies are reported in Duch-Brown (2017).[43]

[42] https://op.europa.eu/en/publication-detail/-/publication/04c75b09-4b2b-11e7-aea8-01aa75ed71a1/language-en

[43] Duch-Brown, N. (2017), Platforms to Business Relations in Online Platform Ecosystems, JRC Digital Economy Working Paper 2017-07.

Table 4. Turnover generated via online platforms.

	N	%
Not applicable to my business model	618	24.2
I don't know but I consider platforms important for business development	294	11.5
Marginal turnover and marginal importance for my business	277	10.8
Only marginal turnover, but strong reliance on business communication online (advertising, social media)	279	10.9
Significant turnover and importance for my business	1085	42.5

N: Number of firms for a total of 2553.

Figure 3. Share of turnover obtained via platforms among firms reporting significant turnover and importance.

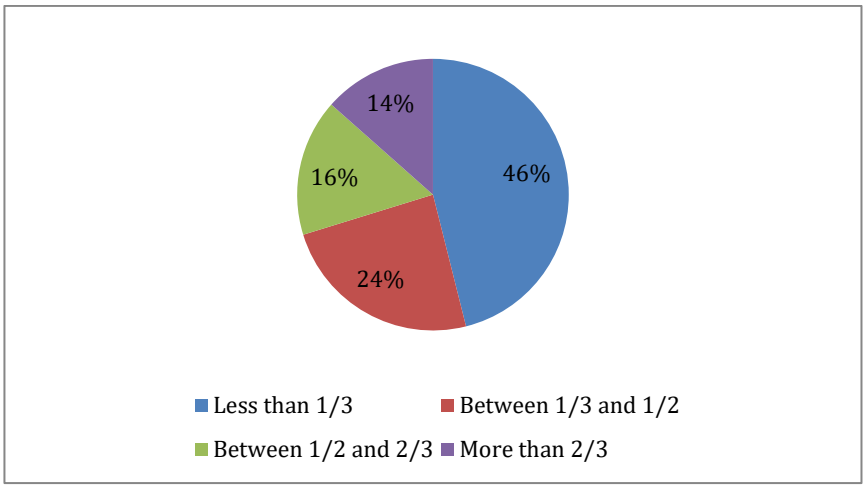

Table 5. Multi-homing: Number of platforms by firm, per activity

Number of platforms	E-commerce		App Stores		Social networks	
	N	%	N	%	N	%
0	1,088	42.6	1,388	54.4	253	9.9
1	437	17.1	543	21.3	802	31.4
2 or more	1,028	40.3	622	24.4	1,498	58.7

Source: Ecorys TNS Panel Survey (2017), including 2553 firms from 7 EU countries (DE, FR, ES, SE, LT, EL, SK).

Industry associations also sometimes conduct research on sales channels' market shares. For instance, the European Hotel Forum has collected data from some of its members' use of online travel agencies.

In some cases, businesses are legally required to disclose platform dependencies that constitute business risks as part of investor disclosures. Ó Fathaigh et al. (2019) provide a systematic analysis

of U.S. Securities and Exchange Commission (SEC) filings for mobile applications' dependencies on mobile platforms.[44]

A potential limitation of self-reporting and survey-based approaches to understanding business dependence on platforms is that if businesses truly are dependent on a platform, then they may be reluctant to fully respond to questions on this topic due to non-disclosure agreements (NDAs) and fear of retaliation (whether justified or not) by the platform. Anecdotally, researchers involved in the P2B regulation impact assessment suggested that such fears may indeed have made some businesses reluctant to respond. An alternative approach would be to obtain data directly from platform companies. For instance, to quantify the share of business revenues from a given platform, the total transaction volume would be acquired directly from the platform company (eg. hotel booking site) and it would be divided by the suppliers' total revenues as gleaned from establishment surveys or industry analysts (eg. total revenues of hotels in Europe).

2.5 Platform's share of consumer attention

A complementary way to assess the economic power of a given platform is to examine the share of consumer attention that the platform commands. If a platform commands the majority of the attention on the demand side then the supply side is likely to depend significantly on the platform to a significant extent to meet the demand. This gives rise to the possibility of the hold-up problem outlined above. For instance, if an e-commerce site commands the attention of 50% of online shoppers, then suppliers are likely to be significantly dependent on it.

Several academic papers also develop the topic from different perspectives, for example Brynjolfsson and Hee Oh made elaborated a paper suggesting ways how to quantify and measure the value of "free" services.[45]

2.5.1 Measuring share of consumer attention

There are no sophisticated or well developed ways at the moment to measure consumer attention, although some web analytics tool do attempt to measure consumer attention with metrics such as bounce rate, or time spent per webpage. There is also a closely related proxy in the advertising click-through-rate and related metrics. A fairly straightforward way of measuring consumer attention would be to equate attention with market shares. The task would then be that of measuring a platform's market share in a given segment (e.g. children's toys in Germany). But realized sales are affected by factors beyond consumer attention.

Another approach to measuring consumer attention would be to focus on "mind share": what platforms/sites do consumers recall as shopping sites for a given category of goods. This is of course still a rather imperfect proxy for the purposes of assessing supplier dependence.

A further approach would be to measure "digital footfall", or traffic figures: how large a percentage of consumer browser traffic is directed towards a particular site, as compared to other sites in the same category. This could be complemented with the 'time spent' metric which is commonly used by social media companies including in investor earnings calls and annual reports. A study by Andre Boik and colleagues finds that for the period of 2008-2013, total time online at the primary

[44] Ó Fathaigh, Ronan, Joris van Hoboken, and Nico Van Eijk. "Mobile Privacy and Business-to-Platform Dependencies: An Analysis of SEC Disclosures." Journal of Business & Technology Law 14 (2019): 49-105.

[45] *The Attention Economy: measuring the value of free digital services on the Internet,* E. Brynjolfsson and J. Hee Oh, 2012. https://aisel.aisnet.org/cgi/viewcontent.cgi?article=1045&context=icis2012

home device has only modestly declined and that the concentration of sites visited and time spent in long sessions has remained remarkably stable. Their finding implies that the total amount of attention that consumers spend on the Internet is more or less fixed and is concentrated on a relatively small number of anchor sites.[46]

Consumer search behaviour could also be used to infer share of attention. For instance, in the e-commerce area, consumers can use a general search engine such as Google to locate an online store that sells a product that they are looking for. Alternatively, consumers can navigate directly to an e-commerce platform. The proportion of such direct traffic vs. search-engine mediated traffic to e-commerce could be used as an indicator of the platform's power over consumers, when combined with overall traffic numbers. Noteworthy in this regard is also consumers' increased "no-click through search" behavior in web searches, which means that consumers find what they are looking for without leaving the search engine's proprietary environment at all. This could point to an increasing power of online search engines over consumers.[47]

The captive loading of third-party business users' websites, products or services both by search engines (e.g. Google AMP) as well as by mapping and social media platforms (e.g. Google My Business, Facebook, LinkedIn, Twitter, etc.) is another important development that needs to be taken into account in assessing platform's power over consumer attention. Importantly, this phenomenon could also increase the breadth of data available to online platforms (e.g. audience engagement statistics).[48]

2.5.2 Data sources on share of consumer attention

From a theoretical point of view, direct measurement is focusing on how to attract users so they spent not only their attention but most of all their time of the website. Tools like Attention Web have been developed to map people's granular presence on the website, based on which companies can practically improve the website appearance to maximize the profit from each website visit.[49]

Data on company market shares in a given industry is collected and published by industry analysts. Each industry tends to have its own market research firms that publish such data. They are also aggregated by sites such as Statista. These data sources are easily available and usually not very expensive, but their methodologies are often opaque and/or weak.

