Clouds Connecting Europe: Interoperability in the EU Data Act

by **Leonie Ott and Yifeng Dong ***

Abstract: Interoperability, describing the ability of systems to work together, is a cornerstone of Europe's vision for a connected digital economy, and the Data Act takes a bold step in this direction. Articles 33-35 of said Act contain far-reaching interoperability mandates for data spaces and data processing services, including cloud services. However, the provisions' unclear language and structural complexities present interpretative challenges. For instance, the meaning of central terms like "data space" and "data processing service" remain ambiguous. To address these challenges, we propose an effects-oriented method emphasising an interdisciplinary analysis of the regulated industry and alignment of various legislative objectives with the effects of interoperability as a policy tool.

Applying this method, we find that the term "data space" must be interpreted restrictively in light of the public interest objectives of the relevant provision, namely as a platform that enables broad data sharing. Similarly, we argue that understanding the term "data processing service" is predicated on the insight that the technical terms used in the statutory definition are reflections of specific economic effects which characterize cloud markets (e.g. lock-in effects and the importance of amortisation). In order to reliably apply the definition, the technical terms must be evaluated in light of these economic effects as a set of interdependent factors in a global assessment, whereby a stronger degree in one dimension can offset weaker degrees in other dimensions.

We argue that this stringent effects-oriented approach is necessary for the Data Act to achieve its goals of strengthening Europe's digital economy by enabling seamless cloud environments and shaping a more open and innovative digital landscape.

Keywords: Interoperability, Data Act, Cloud, Switching, Digital

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Recommended citation: Leonie Ott and Yifeng Dong, Clouds Connecting Europe: Interoperability in the EU Data Act, 16 (2025) JIPITEC 154 para 1.

A. Introduction

1 Interoperability is omnipresent - in our daily lives and in European law. We encounter interoperability when our phones work seamlessly with smart watches, cloud services, speakers and different apps. We can find interoperability provisions, for example, in the Data Act[1] (DA), the Digital Markets Act[2] (DMA) and the Data Governance Act[3] (DGA). This paper takes a look at the little-known, highly controversial and far-reaching interoperability obligations in the DA, where interoperability is described as the "ability of two or more data spaces

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1 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 [2023] OJ L 2023/2854, hereinafter "Data Act", see: Arts 33-36.

2 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 [2022] OJ L 265/1, hereinafter "Digital Markets Act", see: Arts 6(4), 6(7) and 7.

3 Regulation (EU) 2022/868 of the European Parliament and of the Council of 30 May 2022 on European data governance and amending Regulation (EU) 2018/1724 [2022] OJ L 152/1, see: Art 12.

or communication networks, systems, connected products, applications, data processing services or components to exchange and use data in order to perform their functions."[4] Simply put, products or services are interoperable if they "can work together".[5]

2 The legislative expansion of interoperability as a policy tool started when the European Commission (Commission) labelled the lack of interoperability as an obstacle to utilizing the full potential of information and communications technologies.[6] This trend is accompanied by high expectations. For instance, the so-called Draghi report on competitiveness recommends incentivising interoperability[7] and mandated interoperability was even called a "supertool".[8] *Prima facie*, promoting interoperability increases interconnectedness as well as competition and resonates with the values underlying the Single Market.[9]

3 However, the technical and economic realities ask for a more differentiated analysis. To begin with, compelled interoperability always includes trade-offs.[10] For instance, standardisation, which is one way to reach interoperability, can stifle innovation because it "freezes" technical progress.[11] Mandated interoperability has the potential to significantly affect product design, business strategies, economic power and market structures. It is a common misconception that interoperability provisions generally are "light touch"[12] regulation. Moreover, the effectiveness of an interoperability provision is contingent on the details, *inter alia*, the distribution of market power and product specifics. Since interoperability is not an end in itself[13] — it is employed to reach other goals — the rule hinges on intricate market mechanisms. Compelled interoperability can even backfire and achieve the opposite of the intended effects.[14] In sum, one can say that interoperability provisions have complex modes of action. A slight change in the details can have counterproductive repercussions.

