Chapter 2 - The emergence of intermediaries on the internet – a socio-technical[85] review

A. The early internet

As *Wu* demonstrates in his book *The Master Switch*, the last 150 years have been characterised by successive waves of new information technologies of which many promised the dawn of a new age for society. The telegraph, telephone, radio and film all "*passed through a phase of revolutionary novelty and youthful utopianism*" that promised to change the lives of people forever.[86]

It does not come as a surprise that the internet, too, was hailed in the mid-1990s by its pioneers as a new utopian vision come true. *John Perry Barlow's* often cited *Declaration of Independence of the Cyberspace*[87] announced the construction of a new civilisation in cyberspace. He declared the internet a new social space, free from traditional government intervention, based on self-governance, arising out of "*ethics, enlightened self-interest, and commonwealth.*" *Barlow* conjured up a social contract in cyberspace, a new self-governance that would grow bottom-up, based on the norms of its users, regardless of where they are based in the world. *Post and Johnson* fleshed this vision out by arguing that regulation of the internet should be different from the laws of nation states. Cyberspace is a distinct place with unique characteristics, which defy the validity of legal rules from the "real world."[88] They pointed to independently operating self-government and enforcement mechanisms in cyberspace, such as banishing, technical protocols, netiquette and user education, operated by systems operators and

85 The term sociotechnical refers to the complex interactions that arise between technological systems (in this case information technology), society institutions and human beings. See also Roger Clarke and Marcus Wigan, 'The Information Infrastructures of 1985 and 2018: The Sociotechnical Context of Computer Law & Security' (2018) 34 Computer Law & Security Review 677, 678 and for the socio-technological paradigm in: Castells (n 3) 69.

86 Wu, *The Master Switch* (n 1) 5.

87 John Perry Barlow, 'A Declaration of the Independence of Cyberspace' (1996) <https://www.eff.org/cyberspace-independence> accessed 24 May 2019.

88 David R Johnson and David Post, 'Law And Borders- The Rise of Law in Cyberspace' (1996) 48 Stanford Law Review 1367.

users.[89] *Dyson* claimed that cyberspace would redraw the *"meaning of freedom,…, definition of property, nature of competition, sense of community."*[90] He called for a new *Magna Carta* for the knowledge age.

Competition lawyers may partly agree when looking at today's multi-sided online platforms, but not necessarily in the sense inferred by *Dyson* at the time. The early internauts used the unique characteristics of the internet and its infrastructure to challenge the traditional legal authority of nation states, whose jurisdiction was bound by territory.[91] This was a time when the internet had 16 million users, most of them based in the Western industrialised world and belonging to a narrowly circumscribed "cyber elite."[92]

Others, like *Lessig* or *Winner*, put these views into perspective by underlining the interdependence of cyberspace and its inhabitants with the "real world." The fact that rules are not applicable to cyberspace does not mean that they should not have an effect or that the state should not have a legitimate interest to enforce them.[93] *Lessig* predicted an adaptation of law to cyberspace. States would get there by modifying the internet's architecture, read: its code, such as for example mandating encryption. Today we would add watermarking, content filtering or geo-blocking to this. Cyberspace would be zoned, boundaries created between illegal and permitted spaces and content, administered by *"technologies of control."*[94] These technologies would not need to be 100% effective in order to be sufficiently dissuasive, daunting or frustrating for the average user. Harsher criticism comes from *Winner*. He sees cyber libertarians as propagators of a neoliberal ideology where *"ownership [of cyberspace] by the people"* means *"private ownership"*, which peddles the interests of transnational communication businesses.[95]

In Europe, the debate over the regulation of cyberspace was less fierce. Most commentators at the time pointed to the need for traditional regu-

89 ibid 1388–1389.

90 Esther Dyson, 'Cyberspace and the American Dream: A Magna Carta for the Knowledge Age (Release 1.2, August 22, 1994)' (1996) 12 The Information Society 295, 296.

91 Joel Reidenberg, 'Governing Networks and Rule-Making in Cyberspace' (1996) 45 Emory Law Journal 911, 913.

92 Barney Warf, 'Alternative Geographies of Cyberspace' in Uta Kohl (ed), *The Net and the Nation State - Multidisciplinary Perspectives on Internet Governance* (Cambridge University Press 2017).

93 Lawrence Lessig, 'The Zones of Cyberspace' (1996) 48 Stanford Law review 1403.

94 ibid 1409.

95 Langdon Winner, 'Cyberlibertarian Myths and the Prospects for Community' (1997) 27 ACM SIGCAS Computers and Society 14, 16.

lation to adapt to the particular challenges of the digital environment, echoing *Lessig's* remarks. The debate focussed on the more hands-on theme of rights enforcement in cyberspace in the face of a number of emerging harms, such as defamation, child pornography, hate speech or copyright piracy. Self-regulation, standardisation,[96] international law principles *(jus cogens)*[97] or international legal harmonisation were seen as means to address these challenges.

Fast forward 25 years and it looks like the debate over the regulation of the internet and the involvement of the state is still led from the same angle. There are (still) those voices that call for a hands-off and largely self-regulatory approach towards resolving various legal problems on the internet. But there are also calls for a more robust intervention and regulation of companies operating on the internet. However, this observation only holds true on a superficial level. While the main strands of argument have indeed remained the same, the underlying socio-economic and regulatory dynamics of the internet have changed dramatically. This makes today's debate not necessarily less controversial, but much more eclectic, global and inherently less clear-cut.

A brief historic examination of the socio-technical and regulatory developments of the internet and intermediaries will help set today's debate into this new context.

B. The technical architecture of the internet

Although this work focusses on the EU regulatory space one cannot avoid but talking about the internet's US origins, both on a technological and economic level.

It may be seen as an irony: the internet, originally promoted by its most fervent advocates as a medium free from state intervention and subject only to free competition, came about thanks to decades of sustained funding

96 Caitriona Hegarty and Euan Cameron, 'Case for Minimal Regulation of Electronic Network Communications' 10th BILETA Conference Electronic Communications (1995) <https://www.bileta.org.uk/conference-papers/10th-annual-conference-1995/> accessed 3 January 2017.

97 Viktor Mayer-Schönberger and Teree E Foster, 'A Regulatory Web: Free Speech and the Global Information Infrastructure' (1997) 3 Mich. Telecomm. Tech. L. Rev 17.

by the US military and public research money.[98] *Castells* explains how in search for a communications system that could survive a nuclear attack, the development of a decentralised network of interconnected endpoint devices (usually computers) was funded in the 1950s. The aim was to transmit data without a centralised exchange system and largely independent of the underlying network infrastructure.[99] Financed initially mainly through the US Department of Defense's Advanced Research Project Agency (ARPA), it eventually drew in public institutions in government and Universities in a loosely structured and relatively open way.[100]

The main technical inventions which have been underpinning the extraordinary success of the internet originate from this time. They are still the internet's essential underlying technologies.

First, the invention of data packet switching in the 1960s allowed for a revolutionary new way to transmit data. This technology did not require the pre-allocation of bandwidth between end users (like in circuit switching), with its centralised system of exchanges. Instead, the information was broken down in smaller data packets and then sent in a distributed manner to the recipient. It made communication more resilient, due to the various routes data packets could take. It also ensured a more efficient and therefore timelier transmission of data than the circuit switching which prevailed in the telecommunications networks at the time.[101] This made it well suited for the real time transmission of data.[102]

Secondly, the famous layered structure of the internet was an engineering design choice that ensured additional resilience, flexibility and adaptability of the internet to various communication media. There are varying classifications of the functional layers that make up the internet.[103] The choice depends on the level of technical depth needed in a given context. In essence, each layer is responsible for a different function of the data transmission. Each of these functions is implemented through technical

98 Linda D Garcia, 'The Evolution of the Internet: A Socio-Economic Account' in Johannes M Bauer and Michael Latzer (eds), *Handbook on the economics of the internet* (Paperback edition, EE, Edward Elgar Publishing 2017) 533–537.

99 Castells (n 3) 45.

100 Garcia (n 97) 534.

101 W Richard Stevens and Kevin W Fall, *TCP/IP Illustrated. Volume 1, Volume 1*, (2nd edn, Addison-Wesley 2011) 4.

102 Garcia (n 97) 534.

103 Günther Knieps and Johannes M Bauer, 'The Industrial Organization of the Internet' in Johannes M Bauer and Michael Latzer (eds), *Handbook on the economics of the internet* (Paperback edition, EE, Edward Elgar Publishing 2017) 30.

protocols and the whole structure forms a suite or stack of protocols. Here, the most basic grouping of the internet into three layers shall be briefly explained.[104]

At the lowest level of the internet is the infrastructure or link layer (or physical network layer).[105] Protocols at this level ensure that the endpoint devices can link up to the internet via the chosen communication access channel, be it Ethernet, Wi-Fi, cable or cellular.[106]

From here, the protocols at the transport/network, or logical layer ensure that the information is transported and routed through the network to the end user. The Transmission Control Protocol (TCP) has since the 1970s become the standard protocol used to break-up information into data packets at source and reassemble them at the user end point.[107] It thus enables packet switching. According to *Huston*, TCP, which is today incorporated into billions of devices, has remained the "workhorse of the internet."[108]

The Internet Protocol (IP) ensures that the data packets are routed through the networks to their destination via a succession of network switches and routers.

Finally, as described by *Stevens and Fall*, the application layer integrates different ways of how the internet can be utilised. The most known applications are email, the File Transmission Protocol (FTP), peer-to-peer computing (P2P) or, indeed, the World Wide Web.[109]

This layered structure is a ground-breaking element of the internet. Data is successfully routed because each layer's protocol adds information that is essential for the routing process to the packets. This information is added to the data packets in the form of headers. The data packets form the actual content that needs to be transmitted (the payload). The payload is thus successively encapsulated with information on the internet uplink characteristics, sender and recipient details, data packet expiry, delivery quality, delays

104 For more detail see Barbara van Schewick, 'Internet Architecture and Innovation in Applications' in Johannes M Bauer and Michael Latzer (eds), *Handbook on the economics of the internet* (Paperback edition, EE, Edward Elgar Publishing 2017).

105 Knieps and Bauer (n 102) 30.

106 Stevens and Fall (n 94). The link up normally happens via the device's operating system and its network adapter.

107 Garcia (n 97) 536.

108 Geoff Huston, 'A Quick Look at QUIC' (2019) 22 The Internet Protocol Journal 2, 2.

109 Stevens and Fall (n 100).

and other transport information during the routing process.[110] These technical details will become important when content filtering and monitoring systems are being discussed later on.

