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AI AGENTS AND ECOSYSTEMS CONTESTABILITY

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- the direct relevance and timeliness of its contributions to the policy and regulatory development process applicable to network industries and the markets for their services.

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1. INTRODUCTION

Artificial Intelligence (AI) is without a doubt a key technological revolution of the present, possibly comparable in importance and magnitude to previous transformative shifts such as the transition from analog to digital, the shift from offline to online, and the evolution from desktop to mobile computing. Whenever such profound revolutions occur, they give rise to radically new paradigms and forms of interaction, fundamentally altering the technological landscape. These shifts enable new modes of communication, problem-solving, and creativity, often leading to the emergence of entirely new players in the industry and catalysing radical changes in the design, functionality, and usage of devices. As AI continues to evolve, we can anticipate a transformation in how we interact with technology, with interfaces becoming more intuitive, personalised, and capable of understanding and anticipating human needs in ways that were previously unimaginable. This revolution has the potential to redefine industries, disrupt traditional business models, and create a new era of human-machine collaboration.

From today's vantage point, it is difficult to imagine areas which may not be affected by AI-enabled services one way or another. AI-enabled services have already radically transformed many "traditional" digital services and products, such as search, text generation, and wearables. While today we are mostly seeing AI-enhancement of such pre-existing services and devices, in the future we expect even more radical changes in how consumers interact with their (mobile) devices, potentially leading to entirely new services, new interface designs, and new types of wearable devices, where the AI—rather than a specific device, app, or search engine—provides the unique access point for users to the internet and digital services. This has the potential to disrupt the "gatekeepers" that are currently controlling these access points. The first signs of such new designs of mobile devices are already visible today. For example, Deutsche Telekom recently presented the vision of an "app-less" AI phone[3], where the interaction takes place through an AI agent rather than individual apps. The user presents questions to the AI agent, and it is the AI agent, rather than the user or mobile operating system (OS), that chooses which underlying apps or providers are employed to respond to the query. The power to steer consumers' demand, input, and data thus lies with the AI agent, rather than a current gatekeeper—albeit, as will be discussed later, there may be significant overlap in those that provide or control the AI agents and the current gatekeepers of the digital economy.

Such pivotal moments of technological disruption are rare, and thus provide rare opportunities for new players to enter the digital economy and grow to scale, such that they can—in the long run—exert competitive pressure on existing gatekeepers. Market entry and contestability through a "niche-entry-and-growth" strategy was also the strategy pursued by most existing gatekeepers, and is viewed as especially relevant in digital markets, where competition takes place rather *for* the (new) market, rather than *in* the market (cp. Krämer & Schnurr 2022).

Therefore, it is vital for policymakers and regulators to understand the technical and economic consequences of AI on consumer choice, and whether the current EU legal landscape is fit-for-purpose to advance contestability in digital markets in relation to AI-enables services and devices.

[3] https://www.telekom.com/en/media/media-information/archive/deutsche-telekom-frees-smartphones-from-apps-1060272

In particular, in this issue paper, we seek to raise awareness of the importance of AI agents for competition and innovation in digital markets. AI agents (or agentic AI systems) exhibit a higher degree of autonomy, as exemplified in the above scenario for an app-less phone, and therefore bear the greatest potential to disrupt the user experience and to provoke new product designs. However, AI models and services are foundational to AI agents and thus, the distinction between AI services and AI agents is generally blurred. In what follows, we offer a first conceptual framework and legal assessment of applicable regulation on AI agents, pointing to possible issues of categorisation and coherence. Importantly, our focus lies on AI agents (defined in Section 2), on mobile devices and wearables, and not on general competition issues related to AI (for excellent reports on this see CMA 2023 and Autorité de la Concurrence 2024) or mobile ecosystems (see CMA 2022), although the issues are of course connected.

The remainder of this paper is organised as follows. In Section 2 we provide a definition for AI agents and sketch the key players in the value chain. In Section 3 we identify competitive bottlenecks in the AI agents value chain, and in Section 4 we point to possible contestability issues. In Section 5, finally, we review the EU digital acquis with regard to its applicability and scope in relation to AI agents.

2. AI AGENTS AND CURRENT INDUSTRY PARTNERSHIPS

Following the UK Department for Science, Innovation and Technology (2024), AI agents are "*autonomous AI systems that perform multiple sequential steps—sometimes including actions like browsing the internet, sending emails, or sending instructions to physical equipment—to try and complete a high-level task or goal.*"

Similar definitions for AI agents (also called agentic systems or copilots) are proposed by industry stakeholders, such as IBM[4] ("*a system or program that is capable of autonomously performing tasks on behalf of a user or another system by designing its workflow and utilizing available tools*"), Microsoft[5] ("*interactive system that can perceive visual stimuli, language inputs, or other environmentally-grounded data and can produce meaningful actions, manipulation, navigation, gesture, etc.*"), or Open AI[6] ("*AI systems that can pursue complex goals with limited direct supervision*").

AI agents are to be distinguished from (generative) AI models, such as Large Language Models (LLMs) or other foundation models (FMs), although AI agents make use of AI models to perform their tasks, and such models are a vital input to AI agents. The firms providing AI agents may therefore be different from those providing foundation models, although they are likely to be dependent on the input of the latter.

AI agents (or agentic algorithmic systems) can vary widely in their capabilities and hence their degree of agency or autonomy. For example, Chan et al (2023) identify four key characteristics of AI agents that determine their degree of autonomy: (1) *Underspecification* (i.e., the degree to which AI agents

[4] https://www.ibm.com/think/topics/ai-agents
[5] https://www.microsoft.com/en-us/research/project/agent-ai/overview/
[6] https://openai.com/index/practices-for-governing-agentic-ai-systems/

can accomplish a goal without concrete specification of how the goal is to be accomplished); (2) *Directness of impact* (i.e., the degree to which the AI agent's actions can affect the world without a human in the loop); (3) *Goal-directness* (i.e., the degree to which the AI agents acts as if it were designed to achieve a particular objective); (4) *Long-term planning* (i.e., the degree to which the AI agent is designed to make decisions to achieve a goal over a long time horizon vs. in the short term). However, this is just one of many attempts by researchers and practitioners to characterise different levels of autonomy and AI capabilities on the path towards a general artificial intelligence (AGI). True autonomy (or agency) of the algorithmic system is usually considered to be the ultimate step in this path (cp, e.g., Karjalainen 2024; Morris et al. 2024). While narrow AI systems trained to achieve specific tasks can already outperform humans today, it is commonly understood that a general AI that consistently outperforms most humans or a (well-functioning) highly autonomous algorithmic system does not yet exist (cp. Morris et al. 2024). This spectrum in the degree of autonomy and capabilities of AI agents is also the reason why the line between agentic AI systems and non-agentic AI systems is generally blurred and cannot be drawn distinctively.

The market for AI agents is still emerging, but companies specialised in the development of AI agents are currently attracting increased attention and investments (Reuters 2023). These include familiar big corporations such as Microsoft and Google, but also a host of startups, such as Imbue[7], Inflection AI[8], or Adept[9]. Inflection AI, for example, is reported to have raised $1.3 billion for the development of a personalised AI agent (Reuters 2023), named Pi.[10]

Further, mobile device manufacturers such as Apple (in partnership with OpenAI) and Samsung (in partnership with Google) are currently updating their devices with AI capabilities, dubbed "Apple Intelligence"[11] and "Galaxy AI"[12], which also include updates to their respective voice assistants.