4 Against this background, it is all the more surprising that the interoperability rules in the DA leave the reader clueless at many points, even regarding the most prominent questions.

5 The DA, which is part of the European strategy for data,[15] aims at fostering data access and use.[16] The cross-sectoral regulation will be applicable from 12 September 2025.[17] It contains substantive provisions, such as access rights, rules "targeted at tech regulation"[18] and enforcement provisions. The broadly discussed first part of the Act focuses on connected products and related services (frequently

4 Data Act, Art 2 No. 40.

5 Marc Bourreau, Jan Krämer, Miriam Buiten, 'Interoperability in Digital Markets' (Report, Centre on Regulation in Europe 2022) 13 <https://cerre.eu/wp-content/uploads/2022/03/220321_CERRE_Report_Interoperability-in-Digital-Markets_FINAL.pdf> accessed 6 December 2024.

6 Commission, 'A European strategy for data' (Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions) COM(2020) 66 final, 3.

7 Mario Draghi, *The future of European competitiveness* (Part B: In depth analysis and recommendations 2024) 302 <https://commission.europa.eu/topics/strengthening-european-competitiveness/eu-competitiveness-looking-ahead_en> accessed 13 December 2024; similarly, the so-called Letta report suggests sector-specific interoperability measures that could foster the European Single Market: Enrico Letta, *Much More Than a Market* (2024) <https://www.consilium.europa.eu/media/ny3j24sm/much-more-than-a-market-report-by-enrico-letta.pdf> accessed 13 June 2025.

8 Fiona Scott Morton and others, 'Equitable Interoperability: The "Supertool" of Digital Platform Governance' (2023) 40 (3) Yale J. on Regul. 1013.

9 In addition to the economic perspective taken in this paper, there is also a political dimension of interoperability, for example, when EU databases are merged through interoperability, see: Didier Bigo, 'Interoperability: A political technology for the datafication of the field of EU internal security?' in Didier Bigo and others (eds), The Routledge Handbook of Critical European Studies (Routledge 2021).

10 Wolfgang Kerber, Heike Schweitzer, 'Interoperability in the Digital Economy' [2017] 8 JIPITEC 39, 41.

11 Jacques Crémer, Yves-Alexandre de Montjoye, Heike Schweitzer, 'Competition policy for the digital era' (Working Paper No. 6 2019) 59 <https://op.europa.eu/en/publication-detail/-/publication/21dc175c-7b76-11e9-9f05-01aa75ed71a1/language-en> accessed 9 December 2024; Ilsa Godlovitch, Peter Kroon, 'Interoperability, switchability and portability – Implications for the Cloud' (WIK-Consult, Study for Microsoft 2022) 25 <https://www.wik.org/en/publications/publication/interoperability-switchability-and-portability-implications-for-the-cloud> accessed 6 December 2024.

12 Fiona Scott Morton and others, 'Equitable Interoperability: The "Supertool" of Digital Platform Governance' (2023) 40(3) Yale J on Regul 1013, 1017.

13 Wolfgang Kerber, Heike Schweitzer, 'Interoperability in the Digital Economy' [2017] 8 JIPITEC 39, 41.

14 Marc Bourreau, Jan Krämer, 'Interoperability in Digital Markets: Boon or Bane for Market Contestability?' (2022) <https://ssrn.com/abstract=4172255> accessed 6 December 2024.

15 Commission, 'A European strategy for data' (Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions) COM(2020) 66 final.

16 Data Act, recital 2.

17 Data Act, recital 117.

18 Moritz Hennemann and others, 'Data Act, An Introduction' (2024) 19.

referred to as "smart" products).[19] However, the DA additionally considers other areas of the data economy, for example *data processing services* (e.g. cloud services) and *data spaces*.

6 Focusing on interoperability mandates, two chapters of the DA are important. First, Chapter VI of the Act addresses switching between data processing services. Its contractual and technical rules are designed to make switching easier, and aim at creating a pro-competitive effect by decreasing the risk that customers are locked in because of switching costs.[20] Second, the DA has a frequently overlooked[21] Chapter VIII, entitled "Interoperability", which contains four, quite different rules (Arts 33-36)[22].