Packet switching and the encapsulation of data, especially through the TCP/IP protocol suite, mean that the information can travel in a self-contained way, independent of the underlying physical network, devices or applications.[111] Through this set-up the internet could fully embrace and even accelerate the convergence of various communication channels (wireless, cable, fibre, GSM, etc,) that emerged over the coming years. In addition, this modular and decentralised structure would empower users[112] and companies to design a variety of innovative applications and services, which simply integrated on top of the internet's application layer. According to *Lessig* this end-to-end design principle is one of the most important factors behind the growth and innovation engendered by the internet.[113]

Meanwhile, the crucial TCP/IP protocols were open to the public, allowing for continuous modification, improvement and adaptation to operating systems and different infrastructures.[114] *Castells* describes, how in parallel to the ARPANET, a private computer counterculture ("hacker community") started to develop in the US and throughout the world since the 1970s.[115] Individuals started to connect their PCs through telephone lines, using modems, and communicating through newsgroups such as USENET. As ARPANET opened to public research networks, the sprawling computing community eventually adopted the TCP/IP protocol suites as a common standard for communication between PCs.[116]

Collins remarks that this technical set up of the internet explains to a large part the governance structure and subsequent regulatory approach to the internet.[117]

The controlled and subsidised opening of the internet to the academic research community and private networks may actually have been at the heart of the internet's success. *Wu* describes how the internet could sprout

110 ibid.
111 Wu, *The Master Switch* (n 1) 198.
112 Johnny Ryan, *A History of the Internet and the Digital Future* (Reaktion Books 2013) 16.
113 Lawrence Lessig, *Code: Version 2.0* (2. ed., Basic Books 2006) 44–45.
114 Garcia (n 97) 536; Castells (n 3) 47–49.
115 Castells (n 3) 50.
116 ibid 49–50.
117 Richard Collins, *Three Myths of Internet Governance: Making Sense of Networks, Governance and Regulation* (Intellect Books 2009) 60–62.

in a protected space, unbothered by the *"benign"* state-protected telecoms monopoly of AT&T in the US.[118] That monopoly successfully suppressed or delayed a number of other technological innovations for decades in the telecoms sector.[119] From 1995 onwards, the internet was carefully set afloat on the open market, equipped with a technical governance structure, which shall be discussed later.

Meanwhile, its adaptable structure facilitated the emergence of new internet intermediaries, which enabled users to access various new services on a global level, be it in order to communicate, search, create, share or store information, or buy and sell goods and services.

C. *Internet intermediaries within the layered internet*

Internet intermediaries locate, distribute and host information uploaded and shared by the internet's users.[120] From their humble beginnings in the mid-1990s they have seen a spectacular ascendance to become gatekeepers of the internet for consumers and businesses. They are now indispensable for the various activities that people perform through the internet.[121] Two elements have significantly helped their emergence in the early 1990: the invention of the world wide web and a dramatic increase in user take-up.

In 1990, the World Wide Web was conceived by a group of computer scientists around *Tim Berners-Lee* at the C*onseil européen pour la recherche nucléaire* (CERN) in Geneva. Its first key component is the Hypertext Markup Language (HTML), a format that allowed for a standard display of documents on the web, regardless of the underlying computer language. Secondly, the Hypertext Transfer Protocol (HTTP) enabled the communication of hypertext between servers. Finally, a standard address system, not just for the World Wide Web, but for a whole host of other applications, was created. The Uniform Resource Locator (URL), which appears in the

118 Wu, *The Master Switch* (n 1) 59.

119 ibid 107.

120 Lilian Edwards, 'The Fall and Rise Of Intermediary Liability Online', *Law and the Internet* (3rd ed, Hart Pub 2009) 47. See also section 1.4.1.

121 See for example: Natali Helberger, Katharina Kleinen-von Königslöw and Rob van der Noll, 'Regulating the New Information Intermediaries as Gatekeepers of Information Diversity' (2015) 17 info 50, 52; Mariarosaria Taddeo and Luciano Floridi, 'The Debate on the Moral Responsibilities of Online Service Providers', *The responsibilities of online service providers* (Springer Berlin Heidelberg 2016).

address bar of a web browser, referenced the resources stored on the internet in a standard way, thus making them easily findable.[122] Thanks to the invention of the World Wide Web, the foundations were laid for a broad usability of the internet. [123]

By the mid-1990s demand for individuals to connect and to exchange information had grown substantially across the world. The number of PCs connected to the internet had risen from around 300,000 in 1990 to 1 million two years later.[124] By 1995 an estimated 9 million users were on the internet, of which 75% in the US.[125] By that time, the commercial potential of the internet had become apparent. From 1995 onwards, the US Government-funded infrastructure of internet communication backbones was opened up to the private sector.[126] A handful of private investors started to roll out a fibre network of data cables which was to become the mainstay of data communication throughout the US, and globally. This is usually referred to as the "Tier 1" network. These private companies also dominated the "Tier 1" network in Europe, where internet up-take was initially slower than in the US.[127]

1. A typology of intermediaries

It is appropriate to give an overview of the type of internet intermediaries which have emerged over the last 25 years. There are several ways of classifying online intermediaries. However, the online intermediary business is diverse and evolving rapidly following the patterns of constant innovation in digital technologies and markets. A too rigid and fine-grained classification would inevitably be overrun by market developments. Meanwhile a broader classification risks not taking sufficient account of technical design and functional differences, which may become relevant when talking about liabilities and responsibilities of these intermediaries for unlawful content.

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122 Castells (n 3) 50–51.
123 Ryan (n 111) 106–107.
124 ibid 94.
125 Mary Meeker, 'Internet Trends 1995' (Morgan Stanley 1996) 41 <https://www.bondcap.com/report/it95/> accessed 14 June 2019.
126 Garcia (n 97) 541.
127 Meeker (n 124) 35. Gartner, 'The International ISP Market: Evaluation and Selection Criteria (Archived)' (1998) Research Note R-06-3028 9.

EU law has classified ISPs according to their technical role in the information intermediation process, thus distinguishing between "mere conduit", "caching" and hosting.[128] *Rowland et. al.* et al take this typology further and identify intermediaries that facilitate:

- connectivity (internet access providers -IAP),
- navigation (e.g. search engines, peer-to-peer platforms),
- commercial and social networking (e.g. *Facebook, YouTube, Amazon, Skype*)
- traditional intermediation (e.g. online retailers, payment service providers (*PayPal*) etc)[129]

This classification progressively aligns with the degree of active involvement of the intermediaries in the online facilitation process. While this is a useful precision it may only really be practically applicable to internet access providers, whose commercial and technical purpose of connecting users to the internet has not changed over the last 25 years. However, it may be difficult to categorise navigation and commercial/social networking intermediaries according to the degree of (active) involvement in the facilitation process. Business models of these intermediaries and technical capabilities impacting the intermediation process have been evolving and it is exactly the degree of involvement of intermediaries in the facilitation process which has been subject to much controversy, including in front of courts. Secondly, the category of traditional intermediaries mentioned above does not correspond with the definition of intermediaries in the traditional legal understanding. For example, a retailer selling goods as a seller of record online would fall outside of the definition of an intermediary service provider (ISP) under EU law. *Amazon* would, for example, act as an intermediary under EU law for its marketplace activities, but as a "traditional" intermediary when selling goods as a retailer. The legal implications of both scenarios for liability differ significantly.

Peters and Johnson and *Ardia*[130] group intermediaries according to their functional role in facilitating or constraining speech into conduits, web hosts and search and application providers.

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128 Directive 2000/31 (ECD) Article 14.

129 Diane Rowland, Uta Kohl and Andrew Charlesworth, *Information Technology Law* (4th ed, Routledge 2012) 71–73.

130 Jonathan Peters and Brett Johnson, 'Conceptualizing Private Governance in a Networked Society' (2016) 18 NCJL & Tech. 15, 41–58; David S Ardia, 'Free

Below a more pragmatic definition according to intermediary business model will be offered, which follows notably the approach by the OECD[131] and EU policy and legal documents such as the Guidance to the Unfair Commercial Practices Directive.[132] A search engine such as *Google* may have a similar array of technical possibilities as an online marketplace to structure (e.g. prioritise, personalise) the display of content on its website or monetise this information. In fact, e-commerce platforms or social media sites may even function as search engines for specific information, such as news or consumer products. A collaborative economy platform may be involved in facilitating payments in the same way as an e-commerce marketplace. Meanwhile, as will be shown below, many intermediaries have expanded beyond their original business model. They integrated horizontally by creating or acquiring other platform businesses in neighbouring markets. They also integrated vertically by expanding into services that impact structures beyond the web's application layer and extend into the internet's deeper infrastructure, or by integrating other downstream services (such as IT equipment manufacturing, logistics, financial services or advertising).

The typology offered below shall also help to demonstrate the quantum changes that the internet and internet intermediaries have undergone over the last 25 years.

2. Internet access providers

The first internet intermediaries emerged in the wake of the privatisation of the internet in the 1990s. Internet access providers (IAPs) connect individual households and businesses to the internet backbone.[133] Some of the larger Tier 1 backbone network owners also offered these internet access services in the European market (*WorldCom/UUNet*, *EUNet*, *PSINet*). In addition, post and telecommunication incumbents across EU Member States (*France Telecom*, *British Telecom*, *Deutsche Telekom*, *etc*) also offered internet

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Speech Savior or Shield for Scoundrels: An Empirical Study of Intermediary Immunity under Section 230 of the Communications Decency Act' (2010) 43 Loyola of Los Angeles Law Review 373, 386.

131 OECD, 'The Economic and Social Role of Internet Intermediaries - DSTI/ICCP(2009)9/FINAL' (n 45) 10–15.

132 European Commission, 'UCP Directive Guidance' (n 57) 121–145.

133 also called internet service providers (ISPs). This term is not used here because of its confusion with information society service providers (IS(S)Ps)

access. Some of these national incumbents belonged initially to the Tier 2 network operators that sit between the Tier 1 and the local loop, which provides the internet connection for end users. With less extensive data cables these providers paid fees to pass some of their data through Tier 1 networks. Over time many of these incumbents became Tier 1 providers, as they expanded their backbones.[134]

Finally, a plethora of smaller Tier 3 IAPs, many without their own network, rented bandwidth from the larger operators and sold it on to customers. Hundreds of IAPs emerged over the 1990s in Europe and engaged in fierce competition.[135] Over the following years and especially in the aftermath of the dot.com crash in 2000 the IAP market thinned out significantly.