The landscape of AI-related partnerships between technology firms, in many cases involving current gatekeepers under the Digital Markets Act (DMA), is becoming increasingly complex, and often the partnerships involve a deep level of collaboration, which has already raised scrutiny by several antitrust authorities, such as the CMA,[13] the German Bundeskartellamt,[14] the European Commission,[15] and the FTC[16] (Groza & Oudin 2024). Such partnerships may not only provide financial investments, but also access to key inputs such as computing resources or data, which may also involve exclusivity agreements. For instance, Microsoft's partnership with OpenAI involves that OpenAI uses Microsoft's cloud Azure exclusively.[17]

[7] https://imbue.com
[8] https://inflection.ai
[9] https://www.adept.ai
[10] https://greylock.com/greymatter/inflectionai-the-ai-friend-zone/
[11] https://openai.com/index/openai-and-apple-announce-partnership/
[12] https://www.androidpolice.com/galaxy-ai-guide/
[13] https://www.gov.uk/cma-cases/microsoft-slash-openai-partnership-merger-inquiry
[14] https://www.bundeskartellamt.de/SharedDocs/Entscheidung/EN/Fallberichte/Fusionskontrolle/2023/B6-34-23.html
[15] https://ec.europa.eu/commission/presscorner/detail/en/ip_24_85
[16] https://www.ftc.gov/news-events/news/press-releases/2024/01/ftc-launches-inquiry-generative-ai-investments-partnerships
[17] https://openai.com/index/openai-and-microsoft-extend-partnership/

With respect to the development and deployment of FMs, the CMA (2023) highlights that current gatekeepers under the DMA are active (sometimes only through partnerships) in all parts of the value chain, ranging from access to computing resources and data in order to train models, over FM development, to FM deployment in specific application areas such as search, mobile ecosystems, or productivity software. This deep involvement of current gatekeepers has led commentators to conclude that there is "no AI without Big Tech" and that especially new start-ups have a high dependency on existing digital gatekeepers (Kak et al. 2023).

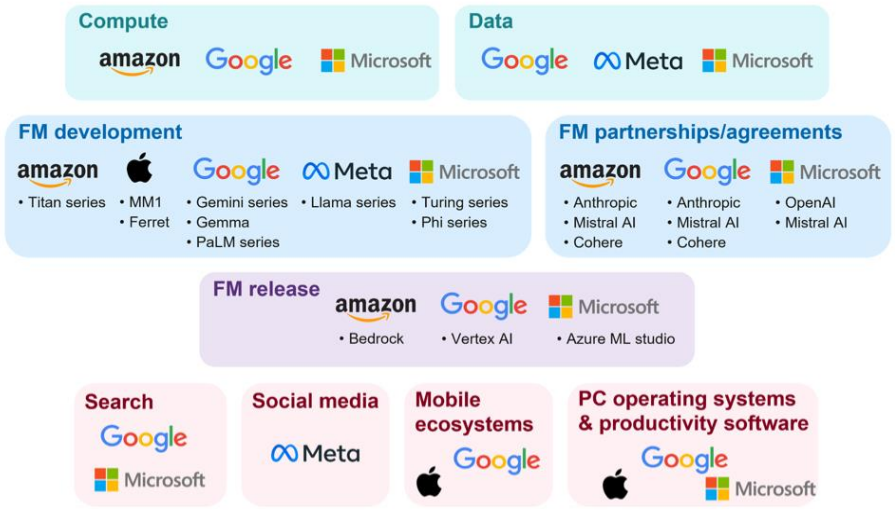

Figure 1: Involvement of DMA gatekeepers in the FM value chain (Source: CMA 2023, Figure 2)

Despite still being in its early stage, the market for AI models is also characterised by strong economies of scale and scope, network effects, and reliance on data input, as well as the dependency on large-scale computing resources and skilled labour (CMA 2023, 2024; Autorité de la concurrence 2024). The market is therefore likely to consolidate even further in the future, with current gatekeepers being well-positioned in this market, as visualised in Figure 1.

3. AI AGENTS AND REQUIRED BOTTLENECK INPUTS

The development and deployment of AI agents involves a complex value chain. In the context of AI agents for mobile devices, one can roughly distinguish the following crucial elements of this value chain:

- AI models (foundation models and specialised models)
- Mobile AI chips (to run models on-device)
- Cloud computing resources (for development and to run models off-device)
- OS integration (access to hardware and software features of the device)
- Application integration (access to individual functionalities provided by external content and service providers)

AI models represent the "brain" of AI agents, which can be comprised of both FMs ("general AI") and specialised models (also known as fine-tuned models or "narrow AI"). As described above, development of AI models requires a complex value chain of its own.

For AI agents running on mobile devices, *mobile AI chips* capable of running AI models at the edge (i.e., on device) are important to increase user experience, as they reduce latency and dependency on connectivity compared to cloud-based solutions. Furthermore, AI computing "on chip" can improve privacy as sensitive data does not have to leave the device.[18] For the avoidance of doubt, the AI chips referred to here are not the same as so-called AI accelerator chips, which are predominantly used to train and develop AI models, and therefore subsumed as part of the AI model value chain.

While more and more AI models are becoming available for developers to run on device[19], currently, not all advanced AI models can be run on device, and thus, AI agents typically employ hybrid solutions, where some tasks are performed by using AI on device, and others require *access to AI models deployed in the cloud*. Due to partnerships or vertical integration of developers of AI models with cloud providers, the cloud provider may often depend on which AI model is used, but this is not inevitable. Further, also providers of AI agents require computing resources (in the cloud) to develop these agents.

AI agents require deep *access to the hardware and software on the device*, as controlled by the OS, in order to perform complex tasks for the user. For example, AI agents may require access to the device's GPS location, calendar, maps, and browser to perform the task of an automated travel booking. AI agents may further need access to low-level OS functionalities, such as power management in order to run efficiently in the background, or to be able to react to handsfree voice commands.

Finally, AI agents would require *access to specific applications* provided by external content and service providers, such as mobility providers, search engines or payment providers in order to fulfil their tasks, such as searching, booking, and paying a travel itinerary. In the vision of an app-less phone, these applications need not necessarily be downloaded and reside as software applications on the phone. Instead, the information exchange between the AI agent and the application could be handled purely through appropriate APIs.

In many cases, through vertical integration or through partnerships, as discussed in Section 2, some players have already attained a superior position in securing access to the aforementioned key bottleneck inputs.

4. AI AGENTS AND CONTESTABILITY CONCERNS

Against this backdrop, it is apparent that in order to be able to provide a competitive AI agent on mobile devices, one would need to integrate deeply with several competitive bottlenecks in the digital economy, including, but not limited to, OSs, search engines, and browsers, which are in themselves

[18] Cp. https://www.qualcomm.com/news/onq/2024/06/whats-next-in-on-device-generative-ai

[19] Current examples include Google's Gemini Nano model running on Qualcomm's Snapdragon 8 Gen 4 chip inside the Samsung S25 smartphone.

considered “core platform services” under the DMA. In addition, access to new likely bottlenecks, currently not recognised under the DMA, such as (foundation) AI models is necessary. The firms that are best positioned to do so, are therefore those firms already controlling one or several of these bottlenecks, as they are most likely to leverage an already strong position in the above-mentioned value chain to gain a competitive advantage in the market for AI agents. Especially those providers of mobile OSs and/or devices, who control which AI agents are pre-installed, have significant power to pick winners and losers. While this may lead to better integration and efficiencies for consumers in the short run, it limits contestability and likely lowers consumers’ surplus in the long run (Heidhues, Köster & Köszegi 2024).

All the typical contestability issues in digital markets and mobile ecosystems, many already explicitly recognised by the DMA, therefore also apply in the context of AI agents on mobile devices. These include:

- Vertical foreclosure by denying access to required bottleneck resources, such as access to OS functionality
- Discriminatory access and unfair access conditions to required bottleneck resources
- Anti-competitive contractual vertical agreements such as exclusivity (e.g., between OS providers, AI model providers, and AI agents)
- Competitive advantages through pre-installation, defaults, and switching costs
- Competitive advantages through superior data access and/or limited data portability

As for other core platform services, the ability of users to be able to freely choose an AI agent provider of their choice, and to mix-and-match through vertical interoperability (Bourreau, Krämer & Buiten 2022) seems also key for the contestability in the context of AI agents for mobile devices. For example, consumers may want to take their AI agents with them when switching from one mobile device ecosystem to another. Or consumers may want to switch the (default) AI agent on their mobile device.