7 Article 33 targets participants of *data spaces* and lays down certain requirements on the data offerings shared within them. Surprisingly, there is no legal definition of a "data space" in the DA and the term can be understood in many different ways. Elucidating this term will be one of the problems this paper tries to solve.

8 Articles 34-35 DA then concern *data processing services*, with Article 34 declaring that many of the switching provisions from Chapter VI shall apply *mutatis mutandis* if multiple services are used in-parallel.[23] Again, this begs the question: What are data processing services? The term appears to mainly target cloud services, but does it go as far as encompassing, for example, everyday applications such as "Microsoft Word" if used in the cloud version? Considering that the DA provisions on interoperability concern, *inter alia*, the entire cloud computing industry in Europe, a cornerstone of innovative businesses and future growth, it becomes clear how relevant the provisions are. The way these obligations are interpreted will decide on whether the cloud industry faces burdensome innovation-stifling rules or customers benefit from a connected European cloud infrastructure.

9 Lastly, Article 36 sets out requirements for *smart contracts* that arrange data sharing. However, the requirements laid down in the provision relate to security and cyber-resilience. Although the provision belongs to the Interoperability Chapter, the supposed connection with interoperability is obscure.[24] Hence, we will not further cover this provision.

10 In sum, the conundrum of the interoperability obligations in the DA is that the legislator has left crucial parts blank, while much else is regulated in great detail. Its addressees – data spaces and data processing services – are not clearly defined, even as these terms are central to their application in practice.

11 In the following, we will suggest a systematic method based on an effects-oriented interdisciplinary perspective to answer these questions (part B) and apply our method to the interoperability provisions in the DA (part C-D).

B. Filling the "Gaps" with an Effects-Oriented Interpretation

12 Digital regulation is confronted with the problem that the subject matter is undergoing constant change, which can hinder legislative specificity. Yet, the uncertainty about vital concepts of the interoperability rules (e.g. the meaning of "data space" and "data processing service") poses a problem for the addressees of the frameworks, who have to identify what their precise duties are and if they are even captured by the legislation. Since the regulated issues are complex and technical, an "intuitive" legal understanding is not constructive. Furthermore, the abstract subject matter, consisting of terms like "data" and "data processing services", creates a myriad of interpretative options. Since the framework is cross-sectoral, the rules will also be applied to a wide range of contexts and situations, which further complicates their interpretation. Moreover, the DA pursues a multitude of goals, since it is part of an overarching policy strategy regarding data;[25] this too increases the complexity of interpretation.

13 In order to solve this challenge, we suggest a method based on a combination of the characteristics of

19 See for example: Federico Casolari, Carlotta Buttaboni, Luciano Floridi, 'The EU Data Act in context: a legal assessment ' [2023] International Journal of Law and Information Technology 399.

20 Antonio Manganelli, Daniel Schnurr, 'Competition and Regulation of Cloud Computing Services' (2024), Centre on Regulation in Europe, 79 <https://cerre.eu/wp-content/uploads/2024/02/REPORT.CERRE_.FEB24.CLOUDS.pdf> accessed 1 April 2025.

21 Philippe Heinzke, 'Data Act: Neue Regeln für Cloud-Service-Provider' [2024] Betriebs-Berater 1291.

22 In the following, provisions cited without the name of the framework belong to the Data Act.

23 The omitted Article 35 allows for standardisation to foster the interoperability of data processing services (see part D).

24 Jonas Siglmüller, 'Standardisierungsbestrebungen für das Rückgrat der europäischen Digitalwirtschaft' [2024] Zeitschrift für IT-Recht und Recht der Digitalisierung 112, 115.

25 Commission, 'A European strategy for data' (Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions) COM(2020) 66 final.

regulatory law and digital markets, which may lend itself to being used for the interpretation of digital regulation in general.