Consumer mind share could be quantified with consumer surveys, and while there are some commercial brand surveys that do this, there are no consistent union-wide efforts.

Digital footfall provides the most comprehensive data source. It can be quantified with data from online competitive intelligence firms, the leading ones being SimilarWeb and Alexa. Both firms provide estimates of visitor numbers, time spent, visitors' countries of origin, etc., for a given website in a given timeframe. Their methods are based on a mix of data from ISPs, browser plugins and other sources, and the data is consistently available. The methods can be quite opaque,

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[46] Boik, A., Greenstein, S., and Prince, J. (2017). The Empirical Economics of Online Attention. *Working Paper.*

[47] Sparktoro by Rank Fishkin, ´Google's European Monopoly (& Shrinking Click-Through Opportunities), 23 January 2019, available at: https://sparktoro.com/blog/googles-european-monopoly-shrinking-click-through-opportunities/.

[48] On Google AMP and the resulting access to audience measurement data, see also: Australian Competition and Consumer Committee, Digital Platforms Inquiry, final report of June 2019.

[49] See for example Tony Haile: What You Think You Know About the Web Is Wrong https://time.com/12933/what-you-think-you-know-about-the-web-is-wrong/

however. For mobile apps, App Annie provides somewhat analogous observational data on app usage.

The EC has already used clickstream data to analyse platforms' web traffic shares as part of its research for the P2B Regulation Impact Assessment. The following is an illustration from that data. We selected information on the top 10,000 websites in 21 EU countries for April 2020, identified the top 50 and 170 platform websites as defined in the Observatory data lab report[50] and computed the platforms' total share of web traffic by country. On average it is around 36% for the Top170 and 34% for the Top50, ranging from 42% in Portugal to just 28% in Croatia (Figure 2). Similarly, we computed the share of unique users, as displayed in Figure 3. Here, we see that the shares of the Top170 and Top50 platforms are 11% and 10%, respectively. Looking at the Top50, the shares lie between 15% (again in Portugal) and 7% (Hungary). The difference between traffic and unique users indicates the enormous level of attention that these platforms concentrate. These data could be further analysed to identify specific platforms' traffic shares within their verticals. This could be a resource-intensive activity as it might require hand-labeling or other approaches to grouping websites into suitably defined verticals. But it would result in a methodologically transparent measure that could be used to create longitudinal time series data.[51]

Figure 4. Platforms' share of Internet traffic by country

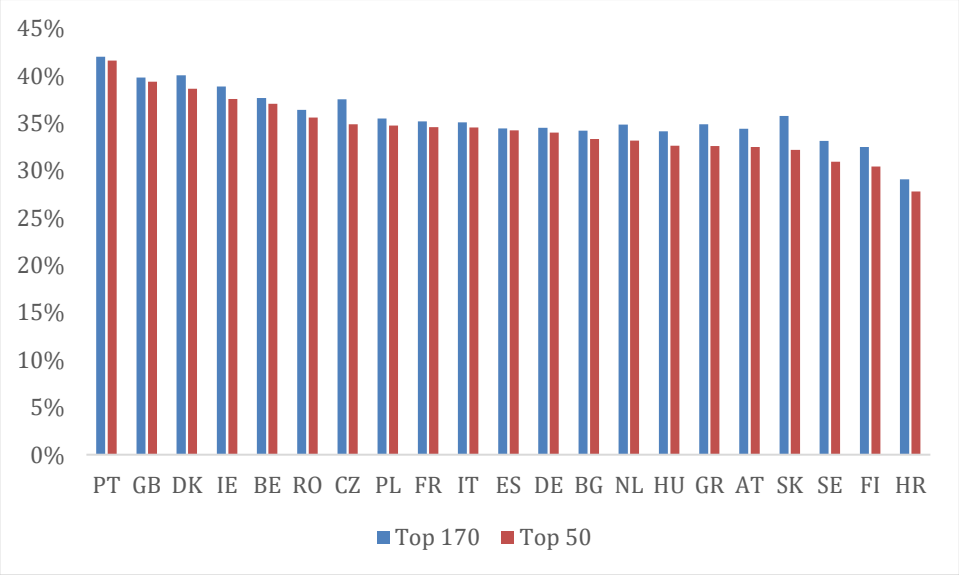
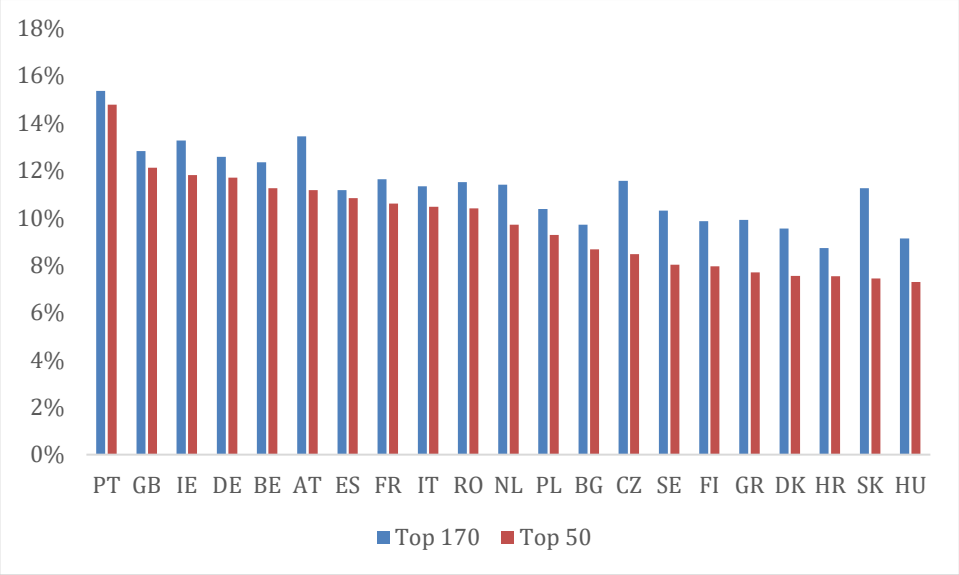


Figure 5. Platform' share of unique internet users by country

[50] Data Lab developed by the Study supporting the work of the Observatory, still to be published (https://platformobservatory.eu/)

[51] Please note that due to the lack of data on multi-homing (i.e. the proportion of people using both search engines and marketplaces), these results may not fully reflect the current market situation.



2.6 Acquisitions as competition strategy

In a situation where a platform appears to be in a dominant or gatekeeper position, its economic power could in theory still be circumscribed by the competitive pressure coming from the existing market operators or threat of entry by new entrants. In other words, if a platform attempts to misuse its economic power and extract rents (also in the form of data) from its users, then competing platforms offering better terms could potentially expand or emerge and rapidly win over users, especially in markets where economies of scale and scope, network effects and other switching costs are weak.