Given the required deep levels of vertical integration—ranging from chips over OSs to apps—necessary to provide an AI agent, enabling such choice for consumers is far from trivial. Currently, policymakers are already grappling with the complexity of enabling alternative browser engines, and access to the NFC chip and alternative app stores. The closest comparable scenario is probably that of enabling alternative browser engines. However, enabling choice and competition between alternative AI agents is likely to be far more complex, also involving even stronger trade-offs for security and integrity due to their ability to react to user input in various forms (e.g., through visual, audio, or motion cues), and their ability to perform tasks autonomously on behalf of the user. Therefore, the API access necessitated by AI agents would not only involve those of a browser engine (which is required by the AI agents in order to browse the web autonomously), but also additional ones.

Furthermore, in the context of personalised AI, even seemingly simple remedies, such as data portability, have a far higher complexity (Riley 2024).

At the same time, providers are currently making efforts to increase the integration of AI agents in their systems and to make it more difficult for users to mix-and-match, or choose alternative AI agents other than the pre-installed ones. For example, Microsoft recently announced that it would equip new

Windows 11 PCs with a hard-wired Copilot key and work towards "*a more personal and intelligent computing future where AI will be seamlessly woven into Windows from the system, to the silicon, to the hardware*."[20] Google is going through a similar process, as it is "*re-imagining the entire OS layer, putting Gemini right at the core of Android*". The integration touches "*every layer of the tech stack: from the infrastructure and the foundation models, to the OS and devices, and the apps and services*".[21]

In order to keep the markets for AI agents open, and to facilitate "niche-entry-and-growth" by new players, frictions in consumer choice need to be minimised. Even though this may be an uphill battle for new competitors, and many of them may eventually be unsuccessful, enabling consumer choice can create competitive pressure and discipline market power by existing incumbents (CMA 2023).

Which current EU laws and regulations may already apply to AI agents and whether they address the contestability and related issues outlined above is discussed next.

5. IS THE EU'S DIGITAL ACQUIS PREPARED FOR AI AGENTS?

Over the past years, the EU legislature adopted a variety of acts regulating the digital economy, resulting in an acquis that includes the Platform-to-Business (P2B) Regulation,[22] the DMA,[23] the Digital Services Act (DSA),[24] the Data Act (DA),[25] and the AI Act.[26] The Commission has also actively enforced competition law, in particular Article 102 TFEU, in digital markets. The acts were not specifically adopted for AI agents, and previous enforcement action has not targeted AI agents. Nevertheless, some acts do have provisions that (could) apply to AI agents, and previous enforcement provides hints as to how competition law may apply to AI agents.

To check whether the EU's digital acquis is prepared for AI agents, we go through three steps. As the scope of each act is different, we first assess if and to which extent the act applies to AI agents (Section 5.1). Next, we survey which of the acts' obligations relate to AI agent contestability (Section 5.2).

[20] https://blogs.windows.com/windowsexperience/2024/01/04/introducing-a-new-copilot-key-to-kick-off-the-year-of-ai-powered-windows-pcs/
[21] https://stratechery.com/2024/integration-and-android/
[22] Regulation (EU) 2019/1150 of the European Parliament and of the Council of 20 June 2019 on promoting fairness and transparency for business users of online intermediation services [2019] OJ L186/57.
[23] Regulation (EU) 2022/1925 of the European Parliament and of the Council of 14 September 2022 on contestable and fair markets in the digital sector and amending Directives (EU) 2019/1937 and (EU) 2020/1828 (Digital Markets Act) [2022] OJ L265/1.
[24] Regulation (EU) 2022/2065 of the European Parliament and of the Council of 19 October 2022 on a Single Market For Digital Services and amending Directive 2000/31/EC (Digital Services Act) [2022] OJ L277/1.
[25] Regulation (EU) 2023/2854 of the European Parliament and of the Council of 13 December 2023 on harmonised rules on fair access to and use of data and amending Regulation (EU) 2017/2394 and Directive (EU) 2020/1828 (Data Act).
[26] Regulation (EU) 2024/1689 of the European Parliament and of the Council of 13 June 2024 laying down harmonised rules on artificial intelligence and amending Regulations (EC) No 300/2008, (EU) No 167/2013, (EU) No 168/2013, (EU) 2018/858, (EU) 2018/1139 and (EU) 2019/2144 and Directives 2014/90/EU, (EU) 2016/797 and (EU) 2020/1828 (Artificial Intelligence Act).

5.1 Categorisation

None of the EU acts refer to "AI agents" specifically. Hence, the first question is one of categorisation: under which concepts, within the acts' scope of application, may AI agents be categorised?

Platform to Business (P2B) Regulation

Platform-specific regulation took its start with the P2B Regulation. The regulation applies to "online intermediation services", i.e., (i) information society services,[27] (ii) that allow business users to offer goods or services to consumers with a view to facilitating direct transactions between those business users and consumers, and (iii) that are provided to business users on the basis of contractual relationships between the provider of those services and business users which offer goods or services to consumers.[28]

It is questionable whether AI agents fall under this definition. While an AI agent can serve as an intermediary between consumers and businesses, it does not have business *users*. Rather, it connects to applications (e.g., travel booking) that have business users. Accordingly, AI agents tend not to have a contractual relationship with those business users.

But the P2B Regulation recognised that not every platform has a contractual relationship with business users. Search engines, in particular, do not contract with every operator of the websites they index. Hence, the regulation separately defines "search engines" as "*digital service[s] that allow[…] users to input queries in order to perform searches of, in principle, all websites … on the basis of a query on any subject in the form of a keyword, voice request, phrase or other input, and returns results in any format in which information related to the requested content can be found*".[29]

Again, some difficulties arise when trying to fit AI agents in this box. Although AI agents are likely to encompass a search function, the integration between a search engine and the AI agent can vary. The few providers of AI agents that have their own search engine can rely on it, providing for a tight integration (e.g., Bing AI). Other providers have to rely on one of the main search engines (e.g., OpenAI's ChatGPT taps into Bing). In either case, the question is whether the AI agent *is* a search engine, or simply *makes use of* a search engine. Moreover, the definition of search engine is limited: AI agents do much more than performing web searches. Does that mean that AI agents are not search engines?

It is unclear whether AI agents qualify as online platforms or search engines under the P2B Regulation. AI agents tend to *integrate with* online platforms and search engines to perform certain tasks, but this may not be enough to fulfil the criteria of the respective definitions. Could it be a determinative factor whether the integration is supported by vertical integration rather than a partnership?

[27] Defined by reference to Directive (EU) 2015/1535 of the European Parliament and of the Council of 9 September 2015 laying down a procedure for the provision of information in the field of technical regulations and of rules on Information Society services [2015] OJ L241/1, Art 1(1)(b) ("*any service normally provided for remuneration, at a distance, by electronic means and at the individual request of a recipient of services*").
[28] P2B Regulation, Art 2(2).
[29] P2B Regulation, Art 2(5).

Digital Markets Act (DMA)

The DMA applies to gatekeepers, i.e., providers of core platform services (CPSs) that have been designated with gatekeeper status.[30] The DMA's list of 10 CPSs includes "online intermediation services" and "online search engines", both of which are defined by reference to the P2B Regulation.[31] As pointed out above, AI agents certainly integrate with such services (and others covered by the DMA, such as social networking services and web browsers), but it is unclear whether AI agents *themselves* qualify as either.