IAPs provide internet connectivity, but also other services such as email, file storage or web hosting. The larger Tier 1 and 2 players are exposed to all layers of the internet. IAPs are in a position to control the use of internet applications[136] and the access to the internet by users. They also run the servers which handle subscribers' information requests when they access the internet. IAPs are therefore essential for internet communication, because they own parts of the routing and switching infrastructure of the internet as well as the servers that respond to information requests by users.[137]

Some of the early IAPs were also information hosts in their own rights and some of them still are. *Demon Internet, CompuServe, AOL or BT Internet* hosted newsgroups and chatrooms on their servers through which users exchanged information, posted content or links. Much of the early case law on unlawful information on the internet deals with the role of these IAPs and their newsgroups in hosting and providing access to e.g. defamatory content.

Over time, other communication channels increasingly merged onto IP based systems. Cable networks and mobile telephone providers, or Wi-Fi operators have since also become IAPs.

The structure of the internet has become even more diverse. Today, communication does not need to involve the Tier 1 backbone any longer.

134 Rob Frieden, 'A Primer on Network Neutrality' (2008) 43 Intereconomics 4, 10.

135 Gartner, 'The ISP Market - France' (1998) G0084758; Gartner, 'The ISP Market - Germany' (1998) G0084761; Gartner, 'The ISP Market - UK' (1998) G0084764.

136 David Clark and KC Claffy, 'Platform Models for Sustainable Internet Regulation' (2014) 4 Journal of Information Policy 463.

137 Ben Wagner, *Global Free Expression - Governing the Boundaries of Internet Content* (Springer Berlin Heidelberg 2016) 21; Meeker (n 124) ch 5.

Regional or national carriers are closely interconnected and internet traffic can pass through an indeterminable variation of connections. With the Web 2.0, large content providers emerged, which also invested in their own global backbones.[138] Meanwhile, the number of internet users accessing the internet has increased to 3.8 billion in 2018. [139] More than half of the world's population therefore need to make use of an IAP.

Due to this central position IAPs have been habitually called upon by damaged parties to stop, disable or prevent unlawful activity or access to unlawful information,[140] or to uncover internet users' physical address through locating the IP address.[141]

3. Search engines[142]

Imagine using the internet without a search engine. Search engines are such a crucial intermediary for our daily online activities that they are seen as gatekeepers not only to the internet, but to information in general.[143]

Soon after the World Wide Web, the first internet browsers emerged on the market in the early 1990s. *Mosaic*, *Netscape* and later the *Internet Explorer*, displayed web content in colour, with images and animations and offered the ability to click on hyperlinks to access content.[144] Due to better usability of the web, the number of pages and content stored on the internet soon proliferated. The number of websites grew from just 2,738 in

138 Esteban Carisimo and others, 'Studying the Evolution of Content Providers in IPv4 and IPv6 Internet Cores' (2019) 145 Computer Communications 54, 54.

139 Mary Meeker, 'Internet Trends 2019' 5 <https://www.bondcap.com/report/itr19/> accessed 14 June 2019.

140 *Tobias Mc Fadden v Sony Music Entertainment Germany GmbH*, *C-484/14* [2016] EU:C:2016:689 (CJEU); *Scarlet Extended SA v Société belge des auteurs, compositeurs et éditeurs SCRL (Scarlet Extended)*, *C-70/10* [2011] EU:C:2011:771 (CJEU).

141 *Productores de Música de España (Promusicae) v Telefónica de España SAU*, *C-275/06* [2008] EU:C:2008:54 (CJEU) [30]. Jonathan Zittrain, *Jurisdiction* (Foundation Press 2005) 70–72.

142 Meta search engines or price comparison sites (like rentalcars.com, trivago.com or skyscanner.net) are included in this category.

143 see for example: Nicholas Diakopoulos and others, 'I Vote For—How Search Informs Our Choice of Candidate' in Damian Tambini and Martin Moore (eds), *Digital dominance: the power of Google, Amazon, Facebook, and Apple* (Oxford University Press 2018); Peters and Johnson (n 129) 55–56., Helberger, Kleinen-von Königslöw and van der Noll (n 120).

144 Ryan (n 111) 108.

1994 to 23,500 within one year. It reached the 1 million mark two years later. Today over 1.6 billion websites exist, of which over 200 million are active.[145]

There was therefore a clear need for search tools that helped users to find what they were looking for on the web. *Yahoo, Lycos*, *Excite* or *AltaVista* were some of the more known early movers that answered to that demand from the middle of the 1990s. A search engine would "crawl" the web for new, or changed web pages on a regular basis and then index the results. Users then received a selection of results drawn from that index, which corresponded to the terms they had entered into the engine's search bar.

Search engines therefore sit on top of the internet's application layer. Web search engines integrate with the World Wide Web application. This business is typically financed from advertising that is displayed with the search results. It is worth underlining that the search engine determines which results match best the user's search request. Its decision mechanism, or search algorithm, selects from the indexed content of the web those websites which appear to satisfy the user's information request. Initially, this selection was made simply by matching the words or phrases entered by the user with their appearance on indexed webpages. The most relevant sites would be the ones which contained the highest density of a users' search terms.[146]

This all changed with the arrival of *Google* in 1998. *Google's* search and display algorithm did not only rank results according to the density of user queries' text alone but also based on the 'relevance' of the website; which is measured by how often other web pages linked to it.[147] *AdWords*, the company's advertising program, works on a similar basis. Advertisers pay different prices for the same keyword depending on the relevance of their adverts in relation to the keyword, which is measured by click-through rates, i.e. how often users select the displayed ad link in order to access the advertised offers.[148] *Google* soon became the most successful search engine due its superior search results and its innovation in advertising models. As of

145 'Total Number of Websites - Internet Live Stats' <https://www.internetlivestats.com/total-number-of-websites/> accessed 19 June 2019.

146 Barwise and Watkins (n 7) 34.

147 Paško Bilić, 'Search Algorithms, Hidden Labour and Information Control' (2016) 3 Big Data & Society 1, 3.

148 Aysem Diker Vanberg, 'From Archie to Google - Search Engine Providers and Emergent Challenges in Relation to EU Competition Law' (2012) 3 European Journal of Law and Technology 18, 4.

2016, the search engine market was dominated by *Google*: in Europe over 90% of internet searches via static devices and over 95% of searches on mobiles devices were made using the *Google* search engine.[149] This dominance has remained unchallenged to this day.

Google and most other large search engines have in the meantime perfected the business of personalised search and advertisement by feeding users' behavioural data, collected through cookies, browsing history and other data collection activity into their business models. *Google* is in an advantageous position as it can draw on data from its numerous other prominent products and services, such as *Gmail*, the *Android* Operating System, the *Chrome* Browser or *YouTube.* In addition, it has agreements with third parties to capture more data in order to optimise its search and ad display algorithms.[150] Personalised advertising became the foundation of *Google's* extraordinary financial fortune.[151] Apart from *Microsoft's* Bing or *Yahoo* it may now be the only search engine that can afford to crawl the web on a more comprehensive basis.[152] Meanwhile, smaller search engine operators make use of the web bots of the leading players, which constantly inventorise the visible web. The arrival of the so-called Web 2.0 (discussed in more detailed below in the context of user generated content (UGC) platforms and social media), from the mid-2000s, heralded a data boon for search engines. With internet users being able to share and create content online via social media and content platforms, the amount of data available to horizontally integrated search engines belonging to *Google* or *Microsoft* skyrocketed. This allowed for further enhancements in personalised search and advertising, and hence revenue generation.

While in the early days there was a widespread assumption that search engines did not add their own bias to users' search results[153] that impartial-

149 *Commission Decision relating to proceedings under Article 102 of the Treaty on the Functioning of the European Union and Article 54 of the Agreement on the European Economic Area (AT39740 - Google Search (Shopping))* [2017] 58–73. This dominance has prevailed over the last 4 years with Google enjoying a global market share in the search engine market of 94.8% as of January 2020. Statista, 'Online Search Usage' (2020) 10.

150 Robert Epstein, 'Manipulating Minds' in Damian Tambini and Martin Moore (eds), *Digital dominance: the power of Google, Amazon, Facebook, and Apple* (Oxford University Press 2018) 299–300.

151 Zuboff (n 5) ch 3.

152 Epstein (n 149) 298.

153 see Vanberg (n 147) 3. who states that apart from the few overtly commercial search engines, such as Overture, which returned results based on the amount

ity is today far from being undisputed.[154] For example, *Google* was fined a record €2.42 billion by the European Commission in 2017 for abusing its dominant position and tweaking search results to the advantage of its own services.[155]

For the purposes of this work, it should be noted that the unique position of search engines in the intermediation of online information confers on them a decisive power to determine and potentially manipulate what content users may access. As will be shown in Chapter 4, search engines have also been playing a controversial role when it comes to making unlawful content, such as IP infringing, defamatory or terrorist material accessible to users.[156]

4. E-commerce platforms

The first companies which made use of the internet as a means of selling goods were retailers in their own right. Many of them were online bookshops. The first true e-commerce marketplace which acted as a commercial intermediary between sellers and buyers was *eBay*, launched as an auction marketplace in 1995. In China, *Alibaba* started its e-commerce marketplace in 1999. *Amazon*, which was founded as an online book retailer in the same year as *eBay*, opened itself to third party sellers in 2000. These first movers have remained the leading e-commerce marketplaces to this day.[157]

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spent by advertisers on keywords, most other search engines returned results based purely on an "impartial crawler algorithm"

154 Bilić (n 146); Dirk Lewandowski, 'Is Google Responsible for Providing Fair and Unbiased Results?' in Mariarosaria Taddeo and Luciano Floridi, *The responsibilities of online service providers* (Springer Berlin Heidelberg 2016).

155 'European Commission - PRESS RELEASES - Press Release - Antitrust: Commission Fines Google €2.42 Bn for Abusing Dominance as Search Engine by Giving Illegal Advantage to Own Comparison Shopping Service' <http://europa.eu/rapid/press-release_IP-17-1784_en.htm> accessed 28 August 2018.

156 Pasquale (n 19) 494–503. And as evidenced by numerous court cases, such as *Google France, Google Inc v Louis Vuitton Malletier, C-236/08* [2010] EU:C:2010:159 (CJEU)

157 Amazon and Alibaba remain the most important online marketplaces by market capitalisation and by number of visitors. EBay, although somewhat declined in importance, remains among the top 3 online marketplaces in Europe. See: Meeker (n 102) 12; Ecommerce Foundation, 'European Ecommerce Report 2018 Edition' (2018) 22 <www.ecommercefoundation.org/reports> accessed 5 July 2018.