However, it is frequently suggested that to bolster their market positions, some large platform companies have adopted a practice of neutralizing threats from new entrants by means of pre-emptive acquisitions. To identify potential targets before they grow to become a threat (and before acquisitions become so large as to attract competition regulators), the platforms are said to use their superior access to data on consumer and/or business behaviour. In the final report on its Digital Platforms Inquiry, the Australian Competition and Consumer Committee refers in this regard to Facebook's alleged use of a security and VPN app for this purpose.[52] The report also contains statistics compiled by University of Oxford researchers on significant data flows from hosted apps to app store operators such as Google and Apple. Such flows give the app store operators an unrivalled view of which apps are taking off.

While M&A activity can clearly be an important indicator for measuring different dynamics including concentration and innovation in the online platform economy, this should be seen as one part of comprehensive and evolving competitive strategies deployed by online platforms. Technical or commercial partnerships that do not necessarily amount to a merger under competition rules may for example carry similar implications for enabling efficiencies but therefore also for actual or potential competition. Internal Facebook recordings in addition refer to

[52] Australian Competition and Consumer Committee, Digital Platforms Inquiry, final report of June 2019, p. 81 and appendix I. https://www.accc.gov.au/publications/digital-platforms-inquiry-final-report

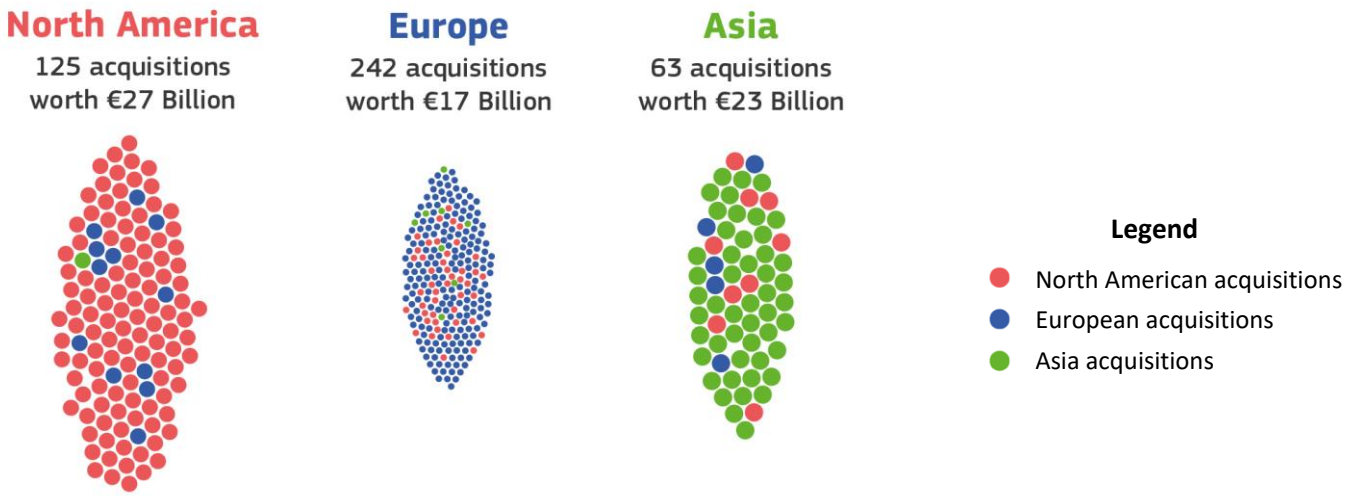
the concept of launching copycat companies in markets that have not yet been captured by the relevant (potential) competitors.[53]

Recent data suggests that volume and value of acquisitions of online platforms peaked during the period 2015-2017. However, M&A activity involving online platforms remains significant today. To date, 2019 saw 135 acquisitions of online multi-sided marketplaces worth a total of EUR 15 billion, in addition to 43 acquisitions of social media worth a total of EUR 11.7 billion.[54]

[53] This concerns the launching of Lasso in Mexico, in an apparent attempt to compete with ByteDance's TikTok app. See: https://www.theverge.com/2019/10/1/20756701/mark-zuckerberg-facebook-leak-audio-ftc-antitrust-elizabeth-warren-tiktok-comments.

[54] Dealroom marketplaces report, 2019. Based on publicly disclosed transaction amounts at worldwide level, and involving only marketplaces and social media having received prior private equity funding.

Figure 6. Spending on acquisitions – chosen regions



2.6.1 Conceptualizing acquisitions as competitive strategy

Concerns have been expressed about whether current merger rules are sufficiently capable to assess the possible anticompetitive effects of the early elimination of new entrants through acquisition, in particular in cases referred to as 'killer acquisitions'. From a procedural perspective, such acquisitions may not meet the turnover thresholds of the EU Merger Regulation, because start-ups may instead of making profits be focused on building a user base and collecting data. US research suggests that companies do engage in "stealth consolidation": anticompetitive deals whose individual size enables them to escape regulatory scrutiny but whose cumulative effect is large.[55]

To address this gap in the jurisdiction of competition authorities, Germany and Austria have introduced an alternative threshold beyond turnover, which employs the value of a transaction as a notification trigger. From a substantive perspective, the impact that a pre-emptive acquisition has on the level of competition is not always straightforward to assess, *for example* because there may be no strong horizontal, vertical or conglomerate overlap between the existing activities of the merging parties.[56]

Against this background, some instances of getting acquired by an incumbent platform company point to an exit strategy for many startups and their investors, which questions whether they are seriously aiming to unseat the incumbents in the first place. Moreover, the venture capital investment model common in the online platform economy could have some anticompetitive side effects already before any acquisitions take place, because investments and potential investments can impact behaviors even where they do not give the investor control over the beneficiary company. The venture capital industry is concentrated, and large platforms are very active as providers of venture capital funding for startup platforms, including outside their geographic areas

[55] Thomas Wollmann. Stealth consolidation: Evidence from an amendment to the Hart-Scottrodino act. American Economic Review: Insights, June 2019.

[56] For a discussion, see report 'Competition policy for the digital era', April 2019, p. 110-124 and M. Bourreau & A. De Streel,'Digital Conglomerates and EU Competition Policy, March 2019, p. 31-33, available at http://www.crid.be/pdf/public/8377.pdf.

of activity as well as indirectly through vehicles such as Softbank's Vision Fund. In other words, even without outright acquiring potential competitors, established platform companies are likely to be already directly or indirectly owning stakes in many of them. A recent KPMG study found that two-thirds of the 187 largest platform companies are privately owned, and that the seven largest among them together in turn hold 50 e-commerce platforms and 24 social media platforms that are each valued at over USD 100 million – amongst a variety of further platform holdings.[57] This points to integration and possible conglomerate effects.