There is another CPS category that is reminiscent of that of an AI agent, namely that of "virtual assistant".[32] The DMA defines a virtual assistant as "*a software that can process demands, tasks or questions, including those based on audio, visual, written input, gestures or motions, and that, based on those demands, tasks or questions, provides access to other services or controls connected physical devices*".[33] Whether AI agents can be categorised under this definition may depend on one's method of statutory interpretation: does one focus strictly on the text or (also) on the legislative intent at the time of adoption?

The above definition of "virtual assistant" is broad. Based purely on the text, in its plain meaning, it may capture AI agents, whose essence is to process tasks or questions based on a variety of cues (voice, writing, gestures, etc.). At the same time, it does not seem that legislators had AI agents in mind when creating the "virtual assistant" CPS category. Note that virtual assistants were not initially included in the Commission's DMA proposal[34] but were later added by lawmakers (European Parliament 2021). Shortly before, the Commission had carried out a sector inquiry into the consumer Internet of Things (IoT), with a focus on voice assistants such as Amazon's Alexa.[35] While there were competitive concerns, e.g., around interoperability, the Commission did not launch any subsequent antitrust investigations. Concerns did find their way into the DMA's legislative process,[36] where lawmakers picked them up. The text confirms how voice assistants—not today's (or tomorrow's) AI agents—were top of mind during the drafting process. First, the "virtual assistant" definition refers to the control of connected physical devices, which is a typical feature of Alexa-type voice assistants.[37] Second, the DMA defines business users of a virtual assistant as "*developers who offered at least one virtual assistant software application or a functionality to make an existing software application accessible through the virtual assistant*".[38] This also seems to hint at the "skills" developed for specific

[30] Digital Markets Act, Arts 2(1) and 3.
[31] Digital Markets Act, Art 2(a)–(b), 2(5) and 2(6).
[32] Digital Markets Act, Art 2(2)(h).
[33] Digital Markets Act, Art 2(12).
[34] See Proposal for a Regulation of the European Parliament and of the Council on contestable and fair markets in the digital sector (Digital Markets Act) COM/2020/842 final.
[35] The inquiry started in 2020 and was finalized in 2022, see European Commission, Sector Inquiry into Consumer Internet of Things (Final Report) COM(2022)19 final.
[36] European Commission, Impact Assessment Report accompanying the Proposal for a Regulation of the European Parliament and of the Council on contestable and fair markets in the digital sector (Staff Working Document) SWD(2020)363 final, para 97.
[37] Similarly, Digital Markets Act, Annex, Section E, refers to "*controlling a smart home device*".
[38] Ibid.

voice assistants like Alexa.[39] The idea of AI agents is that they autonomously access various apps. While this may require API access, it does not require apps to be developed specifically for the AI agent.[40]

In conclusion, the current categorisation of AI agents is difficult. The "virtual assistant" category may provide the closest fit: the definition may be able to accommodate AI agents, but legislative intent does not support it. A more legally certain way to cover AI agents would thus be to add them to the list of CPSs—a process the Commission can initiate with a market investigation, but that requires an amendment of the DMA by the European Parliament and the Council.[41] However, this raises other questions, such as how to define AI agents. In the interest of coherence (see further below, Section 6), reliance on the AI Act's definition of "AI system" may be opportune, but that definition is very broad (see further in this Section).

Looking to the future, AI agents may come to be categorised in another CPS category. Firms are deeply embedding these agents in their OSs. Over time, AI agents may take over many functions now served by the OS until they essentially become one and the same. At that point, AI agents may qualify as OS, which the DMA defines as "*a system software that controls the basic functions of the hardware or software and enables software applications to run on it*".[42] But for now, while the AI agent may control hardware/software functions, software applications cannot be said to *run on* the AI agent.

Should AI agents qualify as one CPS or another, they still require gatekeeper status to fall under the DMA. Gatekeeper status is conditioned on three qualitative criteria: (a) having a significant impact on the internal market; (b) serving as important gateway for business users to reach end-users; and (c) enjoying an entrenched and durable position.[43] These criteria are presumed to be fulfilled when a firm meets certain quantitative criteria, respectively:

(a) achieving EU revenue of at least €7,5 billion in each of the last three financial years or having an average market capitalization/fair market value of at least €75 billion in the last financial year, and providing the same CPS in at least three Member States;
(b) providing a CPS that has at least 45 million monthly active end-users and 10.000 yearly active business users in the EU in the last financial year; and
(c) meeting the threshold of (b) in each of the last three financial years.[44]

At the time of writing, there have been no designations of AI agents, neither as a virtual assistant nor in any other CPS category.[45] For traditional voice assistants, 45 million end-users may have had access to them, but they may not have met the threshold of *monthly* engagement (criterion (b)).[46] The new breed of AI agents is likely to see more active usage due to their increased capabilities. In 2023 already, OpenAI's ChatGPT was reported to have 100 million *weekly* active users (Malik 2023). The hurdle is

[39] https://www.amazon.com/gp/help/customer/display.html?nodeId=G8QQCQL47RFVGAZC
[40] Note that some AI agents have plug-ins, which are similar to voice assistant "skills". OpenAI had them but has meanwhile deprecated them, see https://openai.com/index/chatgpt-plugins/.
[41] Digital Markets Act, Art 19.
[42] Digital Markets Act, Art 2(2)(f) and 2(10).
[43] Digital Markets Act, Art 3(1).
[44] Digital Markets Act, Art 3(2).
[45] See https://digital-markets-act-cases.ec.europa.eu/search
[46] Digital Markets Act, Annex, Section 5, requires end-users to have "*engaged with the virtual assistant in any way at least once in the month*".

then that the active end-user threshold must be met in the last three financial years (criterion (c)). Even if AI agents qualify as CPS, it would thus take time before they attain gatekeeper status.

Before the three-year threshold of entrenchment has been reached, the Commission could nevertheless designate certain AI agents in two ways. First, the Commission could designate an AI agent based on a market investigation, in which it establishes that the qualitative but not the quantitative gatekeeper criteria are met.[47] It would then still have to show that, based on the DMA's criteria and barriers to entry, the provider is entrenched with respect to its AI agent. Given that AI agents are nascent and that the market is, for now, still heavily contested, this seems like a tall order.

Second, the Commission could designate an AI agent provider as an "emerging gatekeeper". *Current* entrenchment is not required in this case, rather, the question is whether the AI agent provider "*will foreseeably enjoy [an entrenched and durable] position in the near future*".[48] This also requires a market investigation, and the Commission can only declare specific obligations applicable to the emerging gatekeeper. At the time of writing, no CPS provider has been designated as an emerging gatekeeper.

In short, it is unclear whether AI agents are covered by the DMA as virtual assistants and designation with gatekeeper status would, in any case, take some time. For the bottleneck inputs for AI agents (see Section 3), the story is also complicated. The AI models underlying AI agents are not covered by the DMA, neither is hardware such as mobile AI chips. As explained above, OSs do constitute a CPS under the DMA. The two main mobile OSs, Apple's iOS and Google's Android, have been designated.[49] The main desktop OS, Microsoft's Windows, has also been designated.[50] Cloud computing services, finally, do constitute a CPS category,[51] but there have not been designations yet.

"Virtual assistants" may provide the most fitting CPS category for AI agents under the DMA, but legislative intent casts some doubt on that qualification. Qualification difficulties aside, the gatekeeper criterion of "entrenchment" means that the designation of AI agents under the DMA would at a minimum take several years.