They were joined by numerous other marketplaces, operating across different regions of the globe, either specialised on certain product sectors or offering a wide range of consumer goods.

Growth in e-commerce has been outpacing traditional retail over the last 20 years and is expected to do so for the foreseeable future. As of 2018 worldwide e-commerce accounted for $2.86 trillion, or 15.1 % of total global retail sales, up from a share of 11.3% in 2016. Global e-commerce grew by 18% in 2018 compared to a 3.3% growth in total retail sales. Two thirds of these sales are being made by sellers on online marketplaces.[158] The data is similar for Europe where B2C e-commerce sales are forecast to grow by 13.5% in 2019 to €621 billion. In the UK, Germany and France online sales made up 17.5%, 15.2% and 10.0% of total retail sales, respectively, in 2017.[159] This growth even accelerated during the Covid 19 pandemic, as people relied even more on internet shopping.

E-commerce platforms, or online marketplaces, connect sellers with buyers via the World Wide Web and sit therefore also on top of the internet's application layer. Most commonly, platforms connect businesses or retailers (sellers) to consumers (B2C). Unlike search engines or IAPs, which answered to new demands of connectivity and information provision created by the World Wide Web, e-commerce marketplaces have significantly disrupted and eaten into already existing, traditional (retail) markets.[160] The ascendance of online marketplaces has impacted many established high street retailers, large or small. Many of them needed to downscale or transforms their business models and reconfigure their value chains along online supply chains, while others were forced out of business entirely.

Online marketplaces are a prime example of the internet's transformative influence on established, more traditional markets. For a start, the sheer variety of millions of products that even a medium sized online marketplace is able to display is unprecedented and cannot be matched by any physical retail outlet. Secondly, through e-commerce, consumers have been getting used to the convenience of home delivery. Thirdly, con-

158 All date on: Jessica Young | Jan 21 and 2019, 'Global Ecommerce Sales Grow 18% in 2018' (*Digital Commerce 360*) <https://www.digitalcommerce360.com/article/global-ecommerce-sales/> accessed 11 July 2019.

159 'Ecommerce in Europe' (*Ecommerce News*) <https://ecommercenews.eu/ecommerce-in-europe/> accessed 11 July 2019.

160 Johann J Kranz and Arnold Picot, 'Internet Business Strategies' in Johannes M Bauer and Michael Latzer (eds), *Handbook on the economics of the internet* (Paperback edition, EE, Edward Elgar Publishing 2017) 374.

sumers are able to shop products on a global scale, be it by accessing marketplaces "abroad" or by marketplaces integrating sellers from across the globe onto their platforms.

For sellers, the ubiquity of the internet means that even smaller businesses can now reach an international or even global audience directly. The story of the decline of the traditional corner shop is therefore often counterbalanced by that store now being able to sell globally online.

Meanwhile, e-commerce marketplaces have also reinforced the trend of the globalisation and digitisation of supply chains.[161] By cutting physical retail structures, sellers will be able to source and ship orders from anywhere in the world directly to the customer. As customer order fulfilment moves up in the supply chain, logistics has become one of the most important cost factors in e-commerce. The pressure for rationalisation engendered technological innovation in the form of business models that incorporate the Internet of Things (IoT), Big Data analytics and cloud computing.[162]

Entire logistics processes, from stock management, storage to delivery, are being transformed. Fast and customised delivery, inventory visibility, efficient returns management and order tracking have become a normal customer experience feature. New specialised logistics service intermediaries offer their services to sellers.[163] Larger marketplace have been offering their own fulfilment solutions in order to control customer experience and gain additional revenue from sellers.[164] Online marketplaces can therefore be considered as the first internet business that seriously disrupted parts of the "old economy."

This disruptive potential becomes apparent when one considers that there are currently over 7,000 online marketplaces and platforms operating in Europe.[165] Internet marketplaces are responsible for 56% of global cross-

161 Dieter Arnold (ed), *Handbuch Logistik* (3., neu bearb Aufl, Springer 2008) 532.

162 Ying Yu and Xin Wang, 'E-Commerce Logistics in Supply Chain Management' (2017) 117 Industrial Management & Data Systems 24.

163 Commonly called Fulfilment Service Providers (FSPs) or Third Party Logistics (3PL))

164 Amazon, Alibaba or JD.com all offer their own transportation and warehousing services to their sellers. Meanwhile, other platforms such as eBay offer their business sellers services with selected delivery companies.

165 'European Commission - PRESS RELEASES - Press Release - Digital Single Market: EU Negotiators Agree to Set up New European Rules to Improve Fairness of Online Platforms' Trading Practices' <https://ec.europa.eu/commission/presscorner/detail/en/IP_19_1168> accessed 17 July 2019.

border e-commerce. For example, in Europe 93% of sellers on eBay export their goods, as opposed to only 26% of companies that do not use online marketplaces for selling on the internet.[166] Meanwhile, on that marketplace, sellers listed over 1.8 billion products as of 2019.[167] On the largest e-commerce platform, *Amazon* marketplace, 2.5 million active sellers are offering their products. Two-thirds of them outsource their logistics, which includes warehousing, order fulfilment and customer returns to the company's *Fulfilment by Amazon (FBA)* service. Apart from reaping extra revenue and valuable inventory management data from sellers, *Amazon* has become one of the world's leading logistics companies.[168] Its marketplace alone has a share of 31.3% in the US online retail market and an estimated 27% in the German e-commerce market.[169] Sellers on these two Amazon marketplaces account for approximately 3% of the entire US and 4% of the entire German retail markets.[170] And this trend is to continue not only for the *Amazon* marketplace, where an estimated 540.000 new sellers have joined the platform in Europe in 2018 alone,[171] but also most e-commerce platforms.

With the advent of Web 2.0, online marketplaces have increasingly integrated a host of other intermediary services, from logistics to payments providers, and from advertising to financial services. This trend is reinforced by an explosion in customer product and seller reviews, not only in the form of text, but also as pictures and videos. In addition, purchase decisions are often shared through other platforms, usually social media. Meanwhile, multi-channel shopping via mobile devices or through voice recognition system has been growing rapidly. Finally, these platforms are

166 European Commission, 'Commission Staff Working Document Online Platforms Accompanying the Document Communication on Online Platforms and the Digital Single Market SWD(2016) 172 Final' (n 54) 13.

167 'EBay Research' (*Marketplace Pulse*) <https://www.marketplacepulse.com/research/eBay> accessed 17 July 2019.

168 'Amazon Research - Marketplace Pulse' <https://www.marketplacepulse.com/research/amazon> accessed 17 July 2019.

169 'Marketplaces Year in Review 2018' (Marketplace Pulse 2018) <https://www.marketplacepulse.com/marketplaces-year-in-review-2018> accessed 17 July 2019. 'Amazon Europe Cross-Border Sellers from UK, Germany, France, Spain, and Italy' (*Marketplace Pulse*) <https://www.marketplacepulse.com/amazon/europe-cross-border-sellers> accessed 17 July 2019.

170 Calculation based on data showing that the share of online retail in total retail sales was 10.0% for the US (Meeker (n 102) 20) and 15.1% in Germany.

171 'Marketplaces Year in Review 2018' (n 168).

open to developers so that their features can be integrated into other websites and systems.

Online marketplaces have therefor become true multisided platforms benefitting from important network effects.[172] Revenue and data are as much derived from sellers and buyers as from other integrated intermediaries which were attracted by the growth in website traffic in the first place, and now reinforce the power of these marketplaces.[173]

The rise of e-commerce marketplaces has also brought problems. The globalisation of retail via the internet has opened the door for unlawful activity, be it the global availability of counterfeit products, falsified medicines, and illegal, non-compliant or unsafe products. [174] Traditionally, enforcement in this area focussed on bulk and container shipments, which are a typical feature of established retail sourcing and distribution networks. EU customs and market surveillance enforcement concentrated on checking these shipments at the central entry points into the Union, such as major seaports or airports.

But as customers can now place orders on foreign marketplaces or through foreign sellers on local marketplaces, goods enter the jurisdiction increasingly as small consignments and parcels. They pass customs largely unchecked and undeclared. The number of small consignments arriving from outside the EU grew by almost 300%, from an estimated 29.8 million in 1999 to 114.8 million in 2013, which is in line with the rise in popularity of online shopping.[175] Customs, enforcement authorities and brand owners are simply overwhelmed. Enforcement is made more difficult by the fact that there is often no economic actor within the EU that can be

172 Barwise and Watkins (n 7) 27.

173 Martens (n 53) 8.

174 See for example: European Commission, 'Bringing E-Commerce Benefits to Consumers - Accompanying Document SEC2011_1640' (European Commission 2012) 40. OECD, 'Online Product Safety' (2016) OECD Digital Economy Papers 261 15–16, 27–28 <http://www.oecd-ilibrary.org/science-and-technology/online-product-safety_5jlnb5q93jlt-en> accessed 23 April 2018.; European Commission, 'Summary of Responses to the Public Consultation on the Evaluation and Modernisation of the Legal Framework for IPR Enforcement' (2016) 10, 41 <http://ec.europa.eu/DocsRoom/documents/18661> accessed 17 March 2017.; Hans-Georg Koch, 'Strategies against Counterfeiting of Drugs: A Comparative Criminal Law Study' in Christophe Geiger, *Criminal enforcement of intellectual property: a handbook of contemporary research* (Edward Elgar 2012) 353–355.

175 European Commission, *Assessment of the Application and Impact of the VAT Exemption for Importation of Small Consignments Final Report.* (European Commission 2015) 37–40

held responsible. Non-EU based sellers are outside the jurisdictional reach of public authorities and courts. Online marketplace operators, where based in the EU, or internet access providers, are the only entities which may be able to effectively stop the sales of unlawful products. These problems will be discussed in more detail in Chapter 4.

5. User generated content and social media platforms – the rise of Web 2.0

During its first 10 years, the commercial internet was used as a medium to search, consult and download information. Where possible, content or products were purchased through the content portals of IAPs. User live interaction was limited to chatrooms and newsgroups.[176] Intermediaries did not deliver content but merely facilitated user exchanges in a largely passive way.[177]

With the start of the new millennium and in the aftermath of the dot.com crash, the Word Wide Web and internet technology started to change, giving rise to the Web 2.0. The technological basis for the emergence of Web 2.0 rested mainly on advances in internet connection bandwidth and computing power.