14 Due to the instrumental nature of regulatory law[26], which tries to steer behaviour in order to reach a certain outcome in the future, a special method of interpretation is required: The law should be applied by focusing on the practical implementation of the regulatory intention.[27] Put differently, the actual effects provoked by a rule are decisive for its interpretation. This approach goes further than a purposive interpretation, but is still in line with the interpretative approach of the Court of Justice of the European Union (CJEU), which states that "[...] in interpreting a provision of EU law, it is necessary to consider not only its wording, [...] but also the context in which the provision occurs and the objectives pursued by the rules of which it is part".[28]

15 The characteristics of regulatory law require that the aim underlying a provision is not just considered in its theoretical dimension. Instead, one examines whether the provision will actually fulfil the pursued goal. The key question is what the actual effects would be if the provision had a certain content.[29] Based on this, one decides if the rule should have that content or an alternative one.[30] Hence, it is important to identify the typical situation the rule applies to and the factual context of the provision.[31]

16 This *modus operandi* has two implications: first, we must clearly establish the legislative goals of the provisions, and second, we must understand the mechanism by which the legislator intends to reach its goals – in this case, interoperability. Those two aspects are set forth in the following as a preface because they pervade all of the specific interpretation questions.

I. The Goals of the Data Act in Light of the Digital Single Market

17 The prerequisite for any effects-based interpretation is a careful analysis of the legislative goals, because they are the yardstick for assessing the practical effectiveness of interpretative options. Here, we differentiate between the goals on the macro-level and the micro-level.[32] The macro-level goals are the objectives of the legal framework as a whole and its context within EU primary law, in particular the aims set out in Article 3 TEU. Then, zooming in to the micro-level, the goals of each specific provision must also be extracted. This differentiation intends to ensure that the technicalities of data-related provisions neither eclipse the broader constitutional background nor create incoherence within a framework. Furthermore, the separate analysis of the goals pursued by each provision is necessary, since the specific objective of rules, even within a chapter, can vary widely, as we will see in the following. We will start with the general objectives of the DA, which can be identified with a high degree of certainty, because they are spelled out in Article 1 of the Act, the initial recitals and the proposal for the Act. In contrast, the micro-level goals of each provision are much less clear.

18 Generally, the intention behind the DA is to foster access to and the use of data and thereby spur data-related innovation.[33] According to recital 1, "high-quality and interoperable data from different domains increase[s] competitiveness and innovation and ensure[s] sustainable economic growth." Referring to the non-rival nature of data, the recital goes on to highlight that "[t]he same data may be used and reused for a variety of purposes and to an unlimited degree, without any loss of quality or quantity."

19 Although more and more data is being produced,[34] the DA states that data is not sufficiently shared to reach an "optimal allocation of data for the benefit of society."[35] The proposal for the DA identified two root causes why the increasing volume of data does not unfold its full economic potential: The data is either unused, because of trust problems, diverging incentives or technological barriers,[36] or

26 As opposed to, say, private law in its function to organise private relationships.

27 Alexander Hellgardt, *Regulierung und Privatrecht* (Mohr Siebeck 2016) 648.

28 Case C-160/20 *Stichting Rookpreventie Jeugd and Others* [2022] ECLI:EU:C:2022:101, para 29; also: C-373/20 *Dyrektor Z. Oddziału Regionalnego Agencji Restrukturyzacji i Modernizacji Rolnictwa* [2021] EU:C:2021:850, para 36.

29 Alexander Hellgardt, *Regulierung und Privatrecht* (Mohr Siebeck 2016) 653.

30 Ibid 653.

31 Ibid 653.

32 Introducing the differentiation of goals on the macro-and micro-level: ibid 657.

33 Commission, 'Proposal for a Regulation of the European Parliament and of the Council on harmonised rules on fair access to and use of data (Data Act)' COM (2022) 68 final, 2.

34 Data Act, recital 1.

35 Data Act, recital 2.

36 In relation to these challenges, it has been argued that establishing a cross-sectoral data sharing infrastructure as well as a fifth European economic freedom (for data) would be beneficial to fulfil the Digital Single market, see: Andrés Chomczyk Penedo, 'The Regulation of Data Spaces under the EU Data Strategy: Towards the "Act-ification" of the Fifth European Freedom for Data?' (2024) 15 (1) EJLT <https://ejlt.org/index.php/ejlt/article/view/995/1088> accessed 13 June 2025. Yet, the DA is not that far-reaching.

is accumulated by a small number of large firms.[37] Hence, one could argue that the framework has two, closely interrelated, lines of attack: One is focused on creating the conditions to establish a market for currently unused data, and the other one is tackling competition-related phenomena, in order to promote competition on data-related markets.