Besides competing startups, platforms also frequently acquire companies that are complementary to the platform. Complementary target companies can perform particularly well when plugged in to the largest platform companies' data backbones ('unique fit'). This is not a competition issue in the same sense as pre-emptive acquisitions of competing startups could be. At the same time, acquisitions that appear entirely complementary could nonetheless be problematic, if and to the extent that they increase the platform company's power in some time horizon and significantly impede competition in new markets. Possible negative effects might be felt at a level that exceeds any given relevant product market defined under competition law, and over a longer time horizon. In this regard, it would for example be interesting to examine whether the recent large-scale acquisitions of open source software companies by online platforms have or will have an impact on the extent to which such software constitutes an overall viable alternative to the acquirers' closed, conglomerate ecosystems, especially in light of a number of acquisitions that happened in parallel.[58] Some commentators have mentioned in this regard that even the mere fact that such software changes ownership might have a psychological impact on developers' trust in and engagement with the software.[59]

In light of all of the foregoing, we believe it is necessary to develop ways of monitoring platform acquisitions in a structural and comprehensive way, to ensure that any potentially required interventions are evidence-based and maximize consumer benefit. Any indicator should ideally be capable of answering a host of research questions that relate to the specificities of the online platform economy (e.g. its potentially global nature, data-driven scale, and scope network effects). A list of such potential indicators is set out in more details in **Annex 1**.

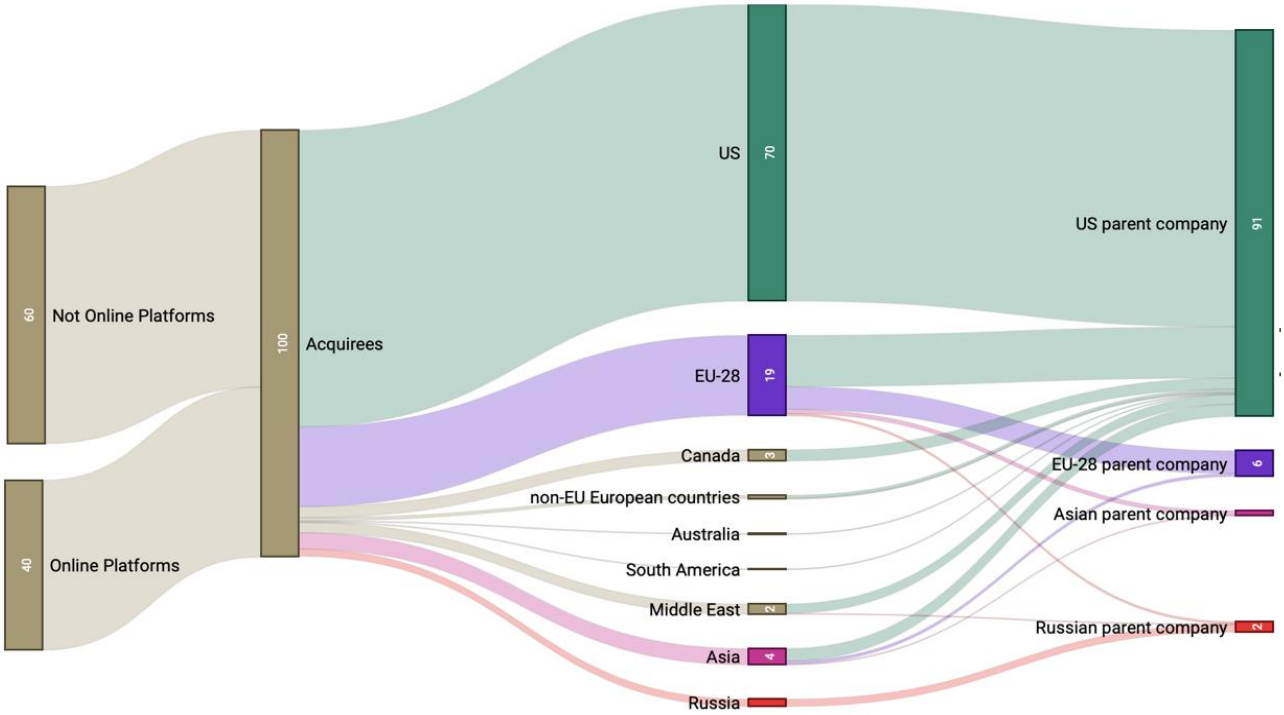
[57] KPMG (2018), Unlocking the value of the platform economy, available at: https://dutchitchannel.nl/612528/dutch-transformation-platform-economy-paper-kpmg.pdf.

[58] Recent examples include Microsoft's acquisition of Github, IBM's acquisition of Red Hat, Salesforce's acquisition of Mulesoft and Adobe's acquisition of the open source e-commerce platform Magento.

[59] See, for example: https://tech.newstatesman.com/guest-opinion/red-hat-ibm-acquisition-open-source, and; https://techcrunch.com/2018/10/26/microsoft-closes-its-7-5b-purchase-of-code-sharing-platform-github/?guccounter=1&guce_referrer_us=aHR0cHM6Ly93d3cuZ29vZ2xlLmNvbS8&guce_referrer_cs=ldaDnPpQdASujphJPFVcMw.

Figure 7. Sankey diagram for the M&A dimension

Figure 7 sketches the whole amount of acquisitions dealt by 50 selected online platforms from 2013 to 2019 and other companies. At the left side of the figure, the first column shows whether the acquired companies were categorised as platforms or non-platforms, 40% and 60% respectively. The third column includes countries of origin of the acquired companies: 70% of acquired companies originated in the US and 19% in the EU-28. The fourth column represents the countries of the parent companies. Over 90% of the start-ups from other countries were acquired by American parent companies. And EU-28 acquired only 6% of all deals, mainly from EU-28 countries and Asia.



Source: Own elaboration.

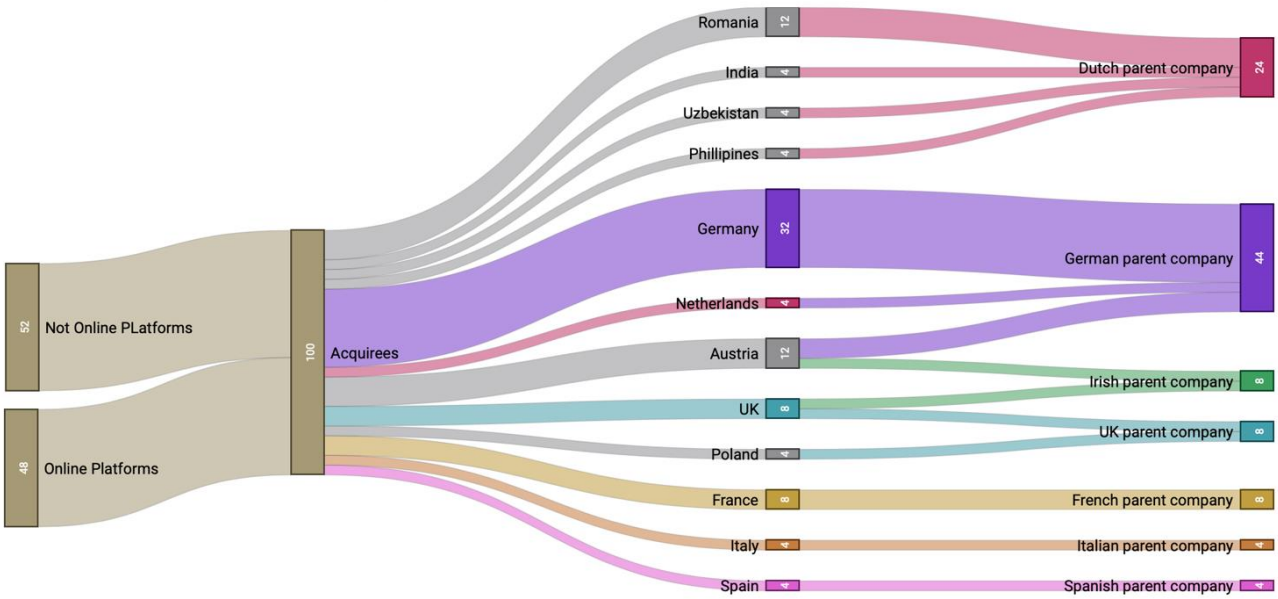
Notes: Middle East (Israel, UAE), Asia (India, Singapore, China, Taiwan, Japan, Thailand, Philippines, Uzbekistan), South America (Chile), non-EU European countries (Belarus, Iceland, Switzerland).
Period covered: 2013-2019.