This allowed for "applications that harness network effects to get better the more people use them."[178] New applications and business models invited users to create and upload content online, be it in the form of blogs, photos or video, and most importantly, share this content with other users.

The first social and professional networking or microblogging services, such as *MySpace*, *Facebook*, *LinkedIn* or *Twitter* all emerged between 2002 and 2006. User generated content sharing platforms - *YouTube*, *Flickr* or *Instagram* - also saw the light during the first decade of the new millennium.

These companies were founded on common business and design models, which are identified by *O'Reilly* as the core elements of the Web 2.0 era:[179]

176 Tarleton Gillespie, 'Platforms Are Not Intermediaries' (2018) 2 Georgetown Law Technology Review 198, 206.
177 Belli and Sappa (n 42) 190.
178 Collins (n 116) 40.
179 Tim O'Reilly, 'What Is Web 2.0: Design Patterns and Business Models for the Next Generation of Software' [2007] Communication & Strategies 17, 37.

> They mobilise users to create, collaborate and shape the content and structures of the web. The exploitation of this user engagement leads to ever more sophisticated and personalised forms of advertisement, which is driven by users themselves, through their own interaction. Typical activities are tagging, liking, sharing, commenting or reviewing of photos, videos, text or other content created by professional or non-professional users, be it on social networking sites or UGC platforms.
>
> This harnessing of "collective intelligence" goes hand in hand with the exercise of control over the unique data created by users' online interactions. These datasets get richer the more people use the service. This consolidation of consumer data opens new possibilities of personalised advertising and manipulation in order to keep users engaged on these platforms and maximise revenue.[180]
>
> The race for data has facilitated a shift towards more nimble web applications, which utilise simple programming such as e.g. XML or JavaScript. Third party developers can easily integrate service features or ads from *Google Maps*, *Facebook*, *Instagram*, *Amazon* or *YouTube* into other websites. This allows for additional personalised and dynamic data and revenue generation across potentially millions of third part websites.
>
> As a logical consequence over the fight for user data and traffic, Web 2.0 companies integrate across multiple types of end user devices and systems, from PC/Mac to mobile phones and smart TV applications or voice recognition systems. At the same time, they offer equally rich and interactive user experience across all of these devices.

Far from just integrating into the applications layer, these businesses have restructured the architecture of the World Wide Web from a "document retrieval tool"[181] to one of distributed applications and services.[182] They still utilise the platform design of the World Wide Web, but rather than

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180 Roger Clarke, 'Web 2.0 as Syndication' (2008) 3 Journal of theoretical and applied electronic commerce research 40 <http://www.scielo.cl/scielo.php?script=sci_arttext&pid=S0718-18762008000100004&lng=en&nrm=iso&tlng=en> accessed 22 July 2019.

181 ibid 38.

182 Christopher T Marsden, 'Beyond Europe: The Internet, Regulation, and Multistakeholder Governance—Representing the Consumer Interest?' (2008) 31 Journal of Consumer Policy 115, 121.

answering and querying information, they manage and exploit the creation and the flow of data as it passes through their distributed systems.[183] The use pattern of the internet shifted from unidirectional access through IAPs towards interaction via platforms.[184]

The platform ecosystem of the internet has increased in complexity. As internet penetration, bandwidth, and technology convergence progress and new internet business models emerge, Web 2.0 intermediaries have become ever more powerful and indispensable. Social networking sites such as *Twitter*, *Instagram*, *Reddit or LinkedIn* have now hundreds of millions of active users. *Facebook* and *YouTube* are actively used by 2.7 billion and 2.3 billion people, respectively.[185] Meanwhile, the original division between social networking and user generated content sites has blurred. Social networks like *Facebook* or *LinkedIn* are as much hosts of photos, videos or other content as UGC sites *YouTube*, *DailyMotion*, *Pinterest* or *TikTok* are used for social interaction.

For a large part of internet users these Web 2.0 platforms have become the prime gateway of access to the internet: through them they participate in social interaction within their communities, receive and share news and, increasingly, search and shop for products. Altogether 3.96 billion people worldwide used social media and UGC platforms actively by July 2020, most of them through mobile devices.[186] Today, the average internet user spends 2.2 hours per day on these platforms.[187] Over 43% of US internet users stay up-to-date on daily news through *Facebook*, 21% by looking at *YouTube* and 12% on *Twitter*.[188] In Europe, of those users who access the internet for news, 22% rely on social media as a main source of information.[189] 57% of young people who use their mobile phone as a means to check the news first thing in the morning do so via social media apps.[190] These intermediaries have become so addictive and seemingly indispens-

183 O'Reilly (n 178) 34.
184 Wagner, *Global Free Expression - Governing the Boundaries of Internet Content* (n 136) 110.
185 Statista, 'Most Used Social Media 2021' (2021)
186 Statista, 'Social Media Usage Worldwide' (2020) 2–3.
187 Aleksandar S, 'How Much Time Do People Spend on Social Media in 2019?' (*Tech Jury*, 8 March 2019) <https://techjury.net/blog/time-spent-on-social-media/> accessed 23 July 2019.
188 Meeker (n 138) 179.
189 'Internet Users' Preferences for Accessing Content Online - Flash Eurobarometer 437' (European Commission 2016) 30.
190 Nic Newman, 'Reuters Institute Digital News Report 2019' (Reuters Institute, University of Oxford 2019) 55.

able that people have been calling the police when services such as *Facebook* or *YouTube* have faced local outages.[191]

A rapidly growing amount of data is created and replicated every day on the internet, be it through users' active participation or by passive navigation. While in 2013, 72 hours of new video were uploaded on *YouTube* every minute this had risen to 500 hours by August 2020.[192] *Facebook* users uploaded 147,000 photos every 60 seconds and *Instagram* recorded over 138,000 clicks per minute on ads posted by business profiles on their platform.[193] In 2010, people who connected to the internet had 208 digital data engagements per day (instances during which their presence on the net resulted in data). Thanks to an increase in time spent online this is set to rise to 4,900 such data engagements per day by 2025, one every 18 seconds.[194] This digital engagement means that for every person on earth, on average 1.7 MB of data are generated per second in 2020.[195]

As with the other intermediaries mentioned above, the ascendance of social media and UGC platforms has not come without problems. As regards unlawful content, the major challenges relate to copyright infringing content, material and activity harmful to children, and illegal speech, such as hate speech or terrorist content, that users upload, access or share via these platforms. These problems have become more prevalent over the last 15 years as the reach, day-to-day use, and variety and amount of content hosted and shared on these platforms grew.

Users may for example, intentionally or not, upload video or music which infringe the intellectual property rights of the owner, be they artists or commercial license holders such as record labels or film production companies. Violations are likely to happen as users, unaware of the complexities of copyright in a digital environment, incorporate popular excerpts or whole sets of music, images or film into their own creations, for example through sampling or mashups.[196] Since their inception, UGC

191 Sangeet Kumar, 'The Algorithmic Dance: YouTube's Adpocalypse and the Gatekeeping of Cultural Content on Digital Platforms' [2019] Internet Policy Review 11–12 <http://policyreview.info/node/1417> accessed 26 July 2019.

192 'Data Never Sleeps 2.0' (Domo 2014) <https://www.domo.com/learn/data-never-sleeps-2>; Statista, 'Social Media Usage Worldwide' (n 185) 29.

193 Statista, 'Social Media Usage Worldwide' (n 185) 29.

194 David Reinsel, John Gantz and John Rydning, 'The Digitization of the World from Edge to Core' (Seagate, IDC 2018) 13.

195 'Data Never Sleeps 6.0' (Domo 2018) <https://www.domo.com/learn/data-never-sleeps-6> accessed 23 July 2019.

196 Jütte (n 12).

platforms have been party to intellectual property disputes in many jurisdictions as users sought to share images, music or video without acquiring the necessary permissions under copyright.[197]

With regards to unlawful content, social media and UGC platforms have been identified as important conduits in the communication of child pornography, incitement to violence and terrorism,[198] defamatory speech or attempts to influence elections through disinformation and targeted advertising campaigns.[199] While IAPs and their newsrooms had some of these issues in the Web 1.0 era, the scale and complexity of the problem has escalated in the era of Web 2.0 platforms. This has led to the assertion that these platforms now control the flow of information online. Their business models and technologies, which are aimed at extracting data from users, lead to a degree of online manipulation that risks undermining the self-determination and autonomy of people.[200]

6. Sharing economy platforms

Sharing economy, or collaborative economy platforms emerged out of the Web 2.0. Like e-commerce platforms they belong to those intermediaries which disrupted and transformed already existing economic sectors. However, while e-commerce platforms uprooted traditional retail, sharing

197 For an early demonstration of the problem: Daithí Mac Síthigh, 'The Mass Age of Internet Law' (2008) 17 Information & Communications Technology Law 79. In Europe the court sagas of the German collective societies (GEMA) against *YouTube* is exemplary in this respect (*Haftung der Internetvideoplattform Youtube für rechtswidrige Uploads, 310 O 461/10* [2012] LG Hamburg 310 O 461/10, OpenJur 2012 36010.) It culminated in a currently pending reference to the CJEU (C-682/18). In France, early cases involving video sharing platform (VSP) *Dailymotion* are illustrative, such as *Christian, C, Nord Ouest Production v Dailymotion, UGC Images* (2007) (Unreported) (Tribunal de Grande Instance de Paris).In the US the key early reference is *Viacom International v YouTube* [2012] US Court of Appeals for the Second Circuit (Manhattan) 10-03270.

198 Great Britain and Media and Sport Department for Culture, *Online Harms White Paper*. (2019); European Commission, 'COM (2017) 555 Final' (n 69) 3–6. Danielle Keats Citron and Benjamin Wittes, 'The Problem Is Not Just Backpage: Revising Section 230 Immunity' (2018) 2 Georgetown Law Technology Review 21, 466–467.

199 Daniel Susser, Beate Roessler and Helen Nissenbaum, 'Technology, Autonomy, and Manipulation' (2019) 8 Internet Policy Review 22.

200 Michal Lavi, 'Evil Nudges' (2018) 21 Vanderbilt Journal of Entertainment and Technology Law; Susser, Roessler and Nissenbaum (n 198).

economy platforms transformed a variety of service sectors, which previously operated in comparatively closed, regulated environments. Another factor setting them apart from e-commerce marketplaces is that the transactions they facilitate often do not result in a transfer of material ownership,[201] but in a commercial sharing of resources, often between private individuals (referred to as P2P or C2C business models).