20 The explicitly mentioned goals of the DA are in line with this two-pronged approach. The Regulation aims at overcoming the technical barriers to the development of the European data economy.[38] Additionally, the DA tries to foster a fairer distribution of value stemming from data.[39] It aims at re-balancing the benefits flowing from data usage by targeting "anomalous concentrations" with view to the rights of the affected parties.[40] Thus, the DA should not only be viewed as part of the European strategy for data, which envisions "a single European data space - a genuine single market for data, open to data from across the world - [...] boosting growth and creating value [...]"[41], but also in light of the competition policy efforts of the Commission, which frequently entail interoperability obligations.[42]

21 In the big picture of the Union's primary law, the DA provisions belong into the context of the single market goal. The DA is built on the legal basis of Article 114 TFEU, which empowers the Union to adopt harmonising laws aiming at the establishment and functioning of the single market. According to Article 26 TFEU, this describes "an area without internal frontiers in which the free movement of goods, persons, services and capital is ensured".

22 The proposal for the DA mentions that the completion of the internal market for data is the main intention.[43] It argues that the DA "will allow the Union to benefit from the scale of the internal market".[44] Its Recital 4 elaborates in this regard that, "in order to respond to the needs of the digital economy and to remove barriers to a well-functioning internal market for data, it is necessary to lay down a harmonised framework specifying who is entitled to use product data or related service data, under which conditions and on what basis." Regarding the need for EU-wide rules, the Commission has stated that that due to the "growing digitalisation of the economy and society, there is also a risk of Member States legislating data-related issues in an uncoordinated manner, which will lead to fragmentation in the internal market."[45]

23 One could question if legal fragmentation is the main problem in digital markets, since in practice, the most significant barriers to, say, a seamless multi-cloud environment are not national borders, but the borders between technical ecosystems.[46] The characteristics of cloud services foster the formation of integrated cloud ecosystems[47] and technical configurations as well as contractual conditions can enclose the costumers inside these so-called "walled gardens".[48] Arguably, the free flow of data and data-related services within the EU is mainly constrained by the borders of ecosystems run by global cloud computing companies, such as Amazon and Google, not by differing regulation.

24 Still, there is a strong nexus between the interoperability obligations in the DA and the single market goal. For example, the method that is chosen to foster interoperability regarding data spaces and data processing services is principally standardisation. Both main provisions, Article 33 and Article 34 (via Article 35), employ standard-setting to facilitate interoperability. This is neither self-evident nor the only option. For instance, in the interoperability provision regarding messaging services in the DMA (cf. Article 7 DMA) the disclosure of interfaces, a technical alternative to standardisation, is the default option for compliance.

37 Commission, 'Proposal for a Regulation of the European Parliament and of the Council on harmonised rules on fair access to and use of data (Data Act)' COM (2022) 68 final, 2.

38 Ibid 1; Data Act, recital 119.

39 Ibid 1; Data Act, recitals 2, 4.

40 Maria Luisa Chiarella and Manuela Borgese, 'Data Act: New Rules about Fair Access to and use of Data' (2024) 10 Athens Journal of Law 47, 53.

41 Commission, 'A European strategy for data' (Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions) COM(2020) 66 final, 4.

42 Juliane Mendelsohn, Philipp Richter in Björn Steinrötter (ed), *Europäische Plattformregulierung* (Nomos 2023) 547.

43 Commission, 'Proposal for a Regulation of the European Parliament and of the Council on harmonised rules on fair access to and use of data (Data Act)' COM (2022) 68 final, 7.

44 Ibid 7.

45 Commission, 'Impact Assessment Report Accompanying the document "Proposal for a Regulation of the European Parliament and of the Council on harmonised rules on fair access to and use of data (Data Act)"' (Commission Staff Working Document) SWD (2022) 34 final, 24.