2.6.2 Measuring acquisitions

To assess how widespread pre-emptive acquisitions are, and which platforms are engaged in the practice, it would be necessary to measure acquisitions of startups where the acquisition does not meet current thresholds for assessment. Depending on the industry/segment, it might be acceptable to investigate and measure all direct acquisitions by online platforms for simplicity, or only their acquisitions that are considered potentially pre-emptive in nature. The former would provide an upper bound on the potential prevalence of pre-emptive acquisitions. The latter would require an element of subjective assessment. For platforms that are acquiring high volumes of startups (e.g. Facebook, Google), it would make sense to quantify acquisitions and compare rates of acquisition over time. Such longitudinal data could be used to examine the effects of regulatory changes, for instance. In segments where the number of new entrants is smaller, a more qualitative indicator ("platform has/has not engaged in potentially pre-emptive acquisitions") might be more sensible.

Figure 8. Sankey diagram for the M&A dimension

Figure 8 shows more specific (country-level) information related to the origins of companies acquired by EU parent companies: [EU country] parent company acquires a company from [country name] that can be classified as a platform or non-platform. Out of all companies acquired by European parent companies from 2013 to 2019, almost half of them can be classified as online platforms. More than 30% of those companies originate from Germany, 12% from Austria and 12% from Romania. Over 40% of those companies have been acquired by German parent companies, and only 24% by Dutch parent companies.



Source: Own elaboration.

Acquisition numbers from large online platform companies could then be benchmarked against similar data from other industries. The acquisition of digital startups is not limited to tech firms; for instance, automotive firms are also active acquirers. Comparing online platform companies' acquisition behaviour against a benchmark industry could give a better basis to understand commercial strategies. Also, observations could include what happened after the acquisition: did the target company continue trading in an arm's-length relationship, was it integrated into the acquiring company, was it re-sold, or was it unwinded? Any clear patterns in post-acquisition behaviour could provide further basis for better understanding and assessing potential commercial strategies.

Simple data on the volume and value of acquisitions of online multi-sided marketplaces and social media (together covering the broader online platform economy) provides a first confirmation that

M&A activity appears to be significant. In addition to 136 successful IPOs worth a total EUR 552 billion, investors acquired 1 723 online marketplaces worth EUR 159.1 billion during the period 2013-2019 (to date). This comes in addition to 609 acquisitions of social media companies worth a total of EUR 250.1 billion. These figures can be benchmarked against semiconductors, which saw EUR 65.6 billion spread over 498 acquisitions, or the entire manufacturing space, which recorded EUR 564.9 billion being spent over 3 625 acquisitions during the same period. Importantly, the data also seem to confirm that online marketplaces are themselves prolific acquirers: these firms made 474 *direct* acquisitions of other marketplaces worth a total EUR 73.9 billion (in addition to indirect, portfolio investments). As regards the EU, a nuanced picture emerges. On the one hand, Europe saw the highest total number of online marketplace acquisitions, but for the lowest total amount relative to North America and Asia (242 acquisitions worth EUR 17.1 billion, versus 125 worth EUR 27.8 billion for North America and 63 worth EUR 23.7 billion for Asia). On the other hand, EU-based online marketplaces accounted for the vast majority of acquisitions of other EU-based marketplaces (185 out of 242), however amounting only to EUR 4.1 billion out of a total of EUR 17.1 billion invested (note that South-African Naspers makes up for a large part of the difference). North American online marketplaces in this regard seem to have underspent in the EU relative to Asia, with EUR 1.2 billion versus EUR 19.7 billion spent over, respectively, 43 and 9 separate acquisitions.[60]

All of the above statistics provide directions for further research and measurement, for example on the question of why EU-based online marketplaces get bought more frequently but at lower values, having secured less funding at similar company ages, than their North American and Asian peers. Given the **global nature of the online platform economy**, the collective impact of worldwide acquisitions of online marketplaces, including notably by marketplaces as acquirers, on innovation and competition including in a cross-continental context is of overarching concern and importance.

2.6.3 Data sources on acquisitions

Various studies, reports, and public documents provide data and analysis on acquisitions in different industries. For instance, DG Competition's public decision on the Priceline-Momondo acqusitions provides a good source on acquisitions in the Online Travel Agency (OTA) and metasearch sectors.[61] However, these are snapshot sources that do not provide rolling coverage over time and across industries.

News monitoring and DG COMP press releases could provide an ongoing data source. However, not all acquisitions are ever publicized, and in some cases small acquisitions only come to light after some time has passed from the deal. Multiple market intelligence companies collect and publish information on acquisitions from sources that go beyond press releases, including media

[60] Dealroom data procured by the European Commission, 2019.

[61] Other documents include the following:
Ex-post Assessment of Merger Control Decisions in Digital Markets, Lear, 9 May 2019
Australian Competition and Consumer Committee, Digital Platforms Inquiry, final report of June 2019
https://www.concurrences.com/en/bulletin/special-issues/mergers-and-acquisitions-in-online-platforms/mergers-and-acquisitions-in-online-platforms-an-overview-of-eu-and-national-en
https://promarket.org/wp-content/uploads/2018/04/Digital-Platforms-and-Concentration.pdf
https://mindthebridge.com/mtbcrunchbase-techstartup-mas-2018/

stories and financial filings. Some of these are likely to represent the best available sources of data on acquisitions in the near term. These companies include the following:

- Crunchbase
- Bloomberg
- BvD (Orbis, Zephyr, Orbis Intellectual Property, Orbis Crossborder Investment)
- Dealroom
- Pitchbook: M&A (deal amount, post valuation)
- SDC
- Zirra

For instance, the Crunchbase database provides rolling coverage on acquisitions against an access fee. API access is available, which could potentially be used to create a real-time quantitative indicator of platforms' gross acquisition behaviour. Human classifiers could be used to flag up potentially anti-competitive acquisitions to create a near-real-time quantitative indicator of anti-competitive acquisitions.

In the longer term, relying on commercial market intelligence, whose methods of production are not always very transparent, is not ideal for such a major area of policy and regulation. We recommend for the EU to develop a system that would more systematically keep track of acquisitions in the online platform economy as a way to identify possible harmful effects of increasing merger activity. To that end, we suggest that the EU introduce obligations on "major" platforms (see section on Platform size and importance, above, on developing such a threshold) to report all acquisitions to the European Commission; not for ex-ante intervention, but for ex-post monitoring. Such reporting obligations could potentially also extend to equity participation, that is, partial ownership, where this is not already captured by the EU merger rules.