Sharing economy platforms suddenly subverted traditional business relationships between suppliers and consumers by allowing private individuals to compete with commercial suppliers. Individuals suddenly became "non-professional traders"[202] on service markets which previously faced a certain amount of entry barriers.

The most known examples are *Airbnb* in the holiday accommodation sector, and *Uber*, *Lyft* or *BlaBlaCar* in the transportation service market. Other rapidly developing sectors include the finance industry, especially crowdfunding platforms such as *Kickstarter*, marketplaces connecting private chefs with diners (*Eatro*), food delivery platforms (*Deliveroo*), second hand fashion marketplaces (*Vinted),* or the sharing of parking space in inner cities (*JustPark*).

Like e-commerce and social media platforms, the new collaborative economy businesses exploit the opportunities offered by the new digital platform technologies and the Web 2.0: the possibility to join a seemingly unlimited number of suppliers in a structured way with a similarly wide customer base. New interactive web features such as online maps and geolocalisation, cloud computing[203] and the ease of online payments were all conducive to bypassing and innovating traditional market structures.

But collaborative platforms display some new features that set them apart from other online intermediaries. First, they capitalise on an already existing trend kicked off by the internet. Peer-to-peer exchange of information was at the very heart of early file sharing businesses such as *Napster* or *Kazaa*. Some theorists even see businesses such as *The Pirate Bay* as a model

201 Vassilis Hatzopoulos and Sofia Roma, 'Caring for Sharing? The Collaborative Economy under EU Law' (2017) 54 Common Market Law Review 81, 85.

202 Yolanda Martinez Mata, 'Bolkestein Revisited in the Era of the Sharing Economy' [2017] Revista Electrónica de Estudios Internacionales 3 <http://www.reei.org/index.php/revista/num33/notas/bolkestein-revisited-in-the-era-of-the-sharing-economy> accessed 12 September 2017.

203 Vassilis Hatzopoulos, *The Collaborative Economy and EU Law* (Hart Publishing 2018) 2.

of the collaborative economy, albeit an extreme version.[204] Collaborative platforms extend these habits into traditional sectors of the economy. Secondly, they also reflect a trend towards ecological consciousness and sustainability and a search for alternative economic models in the wake of the financial crisis of 2008.[205] They hark back to early day, more idealistic views of the internet as a liberalising force which redefines the way people interact socially and economically.[206]

Collaborative platforms have advanced most rapidly in the US, where they started to make an economic impact by the start of the 2010s. However, Europe has also seen rapid adoption of the sharing economy. The EU estimated that in 2018 the collaborative economy had resulted in transactions worth €28 billion and that it has the potential to add €572 billion to the EU economy in the future.[207]

On the flipside, these platforms challenge and potentially undermine established legal concepts and economic relations. While unlawful content appears to be less of a problem on these platforms, the blurring division between personal, commercial and charitable activities pose challenges to tax, labour and competition law.[208]

The legal challenge is that these platforms see themselves as intermediary service provider while the traditional economic actors, whose business are being disrupted, demand that they be regulated under specific sectoral regulation, e.g. as accommodation or transportation service providers.

The outcome of such a demand would depend on the degree of involvement of the collaborative platform in the provision of the underlying service, and in particular, whether the platform exercises decisive influence over the conditions under which it imparts that service.[209] In its *Uber* and

204 Davide Pellegrini and Francesca De Canio, *The New Social Game: Sharing Economy and Digital Revolution : Into the Change of Consumers' Habit* (Bocconi University Press 2017) 28–29.

205 Hatzopoulos (n 202) 3.

206 Wu, *The Master Switch* (n 1) 36., see also Section 2.1.1.

207 European Commission, 'Communication: A European Agenda for the Collaborative Economy - COM(2016) 356 Final' (European Commission 2016) 2.

208 For more detail: Hatzopoulos (n 202); Janelle Orsi, *Practicing Law in the Sharing Economy: Helping People Build Cooperatives, Social Enterprise, and Local Sustainable Economies.* (American Bar Association 2014) 28 <http://public.eblib.com/choice/publicfullrecord.aspx?p=1718422> accessed 25 July 2019.

209 *Asociación Profesional Élite Taxi v Uber Systems Spain SL, C-434/15* [2017] EU:C:2017:981 (CJEU) [39].

Airbnb rulings[210] the CJEU provided criteria and examples of which kind of platforms could be seen as falling under sector specific legislation, and which platforms were acting principally as ISSPs. This legal debate provides a good illustration of the increasingly complex involvement of online platforms in the intermediation process. The methodology employed by courts to assess the activities of collaborative platforms may be of benefit when evaluating other intermediaries and their responsibilities in the fight against unlawful content.

7. Messenger services, cloud platforms and other online intermediaries

There are numerous other intermediaries and platform business models. This sector is evolving dynamically and the border between different types of intermediaries is moving constantly.

Messenger service, such *WhatsApp*, *Facebook Messenger* or *Skype* may straddle the border between telecommunications services and information society services.[211] Most of these are now owned and integrated into larger platforms' ecosystems, such as those of *Microsoft* or *Facebook*. Messaging services converge as well with social media and user generated content (*Instagram*, *WhatsApp*).[212] At the same time, in-app e-commerce through services such as *WhatsApp* or *Instagram* is becoming more common.[213]

Peer-to-peer (P2P) intermediaries have evolved in line with legal and technological changes. Since their start at the end of the 1990s they were subject to claims of facilitating massive infringements in copyright by allowing for the sharing of protected works. Early P2P intermediaries such as *Napster* held indices that pointed users towards files that other users wanted to share. *Napster's* business model was successfully pursued and the company forced to put a stop to its P2P operations in 2001. Subsequently, P2P intermediaries successfully adapted their infrastructure and became more distributed. Modern P2P intermediaries divide the indexing labour.

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210 *Uber* (n 170). *YA, AIRBNB Ireland UC, Hotelière Turenne SAS, Association pour un hébergement et un tourisme professionnel (AHTOP), Valhotel, C-390/18* [2019] ECLI:EU:C:2019:1112 (CJEU).

211 *Skype Communications Sàrl v Institut belge des services postaux et des télécommunications (IBPT), C-142/18* [2019] EU:C:2019:460 (CJEU).

212 European Commission, 'UCP Directive Guidance' (n 57) 142.

213 'How Conversational Commerce Is Changing E-Commerce' (*Content Harmony*®, 28 June 2016) <https://www.contentharmony.com/blog/conversational-commerce/> accessed 6 July 2020. Meeker (n 138) 316.

There are those that provide the torrent software with which users can index the content they would like to share. Others track user requests and connect users that seek to interchange files.[214] These intermediaries are far from obsolete and although legal challenges against them tend to be increasingly successful,[215] this is another story when it comes to closing them down operationally.

Cloud platforms have become important intermediaries in line with the Web 2.0 trend of interactivity and information sharing. They typically have a distinctive physical infrastructure element. Many boast their own data storage centres with servers, IT systems and physical network connections. Others may just rent network capacity from other infrastructure providers.[216]

It is an indispensable feature of the always-on environment that content and processing power are accessible to users at any time and at any place. The new collaborative nature of the web requires that multiple users have concurrent access to software, content or computing power. This paradigm shift has engendered a gradual move of computing power and storage from consumer end devices towards public cloud storage. End devices are in turn increasingly tethered and thin: many functionalities on mobile phones or other end devices are pre-configured and bound to the operating system's environment. In addition, many functions and applications work only when connected to the internet.[217] To illustrate the quantum change that constant connectedness has brought: in 2014 users shared "only"

214 Lilian Edwards and Charlotte Waelde, 'Online Intermediaries and Liability for Copyright Infringement', *WIPO Workshop Keynote Paper* (2005) 6–10 <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1159640> accessed 15 October 2019.

215 *Stichting Brein v Ziggo BV, XS4ALL Internet BV, C-610/15* [2017] EU:C:2017:456 (CJEU).

216 The most common services offered to consumers are data storage solutions (often classed as Software as a Service (SaaS), which comprises the entire suite needed for remote computing, from data storage and software to hardware and network capacity). B2B services comprise Platform as a Service (PaaS: offers operating systems, network and hardware as a service) and Infrastructure as a Service (IaaS: offers to run network and hardware on top of which companies can deploy there software and applications). Cesare Bartolini, Cristiana Santos and Carsten Ullrich, 'Property and the Cloud' (2018) 34 Computer Law & Security Review 358, 361–363.

217 David Lametti, 'The Cloud: Boundless Digital Potential or Enclosure 3.0?' [2012] Virginia Journal of Law & technology 219–220.

280,000 multimedia messages per minute via *Snapchat*.[218] Four years later 2.1 million "snaps" were shared every minute worldwide.[219]

It is estimated that by 2025 almost 50% of the world's data will be stored in the public cloud, compared to under 5% in 2010. By contrast, the percentage of data stored on consumer end devices will decline from over 60% to 20%, with the remainder being made up by enterprise cloud storage.[220] If one considers that the world's entire data sphere will rise from 33 Zettabytes in 2018 to 175 Zettabytes in 2025 [221] it becomes clear that public cloud solutions will become the common feature of user data storage.

UGC and social networks will store the exploding number of videos, music and photos on their own cloud servers. However, in the wake of Web 2.0 there are an increasing number of providers that offer cloud storage solutions to consumers for private document, photo, music or video storage. These services try to answer to the demand of consumers to collaborate and share content or to back up the content stored at home. Services such as *DropBox*, *Google Drive*, *Google Docs/Photos*, *Amazon Drive* or *Microsoft OneDrive* have become common services used by consumers.

The legal challenges here relate mostly to copyright over the content stored, collaboratively produced or modified and made available between users via these services.[222] Cloud services face therefore similar challenges as UGC platforms discussed above.[223]

It should be noted that the various industry and academic sources on this subject matter also mention other business models as internet intermediaries, namely mobile apps and app stores, online payment service providers, domain name registries and registrars, application platforms,

218 'Data Never Sleeps 3.0' (Domo 2015) <https://web-assets.domo.com/blog/wp-content/uploads/2015/08/15_domo_data-never-sleeps-3_final1.png> accessed 26 July 2019.

219 'Data Never Sleeps 6.0' (n 194).