46 Daniel Schnurr, 'Switching and Interoperability between Data Processing Services in the Proposed Data Act' in Jan Krämer and others (eds), *Data Act: Towards a Balanced EU Data Regulation* (Centre on Regulation in Europe 2023) 82 <https://cerre.eu/wp-content/uploads/2023/03/230327_Data-Act-Book.pdf> accessed 6 December 2024.

47 Antonio Manganelli and Daniel Schnurr, *Competition and Regulation of Cloud Computing Services* (Centre on Regulation in Europe 2024) 83 <https://cerre.eu/wp-content/uploads/2024/02/REPORT.CERRE_.FEB24.CLOUDS.pdf> accessed 1 April 2025.

48 Primavera de Filippi, 'Cloud computing: analysing the trade-off between user comfort and autonomy' (2013) 2(2) Internet Policy Review, 4.

25 The establishment of EU-wide standards in the DA is a typical example of harmonisation. The standardisation stipulated in the DA is, on the one hand, the technical route to interoperability and, on the other hand, an approximation of national rules to create a single market for data. This shows how interrelated the concept of interoperability and the European single market are. Standardisation enables products to work together and markets to integrate.

26 In summary, the DA as a whole aims at creating a European market for data and data-related services and tries to promote competition on that market.[49] However, we will see later on that on the micro-level, each provision pursues distinct goals that strongly differ from each other. Reconciling these differences will be a key strategy in gleaning a workable interpretation of the provisions.

II. The Effects of Interoperability

27 The second implication of our suggested interpretative method is that the mechanism between a certain rule and its effects becomes particularly important. To that end, understanding policy tools such as interoperability becomes a prerequisite. The focus on effects means that extra-legal considerations play a significant role.

28 In theory, the concept of interoperability is simple. From a customer perspective, interoperability creates more choice and autonomy.[50] If different services or products can work together, they can be combined. Hence, interoperability facilitates the modularisation and product differentiation of products and services.[51] In general, companies have an incentive to offer interoperability and the level of interoperability demanded by the customers is fulfilled via the workings of the market.

29 Yet, the interoperability provisions in the DA demonstrate that the legislator considered the level of interoperability to be insufficient.[52] Since interoperability is an abstract property of systems and not an end in itself, this raises the question of why interoperability should be mandated at all – which effects can mandated interoperability have in general that are desirable? To begin with, one can differentiate between *public interest* effects of interoperability and *economic* effects of interoperability. In the former case, interoperability furthers general public interest purposes such as improved connectivity for communication purposes[53] or digital resilience through the usage of several services in concert.

30 More importantly though, compelled interoperability can have positive economic effects, which are dependent on the type of interoperability and the market setting. For example, mandated interoperability can foster competition and innovation, especially in platform ecosystems.[54] If customers can "mix-and-match" services from different providers and they still work together, then competition does not merely happen between large ecosystems, but smaller providers also have a chance of gaining customers with their specific product. Thus, interoperability can create efficiencies through competition and innovation by complementors.[55]

31 Within the wide range of possible economic effects, *market-power related* effects can be further distinguished from other economic effects. Interoperability provisions are considered a tool to *counteract market concentration*,[56] especially in markets with strong network effects, where products or services gain attractivity through the number of users.[57] Interoperability can reduce the market power conferred by network effects.[57a] For example, the number of users is highly important for a messenger service and compelled interoperability allows the users of smaller services to connect to the large user basis of other providers. Additionally, mandated interoperability can ameliorate lock-in effects, reduce entry barriers and limit the cost advantages of economies of scope and scale. If competition related issues of that kind are prevalent in the market, interoperability can be mandated to counteract concentration tendencies.

49 Commission, 'Proposal for a Regulation of the European Parliament and of the Council on harmonised rules on fair access to and use of data (Data Act)' COM (2022) 68 final, 7.