2.7 Platform Volatility

The notion of volatility refers to potentially rapid and unpredictable changes in the technologies, policies and practices that make up an online platform. While there are good reasons why platform companies must constantly change and update aspects of their service, this volatility also has downsides. It increases uncertainty and makes it harder for consumers and business users of platforms to plan their activities. It increases businesses' operating costs as they must constantly adapt. In some cases it causes cliff-edge scenarios where an entire business model suddenly becomes untenable due to platform changes. These issues are likely to disproportionately affect smaller companies, as larger firms often receive preferred treatment from platforms in the form of more comprehensive tools, information, and platform-to-business communication channels.[62]

Measuring platform volatility would be useful because it would allow businesses to make more informed choices when deciding which platform(s) to invest into, allow platforms to benchmark their own activities, and provide information for policy makers on whether and where policy interventions might be needed to balance the stakeholders' interests.

[62] YouTube, for example, distinguishes four "benefit" levels according to subscriber numbers. Channels with more than 100.000 subscribers receive access to a "partner manager" that provides council and access to human interaction instead of the standard form-based communication. (https://www.youtube.com/intl/en-GB/creators/benefits/silver/) Similar "ladders" exist for other platforms and larger companies may be able to broker tailormade agreements.

More concretely, volatility could be measured in at least three areas, outlined below.

2.7.1 Measuring volatility of technical specifications and practices

Volatility may affect the full stack of technologies involved in platform activities, such as interaction protocols (e.g. changes APIs or user interface functionalities), information regimes (e.g. changes in the data available to business users, including information on performance), and connectivity mechanisms (e.g. changes in ranking procedures that affect which and how many users can be reached). Adapting to these changes may be costly (e.g. require changes in business tools and practices) or impossible (e.g. if ranking cannot be affected).

Depending on the platform in question, there may be available information on individual changes through company blogs, developer documents (most platforms that use APIs provide version updates that are documented), or simply direct observation of (interface) changes. Companies such as Google regularly announce changes to ranking procedures, even if little detail is provided. Industry websites such as searchengineland.com extensively collect and comment the changes.

Scraping is a possibility for observing volatility over time, for example when it comes to changes in specifications or interfaces. Such efforts connect the larger field of "algorithmic accountability".[63] When it comes to ranking procedures, it is difficult to disentangle changes in actual software code from changes in models based on statistical learning. At the same time, it may be interesting to submit a number of queries to specific platforms at regular intervals to document the observed volatility in outputs. Information science proposes numerous ways to quantify change between ranked lists of items.[64] Since most platforms reduce access A successful example for such an approach was the German "#Datenspende" project financed by the media regulation agencies ("Landesmedienanstalten") of Bavaria, Berlin-Brandenburg, Hesse, Rhineland-Palatinate, Saarland, and Saxony in cooperation with AlgorithmWatch, the Technical University Kaiserslautern, and Spiegel Online.[65] During the 2017 national elections, 1.500 volunteers installed a custom browser-plugin that would send 16 relevant queries (the names of parties and politicians) to Google Search at regular intervals. The resulting dataset not only painted an overall picture of ranking effects on visibility, but also allowed for the analysis of localization and personalization.

2.7.2 Measuring volatility of terms of service, conditions, contracts, etc.

Much like technical specifications, legal documents and (binding) end-user agreements may be subject to significant change over time. This affects platform participants in similar ways as technical changes, reducing plannability and potentially inducing costs.

While these elements are largely available on company websites and could be easily scraped (also going back in time using web archives such as archive.org's WayBackMachine), comparisons based on text processing can hardly pretend to deliver deeper appreciations of the substance of changes over time. One could, however, use software to make changes more visible and provide

[63] e.g. Diakopoulos, Nicholas. 2015. "Algorithmic Accountability." Digital Journalism 3 (3): 398–415. For a typologies of approaches see Sandvig C, Hamilton K, Karahalios K, et al. (2014) Auditing algorithms: Research methods for detecting discrimination on Internet platforms. In: Data and Discrimination: Converting Critical Concerns into Productive Inquiry, Seattle, USA, 22 May 2014, pp. 1–23.

[64] cf. Rieder, Bernhard, Ariadna Matamoros-Fernández, and Òscar Coromina. 2018. "From Ranking Algorithms to 'Ranking Cultures'." *Convergence: the International Journal of Research Into New Media Technologies* 24 (1): 50–68.

[65] The final report is available here: https://www.blm.de/files/pdf2/bericht-datenspende---wer-sieht-was-auf-google.pdf (german)

measures that are at least helpful, e.g. number of paragraphs affected by change from one version to the next.

There have been many different projects pursuing similar goes, often focuses on either terms of service or privacy policies. The TOSBack[66] project relies on a browser plugin and volunteer work to both track changes in companies' terms of service and to distill them into lists of more easily understandable items. The joint Polisis[67] and PriBot[68] projects seek to facilitate the *interpretation* of privacy policies with the help of artificial intelligence[69] to make it easier to scale up from the limitations of volunteer work. While these projects are not focusing analysis over time, the data they collect could be used for precisely this end. Individual research groups have also engaged in attempts document and measure these policies.[70]

2.7.3 Measuring volatility of business practices

While changes in technical and contractual specifications are very relevant, they are often connected to less explicit changes in business practices: recent episodes on social media concerning content removal, ad monetization, and outright banning clearly show that companies have considerable leeway when it comes to interpreting their own vaguely formulated rules. This may again be particularly difficult for smaller companies to handle, even with better redress procedures in place/

Taken together, these three aspects of volatility pose considerable challenges and may only be captured in more significant ways by costly surveys, e.g. with platform participants. Another issue is the difficulty to generalize beyond a "per platform" basis. Scraping, for example, cannot be easily transposed from one platform to another and the comparability of data and indicators is not a given. However, comparability is likely to be somewhat better between platforms operating within the same sector, such as e-commerce or travel, and it is these kinds of comparisons that are most important.

One could relatively easily imagine a pilot project that would select a reduced number of platforms, trying to compile data for them and testing the feasibility of automated approaches.

2.8 Platform Transparency

Platform volatility can be seen as one aspect of the larger problem of transparency, understood as the capacity of platform participants to understand the various rules, regulations, and mechanisms at work inside of specific platforms. Transparency can thus be related back to the three dimensions discussed above but can also relate to the question how active a company is in proactively notifying participants on the factors that are relevant for their business success or in answering questions

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[66] TOSBack provides a short self-description: "TOSBack began as a collaboration between the EFF, the Internet Society, and ToS;DR, and is now maintained by ToS;DR. Every day, we check the Terms and Policies of many online services to see if any of them have changed." (https://tosback.org)

[67] https://pribot.org/polisis

[68] https://pribot.org

[69] Wired article for overview: https://www.wired.com/story/polisis-ai-reads-privacy-policies-so-you-dont-have-to/

[70] The Center for Technology and Society of Fundação Getulio Vargas Rio de Janeiro Law School, in collaboration with the Council of Europe have released two editions of a comprehensive report entitled Terms of Service and Human Rights: An Analysis of Online Platform Contracts. (http://bibliotecadigital.fgv.br/dspace/handle/10438/18231) A study that explicitly compares over time is Linden, Thomas, Rishabh Khandelwal, Hamza Harkous, and Kassem Fawaz. 2018. "The Privacy Policy Landscape After the GDPR." arXiv.org.

and replying to concerns. But the notion also concerns the quality of explanations, the granularity of (technical) specifications, and the capacity of the tools made available to participants to inform them on the standing of their products. If a seller on Amazon Marketplace, for example, can see how their products perform, but only in isolation and not relative to other sellers and Amazon itself, it is difficult to know if one's own strategies are successful or not.