220 Reinsel, Gantz and Rydning (n 193) 6.

221 ibid. 1 Zetabyte = 1 trillion Gigabytes = 10^{15} Megabytes

222 See, for example, on the unlicensed making available of cloud recorded TV *shift.tv, Urteil v 22042009, Az I ZR 216/06* [2009] GRUR 2009 845 (BGH); *VCAST Limited v RTI SpA, C-265/16* [2017] EU:C:2017:913 (CJEU). Or dealing with copyright protected content in general the recent referral to the CJEU C-683/18 (*Elsevier Inc.* v *Cyando AG*)

223 For a detailed analysis see: Martin Senftleben, 'Breathing Space for Cloud-Based Business Models' (2013) 4 JIPITEC. and Bartolini, Santos and Ullrich (n 215).

online advertising networks or webhosting services.[224] The categorisation offered here described the most common types of intermediaries from a socio-technical, economic and legal point of view. They are also the ones most commonly discussed in connection with unlawful content.

D. Intermediary powerhouses

1. Multi-sided platforms

The growth and diversification of the intermediary landscape over the last 25 years has been accompanied by vibrant merger and acquisitions activity. A handful of global intermediary "powerhouses" have emerged as a result, which prevail in their respective markets, or market segments, on a global scale.

These players have been capitalising on new characteristics of digital markets. First, the free and non-rivalrous nature of digital products[225] of using, for example, an internet search engine or a social network, helped attract a broad global user base. By building a strong, experience-based brand value,[226] partly due to being first movers, they created switching costs for consumers. In web-based markets these switching costs are often non-economic in nature (or low in economic terms)[227] as most of these services are offered for free and multi-homing remains possible.[228] Instead, the switching costs rest on other factors such as the power of direct network effects, attraction to the brand and its perceived quality, or more irrational behaviour, such as inertia.[229]

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224 See for example different categorisations in: 'Roles and Responsibilities of Intermediaries: Fighting Counterfeiting and Piracy in the Supply Chain' 47 0 94 <https://iccwbo.org/publication/roles-responsibilities-intermediaries/> accessed 26 September 2017. OECD, 'The Economic and Social Role of Internet Intermediaries - DSTI/ICCP(2009)9/FINAL' (n 46) 9–15. European Commission, 'Online Platforms and the Digital Single Market Opportunities and Challenges for Europe COM(2016) 288 Final' 2.

225 Barwise and Watkins (n 7) 25.

226 ibid.

227 D Daniel Sokol and Jingyuan Ma, 'Understanding Online Markets and Antitrust Analysis' (2017) 15 Northwestern Journal of Technology and Intellectual Property 43, 50–52.

228 *Google (Search) EU Antitrust Procedure* (n 148) 67.

229 Renato Nazzini, 'Google and the (Ever-Stretching) Boundaries of Article 102 TFUE' (2015) 6 Journal of European Competition Law & Practice 301, 306–307.

Secondly, these online intermediaries operate as multi-sided markets (MSM). They are able to leverage their power and create indirect cross-market or network effects.[230] For example, a dominant position attained through a large active user base attracts more advertisers on to the platform.[231]

The important new element is that these intermediaries' have become enterprises that exploit their users' data in unprecedented ways, a practice which is now at the heart of their business model.[232] They not only derive advertising revenue from the data generated by a large and ever more interactive user community. This behavioural data is also processed with a view to constantly improve and personalise services thus reinforcing the existing network dynamics[233] and market hegemony.[234]

Today's large intermediaries have aimed at expanding diagonally across those markets that are, or could be connected to their own platforms. The aim is to channel as much additional web traffic as possible towards their core services in a bid to maximise data streams, exploitation of user data and therefore generate more revenue and reinforce market leadership.[235]

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230 Sokol and Ma (n 226) 50.

231 Barwise and Watkins (n 7) 25.

232 Alexia Autenne and Élisabeth De Ghellinck, 'L'émergence et le développement des plateformes digitales : les enseignements de la théorie économique de la firme' (2019) XXXIII Revue internationale de droit économique 275, 287–288.

233 Damian Tambini and Martin Moore, 'Dominance, the Citizen Interest and the Consumer Interest (Conclusion)' in Damian Tambini and Martin Moore (eds), *Digital dominance: the power of Google, Amazon, Facebook, and Apple* (Oxford University Press 2018) 397–399. European Commission, 'Commission Staff Working Document Online Platforms Accompanying the Document Communication on Online Platforms and the Digital Single Market SWD(2016) 172 Final' (n 54) 21–22. and: Jacques Crémer, Yves-Alexandre de Montjoye and Heike Schweitzer, 'Competition Policy for the Digital Era - Final Report' (European Commission 2019) <http://ec.europa.eu/competition/publications/reports/kd0419345enn.pdf> accessed 31 July 2019.

234 However, some economists also call for caution against an overly dark and undifferentiated view of network effects and big data: David S Evans and Richard Schmalensee, 'Network Effects: March to the Evidence, Not to the Slogans' [2017] SSRN Electronic Journal <https://www.ssrn.com/abstract=3027691> accessed 31 July 2019.

235 Wagner, *Global Free Expression - Governing the Boundaries of Internet Content* (n 136) 104. For more detail on the new competition and regulatory policy challenges related to platforms in the web-based economy see: David S Evans, 'Competition and Regulatory Policy for Multi-Sided Platforms with Applications to the Web Economy' [2008] SSRN Electronic Journal <http://www.ssrn.com/abstract=1090368> accessed 30 July 2019. For example, *Google's* recent announce-

These new facets of online platforms mean that dominance and potential anti-competitive effects are difficult to assess with traditional economic antitrust tools.[236]

2. The leading players

The handful of leading players that have emerged to dominate the global intermediary landscape today are G*oogle*, *Amazon*, *Facebook*, *Apple* and *Microsoft*,[237] often referred to as the *GAFAM*. China, with its relatively closed and tightly controlled internet infrastructure may be the only other country, apart from the US, which has managed to create competing intermediaries which have started to expand massively on a global level, such as *Alibaba* or *Tencent*. By April 2020, the *GAFAM* and China-based *Alibaba* and *Tencent*, belonged to the 10 largest companies in the world by market capitalisation.[238]

A quick overview of the expansion of the *GAFAM* across global internet markets shall be given below.

I. Google (Alphabet)

Google's holding company *Alphabet* is centred around two core intermediary services. Apart from owning the world's most popular search engine,

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ment to phase out the use of third party cookies in its *Chrome* browser in favour of its so-called "Privacy Sandbox" has been interpreted as a means to route even more activity and traffic data directly through its own "first party" tools and products. Elizabeth M Renieris, 'What Google's Privacy Sandbox Means for Internet Governance' (*Emerging Technology, Platform Governance - Centre for International Governance Innovation*, 19 March 2021) <https://www.cigionline.org/articles/what-googles-privacy-sandbox-means-internet-governance> accessed 1 April 2021.

236 See for more detail: OECD, 'Rethinking Antitrust Tools for Multi-Sided Platforms' (n 82) 55–64., Sokol and Ma (n 226). and Justus Haucap and Torben Stühmeier, 'Competition and Antitrust in Internet Markets' in Johannes M Bauer and Michael Latzer (eds), *Handbook on the economics of the internet* (Paperback edition, EE, Edward Elgar Publishing 2017).

237 Zuboff (n 5) l 2969. Barwise and Watkins (n 7); Giovanni Sartor, 'The Impact of Algorithms for Online Content Filtering or Moderation. Upload Filters' (European Parliament 2020) 14.

238 Statista, 'Biggest Companies in the World by Market Cap 2020' (2020)

the company acquired video sharing platform *YouTube* in 2006. Meanwhile, it has successfully built out its own cloud operations *Google Cloud* into the world's third largest professional cloud service by revenue.[239] *Google* also expanded in adjacent markets. Notably, its Android platform is the world's leading mobile operating system, with its own app store, *Google Play*. The *Google Chrome* browser is today the world's most used web browser.[240] *Gmail* and *Google Maps*, the consumer cloud services *Google Docs* and *Google Photos, the Google Shopping* marketplace and many other undertakings complete the picture of a company that is present in almost every sector of the internet economy. The ability to gather data through these services stands to benefit its two core activities *Google Search* and *YouTube.* They are considered to exert a key influence over content governance on large parts of the internet today.[241]

II. Amazon

Amazon is the global market leader in e-commerce. While an online retailer in its own right, it is the marketplace platform that has been responsible for generating an unprecedented degree of valuable user and sales data. Having 2.5 million sellers as competitors to its own retail operations on board means the company can cash in not only on seller fees but also on customer and market intelligence gathered from the sale of third-party products via its own site. The business intelligence and behavioural data generated through these activities is converted into money through advertising and by using it for improving its own product offers.[242] The *Amazon* search bar is today the world's most used search engine for product searches.[243] The company runs the world's leading enterprise cloud service *Amazon Web Services (AWS)*, which is used by a multitude of technology businesses and internet platforms as a computing and web hosting platform.

239 Meeker (n 138) 116.
240 'Browser Statistics' <https://www.w3schools.com/browsers/default.asp> accessed 1 August 2019.
241 Wagner, *Global Free Expression - Governing the Boundaries of Internet Content* (n 136) 104.
242 Khan (n 19) 781–782.
243 ibid 714.

This includes for example *Airbnb* or *Reddit*[244] and even *Amazon's* fiercest competitor in the video-on-demand market, *Netflix.* It has also been competing successfully for large-scale public-sector contracts across the world.[245] Apart from this, the company is amongst the leaders in music streaming, video-on-demand, voice-based commerce and has launched into entertainment content production.

III. Facebook

Facebook started in 2003 and is today the world's most popular social media network, with 2.7 billion active users by the end of 2020. By providing those users with the opportunity to upload images and video, it has also become one of the leading UGC platforms. It bought video sharing platform *Instagram* and messenger service *WhatsApp* in 2012 and 2014, respectively. *Instagram* and *WhatsApp* had 1.2 billion and 2.0 billion users by the end of 2020.[246] Facebook also started its own e-commerce marketplace in 2016, offering its user base to buy and sell goods and services privately or professionally.[247]

IV. Apple

Apple had started out as a hardware company. With the launch of its flagship product, the *iPhone*, in 2007 it successfully constructed an ecosystem of products, services and platforms. 20% of the world's 5 billion mobile phone users are using an iPhone and therefore Apple's *iOS* operating sys-

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244 'Case Studies & Customer Success - Amazon Web Services (AWS)' (*Amazon Web Services, Inc.*) <https://aws.amazon.com/solutions/case-studies/> accessed 30 July 2019. The EU launched an antitrust investigation into these business practices: 'Antitrust: EC Opens Formal Investigation against Amazon' (*European Commission - European Commission*) <https://ec.europa.eu/commission/presscorner/detail/en/ip_19_4291> accessed 30 July 2019.