Data Act (DA)

The Data Act (DA) enables users of connected products and their related services to access (personal and non-personal) data generated through the use of the connected product, where feasible, continuously and in real-time.[52] In that regard, the DA provides for an extended data portability right, but only in relation to connected products. The essence of a connected product is that of a physical device which collects data about its environment and sends (raw or processed) data off to a remote

[47] Digital Markets Act, Arts 3(8) and 17(1)–(2). At the time of writing, there had been one such designation: *Apple – iPadOS* (Case DMA.100047) Commission Decision of 29 April 2024.
[48] Digital Markets Act, Arts 3(8) and 17(4).
[49] *Apple – online intermediation services (app stores), operating systems and web browsers* (Cases DMA.100013, 100025, 100027) Commission Decision of 5 September 2023 and *Alphabet – OIS verticals, OIS app stores, online search engines, video sharing, number-independent interpersonal communications services, operating systems, web browsers, online advertising services* (Cases DMA.100011, 100002, 100004–100006, 100009, 100008 and 100010) Decision of 5 September 2023.
[50] *Microsoft – online social networking services, number-independent interpersonal communications services and operating systems* (Cases DMA.100017, DMA.100023, DMA.100026) Decision of 5 September 2023.
[51] Digital Markets Act, Art 2(2)(i) and 2(13).
[52] Data Act, Arts 3-5.

server.[53] Mere digital services without an associated physical appearance do not fall under the DA. Classic examples of connected products are those that form part of the IoT, e.g., connected cars, medical and fitness devices, industrial or agricultural machinery.

In principle, smart (mobile) devices (e.g., smartphones and wearables) also fall under the definition of a connected product of the DA.[54] Whether the DA is applicable with regard to AI agents depends on whether one considers the AI agent a "related service" to a smart device. A related service is defined as "*a digital service …, including software, which is connected with the product at the time of the purchase, rent or lease in such a way that its absence would prevent the connected product from performing one or more of its functions*".[55] One may well argue, depending on the degree of integration of the AI agent on the smart device, (especially in the vision of an app-less phone, where the AI agent plays a central role in controlling the device), that an AI agent is a related service to a smart device, and thus, AI agents would fall under the scope of the DA.

The DA also includes a definition of "virtual assistants" that is almost but not fully identical to that of the DMA, namely "*software that can process demands, tasks or questions including those based on audio, written input, gestures or motions, and that, based on those demands, tasks or questions, provides access to other services or controls the functions of connected products*".[56] The DA specifies that the concept of connected products is understood to include virtual assistants insofar as they interact with a connected product or related service.[57] Therefore, if one qualifies AI agents as virtual assistants (see the DMA discussion above), personal and non-personal data generated by AI agents are covered by the DA insofar as they concern the interaction with connected products, i.e., serve as the interface for connected products. In reverse, this means that "*data produced by the virtual assistant which are unrelated to the use of a connected product or related service are not covered*" by the Data Act.[58]

AI agents on smart devices (e.g., smartphones or wearables) may qualify as "related service" when pre-installed with the phone and/or as a "virtual assistant" under the Data Act.

Artificial Intelligence Act (AI Act)

The AI Act's scope is determined by the concept of "AI system", i.e., "*a machine-based system that is designed to operate with varying levels of autonomy and that may exhibit adaptiveness after deployment, and that, for explicit or implicit objectives, infers, from the input it receives, how to generate outputs such as predictions, content, recommendations, or decisions that can influence physical or virtual environments*".[59] This broad definition certainly captures AI agents.

[53] See Data Act, Art 2(5) for the full definition ("*an item that obtains, generates or collects data concerning its use or environment and that is able to communicate product data via an electronic communications service, physical connection or on-device access, and whose primary function is not the storing, processing or transmission of data on behalf of any party other than the user*").
[54] In the Commission's proposal of the DA, smartphones were initially excluded in recital 15. However, the exclusion has been deleted in the final version of the DA.
[55] Data Act, Art 2(6).
[56] Data Act, Art 2(31). Notice, for example, the reference to "connected products" rather than the DMA's "connected devices".
[57] Data Act, Art 1(4).
[58] Data Act, Recital 23.
[59] AI Act, Art 3(1).

The exact scope of the AI Act's obligations depends on one's role with regard to the AI system and on the risk of the system. Certain obligations apply to the "provider" (developer); others to the "deployer" (user).[60] An AI agent likely qualifies as a "general-purpose AI system", as it is based on a general-purpose AI model (see Section 3) and "*has the capability to serve a variety of purposes*".[61] This qualification comes with its own obligations.[62] The type of risk involved further depends on the AI agent's usage. AI agents, when used in the form of chatbots, can come with a transparency risk.[63] They may qualify as "high risk" when used as a safety component, in critical infrastructure, workers' management, etc.,[64] but these uses are not a natural fit for the AI agents we know today.

AI Agents are likely considered a "general-purpose AI system" under the AI Act but, when deployed on mobile devices, would usually not qualify as "high risk".

Digital Services Act (DSA)

The DSA applies to "intermediary services". These are not the "online intermediation services" as defined in the P2B Regulation and, by extension, the DMA. Rather, they are information society services used for "conduit" (transmission), "caching" (temporary storage), or "hosting" (storage).[65] While AI agents are not specifically developed for any of these functions, the terms may nevertheless be broad enough to cover AI agents.

The two main types of intermediary services are "online platforms" and "search engines". Again, however, the DSA defines these concepts differently than the P2B Regulation and DMA. Online platforms are hosting services that, at the request of the recipient, store and disseminate information to the public.[66] AI agents fit awkwardly with this definition. Can they be said to "store" their training data? They can be said to "disseminate information to the public", but does it matter that this is not the same training data that is stored?

Under the DSA, an online search engine is "*an intermediary service that allows users to input queries in order to perform searches of, in principle, all websites*".[67] While it does not refer to the P2B Regulation for this definition, it is at least functionally equivalent. However, that also means it comes with the same questions: Does an AI agent's integration with a search engine make it a search engine? Does it matter that the integrated search engine is owned by the AI agent provider?

A DSA qualification that seems like a more natural fit for AI agents is that of "recommender system", i.e., "*a fully or partially automated system used by an online platform to suggest in its online interface specific information to recipients of the service or prioritise that information, including as a result of a search*".[68] AI agents certainly do suggest and prioritise information. However, the fact that

[60] See AI Act, Art 3(3) and 3(4) for definitions.
[61] AI Act, Art 3(66).
[62] Further obligations apply to general-purpose AI models with systemic risk, but our focus here is on agents (systems)—not models.
[63] AI Act, Chapter IV.
[64] AI Act, Chapter III and Annex III.
[65] Digital Services Act, Arts 2(1) and 3(g).
[66] Digital Services Act, Art 3(i) (there is an exception when "*that activity is a minor and purely ancillary feature of another service or a minor functionality of the principal service and, for objective and technical reasons, cannot be used without that other service*").
[67] Digital Services Act, Art 3(j).
[68] Digital Services Act, Art 3(s).

recommender systems are necessarily part of an online platform, means that the questions regarding that qualification also persist here.

Insofar as AI agents qualify as online platforms or search engines, additional obligations apply once they become very large online platforms (VLOPs) or very large online search engines (VLOSEs).[69] A platform/search engine is designated as VLOP/VLOSE by the Commission if it has 45 million average monthly active users.[70]

It is unclear whether AI agents fit the categorisations as online platforms or search engines under the DSA. The qualification as a recommender system appears like a better fit but, since recommender systems are part of an online platform, it is equally in doubt.

Competition Law

The scope of competition law is not determined by any specific definition, but Article 102 TFEU does require a dominant position, which is established by examining market shares and entry barriers.[71] A cursory look at the market does not surface any AI agent with a significant share. Competition appears strong. Three questions are, however, pertinent. First, what is the relevant market for an AI agent? Is there a general market, or should we—given agents' deep embedding in the OS—think of AI agents as an aftermarket, and define, for example, a market for OS AI agents? This has been the Commission's approach for app stores.[72] Second, whatever the exact definition, is the AI agent market prone to tipping? If competition turns out to be *for* rather than *in* the market, then the current competition may result in one, perhaps two, dominant providers of AI agents. Third, to what extent is competition in AI agents determined by firms' strengths in other parts of the value chain? AI agents rely on AI models, which run on computing infrastructure; they require access to both the OS and other applications (Section 3). Certain levels of this value chain may be more concentrated than the AI agent market, and power in one or more of them may carry over to the AI agent market (Bostoen & van der Veer 2024). Defining markets and establishing market power is never easy but is particularly complex in a rapidly developing market like the one for AI agents.