2.8.1 Measuring platform transparency

One way to approach the issue could be to identify different aspects of platform activities and try to create an index for each of them. One such aspect could be algorithmic ranking and similar procedures (e.g. recommendation, filtering); another could be data captured and data uses (particularly relevant when platform participants are also in direct competition with the platform owner, as in the case of Amazon); a third could be "explanations given" for particularly relevant incidents, for example a large drop in rankings, demonetization, or banning. While these things are not easily quantifiable, there are examples of "scorecard" type indices that operate along a number of dimensions that are clearly defined. Greenpeace's *Guide to Greener Electronics*[71], for example, scores companies not just on more straightforward variables such as energy use, recycling, etc., but also on the willingness to provide data on their practices in the first place. More closely related to the subject at hand is the *Ranking Digital Rights*[72] project, which publishes a yearly Corporate Accountability Index that "ranks 24 companies according to 35 indicators evaluating company disclosure of policies and practices affecting freedom of expression and privacy."[73] Every company receives not only a score along 35 quantitative indicators, but qualitative analysis and comparison with previous years. Scholarships argue that "[i]ndices can help to identify trends over time and across different intermediaries in a way that furthers discussions about the role of private firms [...]. Well-designed indices can also help encourage firms to develop better governance practices, as well as empower users to make more informed choices (at least in markets with effective competition)."[74] Another example is the Lumen Database for collection and analysis of copyright takedowns and requests for removal of copyright protected online material.[75] P2B Regulation provides for a transparency in a similar way, when the reasons for delisting of the content are based on a third party notification.[76]

One could again imagine a case study for a select number of platforms that are evaluated based on such a grid of factors.

2.9 Other policy-relevant practices

Beyond the broader issues covered above, there may be specific policy-relevant practices that could warrant special monitoring of their own. But the capacity to actually identify such problematic practices depends, to a degree, on the question of transparency. Many changes or factors affecting participants' business success may be imperceptible to a point that problems and abuses cannot even be detected. Increasingly complex technical infrastructures exacerbate the

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[71] https://www.greenpeace.org/usa/reports/greener-electronics-2017/

[72] http://rankingdigitalrights.org see also Maréchal, Nathalie. 2015. "Ranking Digital Rights: Human Rights, the Internet and the Fifth Estate." International Journal of Communication 9 (October): 3440–49.

[73] https://rankingdigitalrights.org/2019-indicators/

[74] Suzor, Nicolas, Tess Van Geelen, and Sarah Myers West. 2018. "Evaluating the Legitimacy of Platform Governance: a Review of Research and a Shared Research Agenda." International Communication Gazette 80 (4): 385-400, p.386.

[75] https://www.lumendatabase.org/

[76] Article 5(5) of the P2B Regulation.

issue. As Brin and Page (1998: 18) famously state in their original presentation of Google Search, "a search engine could add a small factor to search results from 'friendly' companies, and subtract a factor from results from competitors. This type of bias is very difficult to detect but could still have a significant effect on the market".

2.9.1 Data sources on policy-relevant practices

It would nevertheless be possible to use surveys or similar strategies that seek to count at least the visible part of (potential) problems by counting complaints or other forms of contestation. For instance, the Observatory will have an "online portal" that will allow business users of platforms to submit any concerns that they have for the Observatory's consideration. In specific cases, it may be possible to automatically detect complaints, for example though the use of keyword search: on YouTube, for example, terms like "demonetization" and "adpocalypse" can capture video creator complaints.[77] Meta-review sites such as Trustpilot may be interesting reservoirs of data on problematic practices, even if data reliability would clearly be a problem.

The P2B Regulation, once it will be applied in 2020, should provide more visibility into platform users' grievances. It requires in Art. 11(4) that providers of online intermediation services shall establish and make easily available to public information on the functioning and effectiveness of their internal complaint-handling system. The provision further specifies what types of information the report should contain, and that it should be updated at least annually. Small and micro-companies are excluded from this duty, however.

To some extent, platforms are already releasing this kind of information. Google, for example, provides extensive data in their *Transparency Report*[78], including government requests for information or content removal. These may me practices to build on, improve, and standardize between platform providers.

[77] For an example of the use of web scraping to harvest complaints computationally, see Wood, A. & Lehdonvirta, V. (2019). Platform Labour and Structured Antagonism: Understanding the Origins of Protest in the Gig Economy. http://dx.doi.org/10.2139/ssrn.3357804

[78] https://transparencyreport.google.com

3. Overall recommendations

Table 6 summarizes our main recommendations related to each topic area and indicator. On the one hand, the recommendations are presented with the needs of the ongoing Observatory in mind, and its need to produce useful observations on the platform economy in the near term. On the other hand, we have considered what could be done to ensure that important indicators are available to policy makers and researchers in the longer term.

We recommend that in the near term the EC direct resources to compiling numbers on selected industry verticals and selected individual platforms. This serves two purposes. One is producing quick but useful insights on strategically important verticals and platforms. In the presence of winner-takes-most dynamics, measuring even just the top one platform may provide a reasonable idea of the overall state of the market. This is in marked contrast to most conventional markets and approaches to measuring them. The second purpose of such quick studies is to serve as pilots for larger, more comprehensive, and more regular efforts that could be in the future undertaken for instance by statistical agencies to produce basic data on what is becoming a systemic part of the economy.

Table 6. Recommendations pertaining to specific indicators

Area/Indicator	Status/recommendations
Significance of platforms in the broader economy	
1. Volume of trade mediated by platforms	Novel but conceptually quite straightforward indicator. Data lacking; some snapshot data exists in specific verticals. We recommend (1) that the EC develop a snapshot picture of platform-mediated trade flows in selected verticals from existing data sources as part of the Observatory, and (2) investment into longitudinal data collection by statistical agencies. Instead of a piecemeal national approach, Eurostat could compile data acquired directly from platform companies. Empowering Eurostat to acquire the data would likely require new legislation.
2. Platform size and importance	Needs more conceptual development. An active area of research in the competition policy domain. We recommend further investment into research, with a focus on measuring platform size/importance for the purposes of specific regulatory objectives, including but not limited to competition.
3. Data on data	Both conceptual underpinnings and data sources are lacking. We recommend that EC direct research funding to this area.
Platforms' power over users	
4. Business dependence on platforms	Conceptually quite well developed, but data sources are lacking beyond snapshot survey data. We recommend that (1) EC use survey data to develop a snapshot picture for the purposes of the Observatory; (2) industry associations are encouraged to collect data from their members regularly for longitudinal data; and (3) national statistical agencies introduce questions on platform use and dependence into their establishment surveys.