245 Norman Solomon, 'Why Amazon's Collaboration With the CIA Is So Ominous -- and Vulnerable' *HuffPost* (34:16 500) <https://www.huffpost.com/entry/why-amazons-collaboration_b_4824854> accessed 10 April 2020.

246 'Most Used Social Media 2021' (n 184).

247 Mary Ku, 'Introducing Marketplace: Buy and Sell With Your Local Community' (*About Facebook*, 3 October 2016) <https://about.fb.com/news/2016/10/introducing-marketplace-buy-and-sell-with-your-local-community/> accessed 11 November 2020.

tem.[248] Apple comprises its own web browser (*Safari*), music and video streaming service (*iTunes*) and an app store. While the *iPhone* was revolutionary, it also boosted sales of the *iTunes* music streaming service and the adoption of the app store. *Apple* constantly added new interactive products such as tablet computers, smart watches, and services, like mobile wireless payments, voice recognition, cloud services or video messaging services to its technology platform.[249] Due to their closed nature (*Apple* end devices are usually needed to download and consume content) the company's services are not normally cited as classical online intermediaries. However, the *Apple App* and *iTunes* stores offer third parties to upload and sell their content and can therefore be considered online intermediary services.

V. Microsoft

Microsoft's origins are in software, but it has turned into a true digital platform and data business over recent years. It reinvigorated its search engine *Bing*, making it the world's second most used general search engine.[250] This happened after substantial investment into search technology and data capture thus driving ad revenue.[251] *Microsoft* bought *Skype*, one of the most widely used messenger service with over 300 million users and is transforming it into a social messaging app.[252] In 2016, it bought the leading professional social network *LinkedIn*, with over 260 million active users. The company's *Azure* professional cloud service is the second largest by revenue worldwide behind *AWS*. It also offers a B2C cloud service, *OneDrive*, a web browser, *Microsoft Edge*, and owns the popular gaming brand *Xbox*, which includes interactive gaming and streaming. By virtue of having the most widely used PC operating system *(Windows)*[253] and pro-

248 'Mobile Operating System Market Share Worldwide' (*StatCounter Global Stats*) <http://gs.statcounter.com/os-market-share/mobile/worldwide> accessed 31 July 2019. 'Global Digital Report 2018' (Wearesocial 2018) 94 <https://wearesocial.com/blog/2018/01/global-digital-report-2018> accessed 23 July 2019.

249 Barwise and Watkins (n 7) 31–33.

250 *Google (Search) EU Antitrust Procedure* (n 148) 35.

251 Zuboff (n 5) l 2988.

252 'Skype Adds Snapchat-like AI Photo Effects to Its Mobile App' (*Engadget*) <https://www.engadget.com/2017/11/08/skype-photo-effects/> accessed 31 July 2019.

253 *Windows* is also an operating system for mobile devices, albeit far behind *Google's Android*, and *Apple's iOS*

ductivity software *(Office)* it aims to centralise the process of gathering data from user activities on its various platforms and services.[254]

3. From content to infrastructure control

Taken together, platforms and intermediary services, be it in e-commerce, social networking, video and image sharing, or internet search are used by a majority of the world's population on a daily basis. The world's six most popular websites by traffic volume belong to online platforms, namely search engines (*Google.com*, *Baidu*), social media and UGC platforms (*YouTube*, *Facebook*, *Instagram*, *Twitter)*. Other intermediaries and platforms such as *Amazon*, *Reddit*, *Wikipedia*, *eBay*, *WhatsApp*, *LinkedIn*, *AliExpress*, *Tmall*, *Pinterest* and various *Google* country domain search sites are all amongst the top 50 webpages worldwide.[255]

Given their deep exposure to content and internet traffic, the leading players have expanded beyond simply sitting on top of the web application layer. The ongoing shift towards cloud-based content hosting, sharing, online transactions and on-demand entertainment via the systems of these intermediaries has triggered massive investments into physical infrastructure.[256]

All of the larger intermediary platforms have expanded their cloud operations by creating server farms, data centres and high speed data connections across the globe.[257] It is estimated that the leading platform corporations own several million data servers in hundreds of data centres worldwide in order to host content and process user requests and the related

254 Zuboff (n 5) 3036.

255 'Website Ranking: Top Websites Rank In The World - SimilarWeb' <https://www.similarweb.com/top-websites> accessed 1 August 2019.

256 Eli M Noam, 'From The Internet of Science to the Internet of Entertainment' in Johannes M Bauer and Michael Latzer (eds), *Handbook on the economics of the internet* (Paperback edition, EE, Edward Elgar Publishing 2017) 561–563.

257 See, for example, the statement that Google built its owns high-speed network infrastructure for the provision of its *Google Search* and *YouTube* services in *Google LLC v Bundesrepublik Deutschland*, *C-193/18* [2019] CJEU EU:C:2019:498 [22]. Or Jane Wakefield, 'Facebook Internet Cable "Circumference of Earth"' *BBC News* (15 May 2020) <https://www.bbc.com/news/technology-52676253> accessed 11 June 2020.

traffic data.[258] Today these leading companies control over 50% of the global cloud capacity.[259] Every time a user accesses or shares, and therefore replicates content, they are not only likely to retrieve it from an intermediary platform's server. Moreover, that information will also need to pass through critical interconnection or nodal points when it enters and leaves the realms of the platform's cloud storage and computing ecosystem.[260] The large internet intermediary players are today also the world's leading content providers. The demand for data storage, replication and transport generated by these companies' means they have moved towards the core of the internet by building infrastructures and conducting peering arrangements that parallel the Tier 1 networks.[261]

This marks a change from the former architecture of the web and suggests that intermediaries are increasingly affecting the basic infrastructure, or the core, of the internet.[262] This would confer on these intermediaries' powers to regulate the way content is managed not only on their platforms but also by exerting influence on data transmission. *Lessig's* famous assertion that in cyberspace "code is law"[263] and that the internet would become a zoned place has become therefore ever more real.

E. Summary: socio-technical and economic role of internet intermediaries

Internet intermediaries have seen a spectacular rise in importance over the last twenty-five years of the internet's history. The intermediary landscape has diversified and expanded. Initially, internet access providers were the main gatekeepers that enabled users to go online. However, with the commercial potential of the internet becoming apparent, more content being available and more people using the internet, the first information intermediaries started to emerge. Search engines and e-commerce marketplaces responded to the need to match the unprecedented amount of information

258 European Commission, 'Commission Staff Working Document Online Platforms Accompanying the Document Communication on Online Platforms and the Digital Single Market SWD(2016) 172 Final' (n 54) 7.

259 'Amazon Leads; Microsoft, IBM & Google Chase; Others Trail | Synergy Research Group' <https://www.srgresearch.com/articles/amazon-leads-microsoft-ibm-google-chase-others-trail> accessed 1 August 2019.

260 Lametti (n 216) 215–217.

261 Carisimo and others (n 137) 56–57.

262 ibid 55.

263 Lawrence Lessig, *Code and Other Laws of Cyberspace* (Basic Books 1999).

and services on the World Wide Web with the increase in demand for these contents.

Web 2.0 facilitated the sharing of content and the interaction of users online. This new interactivity spurred the emergence of social media networks, UGC platforms and sharing economy business platforms. The most successful intermediaries realised that interactivity brought unprecedented opportunities for capturing users' behavioural data. The more users engaged with the new platforms, shared and consumed content, purchased products and services, collaborated or just stayed online, the more behavioural data could be seized and analysed. This personalised data led to a boon in advertising revenue for these platforms. The successful platforms also used this data to lock in users by further personalising their services. As more content is created and moved online, the leading platforms invested in their own cloud and network infrastructure. These new, growing physical networks have come to rival the traditional physical infrastructure to the point that they now provide core parts of the internet's infrastructure.

The multi-sided platforms that have emerged display unique market dynamics, which are characterised by a tendency to create powerful network effects that can lead to market domination. They have created new markets and are fundamentally disrupting traditional markets. While the intermediary landscape remains vibrant and diverse, a small number of global online intermediaries dominate digital markets currently. These diagonally integrated super-platforms provide for search, information, retail and entertainment.

Today, for the majority of the world's population using the World Wide Web means using an internet platform, most probably one of the world's leading players. This is important in the context of the challenges that consumers and regulators face when dealing with unlawful content on the internet. This challenge is not only global in the sense that the internet is a global medium that cuts across jurisdictions, but also because the content is managed and governed by global corporate entities.

To be clear, this work does not focus on the problems of dealing with unlawful content on the world's dominating platforms, but rather with the general challenge of unlawful content facilitated by online intermediaries. However, their prominent position on the internet has made these large actors attractive targets for all kinds of illicit activity and unlawful content. Regulators approach these companies first when launching policy initiatives because of the comparatively high visibility of unlawful content

on these platforms and because of their global presence.[264] These companies are also the defendants in high profile and influential court cases involving unlawful content on the internet.[265]

In the following chapter, the regulatory approaches towards the internet and content regulation will be demonstrated. After an introduction into online intermediary liability, an overview of the regulatory framework for intermediary liability in Europe, the US and some other jurisdictions will be given. This will be followed by a demonstration of key legal challenges that have arisen over the last twenty years with regards to the liabilities of internet intermediaries for unlawful content. The aim is to expose the evolving legal challenges in the light of the changes in the intermediary landscape, market and technological developments that were sketched out here.

264 European Commission, 'Code of Conduct on Countering Illegal Hate Speech Online - Results of the 3rd Monitoring Exercise - Fact Sheet | January 2018' (European Commission) <https://ec.europa.eu/newsroom/just/document.cfm?doc_id=49286> accessed 23 August 2018; 'European Commission - PRESS RELEASES - Press Release - Code of Practice against Disinformation: Commission Calls on Signatories to Intensify Their Efforts' <https://europa.eu/rapid/press-release_IP-19-746_en.htm> accessed 2 August 2019. Rowland, Kohl and Charlesworth (n 128) 73.

265 See for example *Viacom* (n 163); *Google France v Louis Vuitton* (n 123); *GEMA v YouTube, 310 O 461/10* (2012) openJur 2012, 36010 (LG Hamburg); *Opinion of Advocate General Szpunar on Eva Glawischnig-Piesczek v Facebook Ireland Limited, C-18/18* [2019] CJEU EU:C:2019:458. Although this is not entirely true for the area of trademarks where *eBay*, the then leading e-commerce marketplace, was in the focus of court cases.