The dominance of AI agents depends largely on how the market is defined, even if the extensive vertical integration of certain players likely forms a significant barrier to entry. The exact nature of AI agent competition remains uncertain.

Net Neutrality Regulation

Insofar as a smart device with a pre-installed AI agent is supplied by an internet access provider, especially when supplied in conjunction with an internet access subscription, one may consider whether the Net Neutrality Regulation applies, as the AI agent could give preference to certain content providers over others when accessing content on the internet. However, the regulation only applies to the provision of the internet access service "*irrespective of … the terminal equipment used*".[73]

[69] Digital Services Act, Section 5.
[70] Digital Services Act, Art 33.
[71] Market shares reflect actual competition, barriers to entry potential competition. In addition, countervailing bargaining power can play a role.
[72] *Apple – App Store Practices (music streaming)* (Case AT.40437) Commission Decision of 4 March 2024.
[73] Regulation (EU) 2015/2120 of the European Parliament and of the Council of 25 November 2015 laying down measures concerning open internet access [2015] OJ L310/1, Art 2(2).

Moreover, Internet access providers must allow end-users to use the terminal equipment and applications of their choice when using their internet access service.[74]

Therefore, net neutrality regulation does not provide special obligations for internet access providers when supplying smart devices equipped with AI agents. At the same time, internet access providers cannot restrict the access of AI agents to the internet.[75]

In reverse, providers of AI agents designated as gatekeepers under the DMA cannot restrict a user's choice of internet access service.[76]

Internet access providers cannot restrict access to AI agents. At the same time, AI agents designated under the DMA cannot restrict access to Internet access services.

5.2 Obligations

AI agents fall under the scope of the EU's various digital acts, albeit to different degrees. In some cases, it requires active steps from the Commission (e.g., gatekeeper designation under the DMA); in other cases, the relevant act applies automatically (e.g., most of the AI Act). Next, the question is which of the acts' obligations relate to AI agent choice, competition, fairness, and contestability. We survey them in this section.

Uninstallation, Choice Screens, and Interoperability

Post-designation, the provider of a CPS with gatekeeper status needs to abide by the **DMA**'s list of obligations.[77] While some of the DMA's obligations are of a more general nature, many of them are targeted at specific CPSs. For virtual assistants, the most suitable—if uncertain—label for AI agents, a highly relevant obligation is found in Article 6(3), which obliges gatekeepers to "*allow and technically enable end users to easily un-install any software applications on the operating system of the gatekeeper*".[78] As a result, an OS provider that integrates an AI agent, whether that be its own or that of a partner, needs to make the application easily un-installable. There is one limitation: the gatekeeper may restrict uninstallation of applications that are (i) essential for the functioning of the OS or of the device; and (ii) which cannot technically be offered on a standalone basis by third parties. AI agents are unlikely to meet either of the two conditions of this exception at present. One can imagine a future where they are integrated with the OS/device to such an extent that they are indeed essential, which would meet the first condition, but even then, the second one would remain in doubt.

While the uninstallation obligation applies to all apps, the DMA goes one step further when it comes to virtual assistants (as well as web browsers and search engines, of which an AI agent may form part).[79] Gatekeepers must make it easy for end-users to change the default virtual assistant. This requires prompting end-users at the moment of the end-users' first use of a virtual assistant, to choose from a list of the main available virtual assistant service providers, to which the OS of the gatekeeper directs or steers users by default. In other words, the provider of a gatekeeper OS must present a

[74] Net Neutrality Regulation, Art 3(1).
[75] Net Neutrality Regulation, Art 3(3).
[76] Digital Markets act, Art 6(6).
[77] Digital Markets Act, Arts 5–7.
[78] Digital Markets Act, Art 6(3), first paragraph.
[79] Digital Markets Act, Art 6(3), second paragraph.

virtual assistant choice screen. Such choice screens are well-known from competition enforcement, where they have served as remedies in the *Microsoft II* and *Google Android* cases (see Figure 2 below).[80]

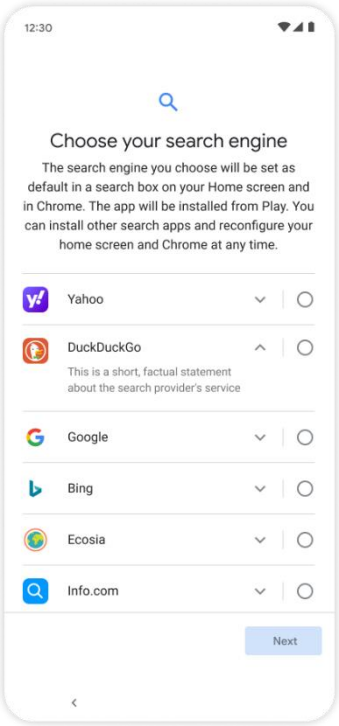

Figure 2: Google Android search engine choice screen (Source: Google[81])

There is, however, an important limitation: the OS gatekeeper must only serve a virtual assistant choice screen if its own virtual assistant has been designated. That is why, for example, Apple had to implement a choice screen for browsers, as its own Safari browser had been designated; but not for search engines, as it does not have its own search engine.[82] This has two implications. First, given that no virtual assistants have been designated, no gatekeeper is obliged to set up a choice screen for them. Second, a gatekeeper may be able to avoid designation of its own AI agent by integrating a third-party's AI agent; as a result, it would not have to serve a choice screen. The question arises whether, depending on the exact level of integration, an AI agent formally owned by a partner could nevertheless be considered the gatekeeper's "own" virtual assistant.[83]

It bears reiterating, that changing a default virtual assistant is likely to be much more technically difficult than changing a search engine or even a browser engine (see above, Section 4), as it requires deep access to the device's OS.

Access to a device's hardware and software is regulated in Article 6(7) of the DMA. This provision obliges a gatekeeper to grant providers of services "*free of charge, effective interoperability with, and access for the purposes of interoperability to, the same hardware and software features accessed or*

[80] *Microsoft (tying)* (Case COMP/C-3/39.530) Commission Decision of 16 December 2009 and *Google Android* (AT.40099) Commission Decision of 18 July 2018.
[81] https://www.android.com/choicescreen/
[82] Apple's Non-Confidential Summary of DMA Compliance Report, 7 March 2024, https://www.apple.com/legal/dma/dma-ncs.pdf. For its browser choice screen, see https://developer.apple.com/support/browser-choice-screen/.
[83] The anti-circumvention obligation of Digital Markets Act, Art 13, may play a role here.

controlled via the operating system or virtual assistant listed in the designation decision pursuant to Article 3(9) as are available to services or hardware provided by the gatekeeper".[84] In other words, the gatekeeper OS/virtual assistant provider must give other providers of AI agents access to those hardware and software features that are available to itself. There is a limited security exception.[85]

Taken together, Articles 6(3) and 6(7) are supposed to bring contestability to the AI agent market.[86] Defaults are sticky, but gatekeepers must make virtual assistants easily changeable and must even serve end-users a choice screen upon first usage. Interoperability with the device and OS is essential to provide a capable AI agent, and gatekeepers have to give competing providers of AI agents access to their hardware and software. These provisions should level the playing field so that providers of AI agents can compete on the merits, even if a choice screen can never fully compensate for the advantage of default placement. However, for these provisions—and in particular the choice screen obligation—to become fully applicable, the gatekeepers' AI agents must first be designated, in particular as virtual assistants (at least for Article 6(3) of the DMA).