5. Platform's share of consumer attention	Conceptually quite straightforward but would benefit from further elaboration. Internet traffic data and search data could be used to develop longitudinal proxy indicators, but requires further work. We recommend that EC develop pilot indicators for selected verticals and platforms as part of the Observatory.
6. Acquisitions as competitive strategy	Longitudinal data is available from commercial providers, but is likely to be incomplete. The topic also benefits from further conceptual and theoretical development. We recommend (1) that EC produce a pilot indicator measuring selected platforms' acquisition behaviour over time as a way to push forward the conceptual development; (2) direct further research funding into this area; and (3) introduce new obligations on major platforms to report any M&A activity to the European Commission, not for ex-ante intervention but for ex-post monitoring purposes.
Consequences of platforms' power	
7. Platform volatility	Conceptually quite well developed. Nature of data depends on type of volatility, with some being easier to quantify than others. We recommend that EC (1) consult with platforms' business users on effects of volatility, and (2) commission the development of an automated volatility tracker tool on selected platforms as part of the Observatory, both to provide data and to act as a pilot for a potentially wider follow-up.
8. Platform transparency	Would benefit from further conceptual work e.g. on the tradeoffs between transparency and legitimate business interests. Some existing data. We recommend EC develop a pilot "scorecard" of transparency of selected platforms.
9. Other policy-relevant practices	We recommend that the EC direct resources to analysing the data that will be generated by (1) the Observatory's online portal, and (2) the P2B Regulation's transparency obligations on platforms to disclose data on their internal complaint-handling systems. On this basis, the Observatory should analyse whether there is need for follow-up regulation that creates additional reporting obligations on platforms concerning complaints and their handling.

ANNEX 1: Guiding questions for monitoring acquisitions as competitive strategy

This annex sets out relevant research questions that could be informed by the recommendation in Chapter 2.6 to conduct more systematic monitoring of platforms´ M&A activity.

1) Acquisition history of platforms

What are the most "typical" types of acquisitions by platforms? What are the differences and commonalities in the acquisition focus and strategies? What aspects of these acquisitions are relevant to map and systematically compare acquisition histories and strategies and answer this question? - e.g. type, age and size of target, market position acquirer (e.g. challenger vs industry incumbent, vertically integrated, locked-in consumer base), rationale (acquiring technology/IP, talent and/or data/networks of users), value of acquisition, whether the target was maintained at arm's length or successfully integrated (see also question 3), whether data sharing occurred post-acquisition, whether it was divested or discontinued, whether the acquisition has been subject to merger control and possible remedies, etc.

Can certain common typologies be discerned for types of competitive strategies/rationale deployed by platforms? E.g. **geographical expansion (differentiated vs one-brand strategy), platform diversification (differentiated vs one brand strategy)** (e.g. eBay, Priceline and Tripadvisor acquiring successful marketplaces in specific product or geographic niches, and beyond their existing area of geographic activity, while maintaining these as standalone brands), **platform integration** (e.g. Alphabet integrating hardware/software, ads/platforms, directory/services), **company-specific platform ecosystems** (e.g. Alphabet is particularly integrated both vertically and horizontally), **sector-specific hardware-software integration** (e.g. B2B IIoT platforms, Siemens Mindsphere, Philips Healthsuite, Bayer Xarvio, IBM Watson, SAP Leonardo, Schneider Exostructure, Microsoft Azure), etc.

Fact-finding strategy: What are the possible sources of data and information for the aspects identified (main indicators)? E.g. Fianancial/company databases: BvD (Orbis, Zephyr, Orbis Intellectual Property, Orbis Crossborder Investment), Bloomberg, SDC; startup databases/analysis: 2018 Atomico State of European Tech Report, Startup Europe, Dealroom (VC investment in marketplaces) Crunchbase (M&A); Competition authorities (decisions + studies + ex-post evaluations, like Lear report digital markets.

2) Industry comparison

How does the acquisition activity of online platforms compare to that of big pharma, energy, car manufacturers, etc. Can we isolate digital-specific acquisitions for these sectors as a 'control group'?

Note in this regard the sizeable pipeline of M&A activity for established EU non-tech companies (VW[79], BNP, Bayer, Siemens, Continental, Vodafone), and the large number of their prior tech acquisitions that were not subject to merger control. For the status of acquirer as vertically

[79] https://www.bloomberg.com/news/articles/2018-08-23/vw-sees-tech-acquisitions-this-year-as-we-digital-project-starts.

integrated incumbent, the Bayer-Monsanto, Dassault-Exa, Schneider-Invensys, Siemens-Mendix, Philips-Vitalhealth and other individual acquisitions could provide insights.

3) Impact of acquisitions on platforms' activities

How did the acquired targets contribute to the platforms' activities? In this regard, what are the most "typical" ways in which these acquisitions improved and/or extended the scope of activities of the acquirer? What are the main sources of synergies?

By understanding the likelihood of *potential entry* for specific types of platforms, it may be easier to appreciate in which cases synergies are likely to result.

Case studies: what have been the main/most successful new developments in GAFAM's activities over the past 10 years? To what extent did GAFAM rely on acquisitions for these developments?

Fact-finding strategy: What possible data and information sources could we use to answer this question and to qualify the contribution of acquisitions to the acquirer's activity as small, substantial or very substantial?

4) Expansion of platforms beyond their home (geo) markets. Global vs local competition.

Based on an overview of geographic expansion by platforms at global level:

Which geographies, besides US, have spawned successful platforms having global potential? What are the key factors /sets of circumstances that play a significant role in platforms` decision to expand into new geographies from their "home" markets? What prevents platforms which are successful in their home markets to expand into new geo markets, or what moves them to pull out?

Examples of possible case studies: Softbank's cross-industry shareholdings, the Uber, Didi and Grab market sharing schemes and the integration of GO-JEK into Google Maps.

Fact-finding strategy: What possible data and information sources could we use to answer these questions?

5) Expansion of platforms beyond their core (product) markets.

Based on an overview of expansion into new products/services, in particular by GAFAM and a select number of other platforms:

What are the key factors /sets of circumstances that play a significant role in platforms` decision to expand into new activities/markets from their core activities/markets?

Examples of possible case studies: (e.g.Amazon Firephone, Google Hangouts, Google Android, Facebook payments, Apple Music, Amazon Prime video streaming, etc).

Fact-finding strategy: What possible data and information sources could we use to answer these questions?

6) Role of online platforms in the startup ecosystem

Overall question: To what extent are online platform acquisitions (focusing on GAFAM) critical for a healthy and resilient start-up ecosystem? What are the main indicators that determine the "health" and "resilience" of a startup ecosystem?

Fact-finding strategy: what possible data and information sources? Financial and company databases (ORBIS/Zephyr, Bloomberg, SDC); specialised databases/analysis for tech startups (Crunchbase, Dealroom incl. focused reports e.g. Dealroom report on trends in marketplaces?; Specialist tech analysts (Gartner, IDC etc).

7) Partnerships & technical integration

Given their prevalence in the online platform economy, should we also be looking into certain types of partnerships (including minority investments and technical/API integration) when analysing M&A as a competitive strategy? To what extent do these partnerships potentially present an alternative to a merger/JV? To what extent may the competitive impact of (at least some) of these partnerships be similar to that of a merger/JV?

Examples of partnerships: the Alphabet-Apple search traffic sharing agreement (seen from a possible "ecosystem-level competition"), the Alphabet-Deliveroo integration as well as the integration of four competing EU providers of tickets for cultural attractions into Google Maps