An OS provider designated as a gatekeeper under the DMA that pre-installs an AI agent must make it easily un-installable, and—provided the AI agent is owned by the same OS provider—prompt users with a choice screen on which they can choose an alternative AI agent. It is not clear, however, to what extent the latter obligation holds in case the AI agent is provided by the OS provider in cooperation with a third-party. To guarantee equal functionality, the OS provider must give other AI agents access to the same hardware and software as its own AI agent.

Competition

Competition law continues to complement the DMA. Competition enforcement can target the different levels of the AI agent value chain (Section 3), from the models, over cloud computing, to the OS level. However, from the perspective of enforcement efficiency, the DMA would constitute the preferred tool *where it applies*. Its application requires designation of these respective services, in particular, virtual assistants and cloud computing; the main OSs have already been designated. FMs themselves are not a CPS, but the European Parliament called on the Commission to investigate whether generative AI should be added to the list of CPSs.[87]

Where competition law might play a meaningful role is with regard to practices that run across levels of the value chain. A prime example are the partnerships between cloud providers and FM developers. The *Microsoft/Mistral* decision by the CMA shows, however, that minority stakes are difficult to capture under present merger control regimes, which require "control" of one firm over another.[88] Competition law's abuse of dominance provision could apply to agreements between device/OS providers and AI agent providers. Exclusivity agreements (potentially in the form of a revenue-sharing

[84] Digital Markets Act, Art 6(7), first paragraph.
[85] Digital Markets Act, Art 6(7), second paragraph ("*The gatekeeper shall not be prevented from taking strictly necessary and proportionate measures to ensure that interoperability does not compromise the integrity of the operating system, virtual assistant, hardware or software features provided by the gatekeeper, provided that such measures are duly justified by the gatekeeper.*").
[86] Digital Markets Act, Art 6(4), which obliges gatekeepers to "*allow and technically enable the installation and effective use of third-party software applications*" can play a supporting role.
[87] European Parliament resolution of 16 January 2024 on competition policy – annual report 2023 (2023/2077(INI)).
[88] CMA, Case ME/7102/24, *Microsoft/Mistral AI*, 17 May 2024.

arrangement) have been found abusive under Article 102 TFEU.[89] Even pre-installation by a device/OS provider of their own AI agent could be scrutinised as a potentially abusive tie.[90] The other way around, competition law may come in where a single AI agent attains dominance and refuses to deal with an OS provider that would like to integrate the agent. If the market has fully tipped towards a single AI agent (see above, Section 5.1), access could be mandated under the essential facilities doctrine.[91]

Competition law may come in situations where the DMA does not apply to AI agents, either because there is no designated CPS, or because there is no relevant obligation. In particular, the DMA has little to say about practices that run across the value chain (e.g., partnerships), rather than being limited to a single CPS market. Competition law enforcement must, however, contend with a high threshold of intervention, both in the requirement of dominance and the analysis of abuse.

Transparency

A number of EU regulations impose transparency obligations. Transparency generally requires a provider to make its specific terms and conditions readily available, also before contracting, and to draft them in plain and intelligible language.[92] Note that transparency and competition interact: transparency about terms and conditions can improve competition, as it helps end-users make informed choices, and gives business users insight into how their business may be affected.[93] Transparency is often presented as relating to fairness, even if transparency only provides a "soft" form of it.[94]

The **P2B Regulation** requires transparency regarding terms and conditions, especially those related to termination, and regarding differentiated treatment and ranking.[95] As noted above (Section 5.1), it is not settled whether AI agents qualify as online platforms or search engines and are thus subject to the obligations. Insofar as they are obliged to guarantee transparency, new questions arise, especially with regard to ranking. In the course of their operation, AI agents constantly rank the products and services of third parties. The challenge in complying with a transparency obligation in this regard is that the ranking is not always carried out by the AI agent; it may be carried out by a connected search engine or other application. When booking travel, for example, an AI agent may give a first and a second choice of hotel platform, in which case it is doing the ranking. But once a hotel booking platform is chosen, it is the platform in question doing the ranking—not the AI agent. Does a transparency obligation still apply to the provider of the AI agent in this scenario?

The **DSA**'s transparency obligations build on the P2B Regulation. A specific provision obliges online platforms that use recommender systems (including AI agents) to "*set out in their terms and conditions, in plain and intelligible language, the main parameters used in their recommender systems,*

[89] *Google Android* (AT.40099) Commission Decision of 18 July 2018. Note that the revenue-sharing limb of the decision was annulled on appeal, though the issue was evidentiary, see Case T-604/18, *Google and Alphabet v Commission (Google Android)*, EU:T:2022:541. In the U.S., see *United States et al. v. Google LLC*, 8 August 2024 (D.D.C. 2024).
[90] See *Microsoft* (Case COMP/C-3/37.792) Commission Decision of 21 April 2004.
[91] See Joined cases 6 and 7-73 *Commercial Solvents v. Commission* EU:C:1974:18; Joined cases C-241/91 P and C-242/91 P *RTE and ITP v. Commission* ('*Magill*') EU:C:1995:98; Case C-7/97 *Oscar Bronner v. Mediaprint* EU:C:1998:569.
[92] See, e.g., P2B Regulation, Art 3.
[93] Conversely, transparency can also harm competition by facilitating collusion.
[94] E.g., in the P2B Regulation, whose full title refers to "fairness and transparency".
[95] P2B Regulation, Arts 3, 4, 5 and 7.

as well as any options for the recipients of the service to modify or influence those main parameters". The DSA's other provisions relate mostly to content moderation. Again, the issue arises that an AI may, for much of its output, simply be a mediator that serves up the results generated by the algorithms designed by others (e.g., search engine providers). An AI agent provider can be transparent about its own recommender system but will have little insight into those of third parties. Does it suffice then to refer simply to the third-party terms and conditions?

The **AI Act** also mandates transparency for AI systems, but more from a product liability standpoint. Providers of AI systems that are intended to interact with natural persons, such as AI agents, must ensure that those natural persons are aware they are interacting with an AI system.[96] Providers of AI systems that generate content, which many AI agents are capable of, must mark that content as AI-generated.[97] The obligations are stricter for high-risk AI systems but, as noted, that qualification does not readily apply to the AI agents discussed here. The models underlying AI agents are likely to qualify as general-purpose, which means that *providers* of such models must draw up technical documentation and must make it available to *deployers* of AI agents, so that the latter have a good understanding of its capabilities and limitations.[98] This obligation is relevant, for example, when a device or OS provider makes use of the AI agent provided by a third-party.

The P2B, DSA, and AI Act all provide for transparency obligations, but on different aspects and to a different degree. The operation of AI agents, which interact with many other services, complicate the scope of the obligations, especially those related to ranking. Should the AI agent provider be transparent about its own ranking algorithm, or does the obligation extend to the services that the AI agent makes use of in its operation?

Data Access

Data access can spur market contestability both horizontally (in the same market as the firm giving access) and vertically (in an adjacent market). Data access rights are constituted by the DMA and the DA as well as under the General Data Protection Regulation (GDPR).

In case AI agents qualify as a "related service" or "virtual assistant" under the **DA**, smart device users have a right to obtain any personal or non-personal data generated by the use of the AI agent as it is "*readily available*". This will typically include any raw input data, such as prompts and voice commands; but it expressively excludes derived data, such as data derived by means of "*complex algorithms, including those that are part of proprietary software*",[99] i.e., virtually any output data of the AI Agent. Data provision is also limited as far as it concerns trade secrets.[100] The data that falls under the scope of the DA has to be provided continuously and in real-time to the user at no charge. The user can also assign a third-party (potentially another AI agent) to receive the data. In this case, the application of the DA for the purposes of contestability is very limited, however. The third-party receiving the data must first negotiate the terms of the access conditions with the data holder, including a fair, reasonable, and non-discriminatory price for access.[101] Further, the third-party data

[96] AI Act, Art 50(1).
[97] AI Act, Art 50(2).
[98] AI Act, Art 53(1)(b) and Annex XII.
[99] Data Act, recital 15.
[100] Data Act, Arts 4(6) and 5(9).
[101] On the economic issues related to this, see, e.g., Krämer (2022).

recipient would not be allowed to use that data to develop a competing product.[102] It is questionable what constitutes precisely a "competing product" in the present context, where we identified the smart device as the candidate for a "connected product" and the AI agent as its "related service". Potentially, third parties may therefore use the data to develop a competing AI agent (related service), but not a competing smart device with an AI agent pre-installed. At last, data recipients may also not be gatekeepers under the DMA.[103]

In summary, while the DA applies broadly to all manufacturers of connected products[104] and concerns both personal and non-personal data generated by the use of the AI agents, it limits data use for purposes of contestability severely. In addition, the DA seeks to facilitate switching between data processing—in particular cloud—services,[105] which as discussed above (Section 3), are a key input for the FMs underlying AI agents. Cloud providers must be clear about switching terms, phase out switching charges ("egress fees"), unbundle certain services, and facilitate data portability between different services. The impact on contestability is much clearer here. While the above access rights related to connected products can have a modest impact on competition, particularly in adjacent markets (including aftermarkets), economically and technically lowering switching costs between cloud services can significantly boost competition in this market.

Furthermore, providers of AI agents designated as gatekeepers under the **DMA** are required to make personal data provided by end-users available free of charge, continuously, and in real-time, to the respective end-user and third-parties authorised by the end-user, for the express purpose of enhancing contestability.[106] Nevertheless, the scope of the portability obligation under the DMA, which, for reference, is the same as under Article 20 of the GDPR, is limited to "data provided" by the end-user (e.g., prompts to the AI agent) and excludes derived or inferred data (e.g., responses or actions taken by the AI agent). Further, currently, there is also debate about what "continuous and real-time" means operationally, given the diversity (e.g., in types, location, detail) of data held, and concerns about ensuring data privacy and security. While the same concerns generally arise also with respect to one-off data portability under Article 20 GDPR, the continuous and real-time nature of the data transfer could present additional risks (Krämer 2021). To note, this data portability provision under the DMA can also apply to firms designated as "emerging gatekeepers".

Further note that if AI agents were to be designated as "search engines" under the DMA (see above, Section 5.1), their provider also has to give access to click and query data (such as prompts).[107]

Finally, and for completeness, end-users may, of course, also request personal data provided to non-gatekeeper AI agents on the basis of the **GDPR**,[108] and such data may also be transferred directly to third-parties authorised by the end-users. While the data can be accessed free of charge, the data must not be provided continuously and in real-time, which has proven to be of limited value for contestability (Krämer 2021).

[102] Data Act, Art 6(2)(e).
[103] Data Act, Arts 5(3) and 6(2)(d).
[104] Unless these are small or micro enterprises. See Data Act, Art 7(1).
[105] Data Act, Chapter VI.
[106] Digital Markets Act, Art 6(9).
[107] Digital Markets Act, Art 6(11).
[108] Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data [2016] OJ L119/1, Art 20.

User input data (e.g., prompts) to AI agents can, in principle, be accessed through the DA, the DMA, and the GDPR, but only data accessed through the DMA may be meaningfully used by third-parties for the purposes of contestability. In all cases, the user of the AI agent must authorise third-party data access.

6. CONCLUSIONS AND OPEN ISSUES

What to make of the EU's digital acquis, as a whole, when it comes to AI agents? Let us consider their categorisation and the applicable obligations in turn.

The DMA provides the at first sight clearest categorisation for AI agents, namely as virtual assistants, though that qualification gets more complicated when considering legislative intent. In the interest of legal certainty, one may wonder whether bringing AI agents under the DMA would require adding a new CPS category. In any case, another active step—designation—is required for the obligations to apply. Given AI agents' recent explosion in popularity, meeting the gatekeeper thresholds is a matter of time, though it could be sped up modestly, especially by relying on the emerging gatekeeper concept. In the meantime, competition law continues to apply, though it may be difficult to establish dominance.

Most regulations beyond the DMA do not include a virtual assistant category, which makes their scope with regard to AI agents even less clear. Both the P2B Regulation and the DSA apply to online platforms and search engines, albeit defined differently, but it is unclear to which extent either concept captures AI agents. In addition, the DSA has a recommender system category, which appears more suitable but is equally in doubt. Under the AI Act, AI agents are likely considered general-purpose AI systems, though not with a high risk. The Net Neutrality Regulation has no immediate applicability to AI agents. Under the DA, finally, AI agents may qualify as a related service (in case smart devices, such as smartphones, qualify as a connected product, and the AI agent is crucial for the functioning of the device) and/or as a virtual assistant.

In short, AI agents—as a new type of service—fit awkwardly with the established categories that much of the EU digital acquis is built, from online platforms, over search engines, to virtual assistants. In the future, when AI agents become so deeply embedded in the OS that they become an essential part of the OS a designation of AI agents as an OS may also become feasible. This can have far-reaching consequences under the framework of the DMA (as noted below), as some obligations apply only to OS CPSs, but not to virtual assistant CPSs. Categorisation becomes all the more difficult when the smart device or OS on which the AI agent runs and the AI agent itself are provided by different firms, especially given the extensive industry cooperation in this domain.

When it comes to obligations, those of the DMA are again most targeted with respect to contestability. They relate to uninstallation, selection of defaults (via choice screens), interoperability, and data portability. The scope of the obligations can, however, be tricky. The choice screen obligation, for example, only applies when an OS provider's own virtual assistant has been designated. Does this mean that OS providers can circumvent the obligation by pre-installing a third-party's AI agent? Could the level of integration be determinative for the (non-)application of the obligation? Competition law applies in concert and may come in particularly where the DMA does not apply, i.e., to practices that run across the value chain (e.g., partnerships and exclusivity agreements). In particular, strong

partnerships or even vertical integration is expected between providers of AI agents and (gen) AI models, which fuel these agents. Further, depending on the degree of autonomy, the lines between agentic AI systems and (non-agentic) AI systems can be very blurred, which makes it difficult to distinguish them decisively.

Beyond the DMA, the regulation applicable to AI agents becomes piecemeal. The P2B Regulation, DSA, and AI Act mostly include transparency obligations that also apply to AI agents, but on different aspects and to a different degree. When AI agents interact with other apps, as they do for much of their operation, the subject of the regulation (AI agent or app provider?) also comes into question. Next, the DA, DMA, and GDPR provide partially intersecting data access obligations. Their force may, however, be limited by the fact that users must initiate the access, and the data covered consists mainly of that inputted by the user (e.g., prompts). The DA even expressly prohibits third parties from using data obtained through the DA to develop a competing product, but questions remain whether it could be used to develop a competing 'related service'.

In conclusion, the EU regulatory framework for AI agents is fragmented and often unclear as to its applicability and obligations. Given this fragmentation, regulators are already thinking ahead to coordinating enforcement between the different acts. One important vehicle for doing so is the High-Level Group for the Digital Markets Act, which consists of various (networks of) authorities including the Body of the European Regulators for Electronic Communications, the European Data Protection Supervisor, the European Competition Network, and the Consumer Protection Cooperation Network.[109] They have already issued a public statement on AI, promising to work together "*to preserve contestability and the incentives to innovate in AI*".[110] Especially in areas where different acts overlap, such as with regard to data access and interoperability, such cooperation is crucial.

[109] Digital Markets Act, Art 40.

[110] European Commission, 'High-Level Group for the Digital Markets Act Public Statement on Artificial Intelligence' (Statement, 22 May 2024) https://digital-markets-act.ec.europa.eu/high-level-group-digital-markets-act-public-statement-artificial-intelligence-2024-05-22_en.

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