50 John Palfrey, Urs Gasser, *Interop: The Promise and Perils of Highly Interconnected Systems* (Basic Books 2012) 57.

51 Wolfgang Kerber, Heike Schweitzer, 'Interoperability in the Digital Economy' [2017] 8 JIPITEC 39, 42.

52 See also Data Act, recital 3.

53 Ibid 48.

54 Raegan MacDonald, Owen Benett and Udbhav Tiwari, 'Digital Markets Act (DMA): July 2021 position paper on the European Commission's legislative proposal for an EU Digital Markets Act' 9–11 <https://blog.mozilla.org/netpolicy/files/2021/07/FINAL_DMA-Position-Paper.docx_.pdf> accessed 1 April 2025.

55 Marc Bourreau, Jan Krämer, Miriam Buiten, 'Interoperability in Digital Markets' (Report, Centre on Regulation in Europe 2022) 26 <https://cerre.eu/wp-content/uploads/2022/03/220321_CERRE_Report_Interoperability-in-Digital-Markets_FINAL.pdf> accessed 1 April 2025.

56 Fiona Scott Morton and others, 'Equitable Interoperability: The "Supertool" of Digital Platform Governance' (2023) 40 (3) Yale J. on Regul. 1013, 1015.

57 Ibid 1016-1019.

57a Ibid 1019.

32 However, compelled interoperability can also create adverse economic effects. For instance, requesting interoperability can reduce the incentive to multi-home (i.e., use several services for the same purpose), which has the potential to strengthen large players. For instance, if WhatsApp were interoperable with every other messenger, users might lose the incentive to use other apps. Another example of negative effects would be inefficiencies due to vertical separation.[58]

33 These trade-offs raise the question of when it is justified – from a policy perspective – to increase the level of interoperability above the one defined by the market mechanism. In case public interest consequences are the rationale, this is a purely political question. Regarding economic effects, one could argue that interoperability should only be mandated in case a *market failure*[59] can be identified.

34 For instance, a market failure is present if a dominant firm unilaterally decides about standards and the level of interoperability.[60] An example of a market failure situation was seen in the competition law case of Microsoft, decided by the General Court in 2007, in which a workgroup server producer complained that Microsoft did not disclose the interfaces of its operating system, although Microsoft was dominant in this market and without being interoperable with the de facto standard one did not have a realistic chance on the market.[61] In cases like this, interoperability mandates can be used as a tool to correct market failures.

35 As we will see later on, the interoperability provisions in the DA are less stringent regarding their economic justification. Although there is the possibility of market failure in the cloud service market,[62] the obligations target all providers, regardless of market power. In the case of data spaces, it is not even clear which specific economic problem the obligation is trying to tackle through interoperability. This is in line with a characteristic of the DA to "no longer [limit] itself to addressing well-defined market failures (like market power). Rather, it follows a market-shaping approach: it [...] redefines the legal infrastructure based on which markets evolve."[63] Since increasing the level of interoperability is not necessarily economically advantageous, however, this approach is questionable.

36 This categorization of interoperability effects can reveal tenuous economic justifications and allows for a systematic discussion and interpretation of the specific interoperability rules.[64]

C. Article 33: Interoperability in Data Spaces

37 Having developed the required interpretation method and analysis of the DA and interoperability in general, we can now apply these insights to solve the specific open questions in each provision that could hinder their effective application in practice.

38 To begin with, Article 33 addresses *participants of data spaces*. They are subject to a long catalogue of obligations in Article 33(1), which mainly boils down to adequately documenting the data or data services they offer. For instance, participants in data spaces must specify the dataset content, the data quality and the technical means to access the data. In addition, the means to enable interoperability with automated data sharing agreements, such as smart contracts, must be provided "where applicable".

39 The provision refers to this long catalogue of obligations as "essential requirements to facilitate the interoperability of data, of data sharing mechanisms and services, as well as of common European data spaces". The term "common European data spaces", which refers to a particular Commission initiative, is not to be confused with *data spaces* in general.[65] In

58 Marc Bourreau, Jan Krämer, Miriam Buiten, 'Interoperability in Digital Markets' (Report, Centre on Regulation in Europe 2022) 26 <https://cerre.eu/wp-content/uploads/2022/03/220321_CERRE_Report_Interoperability-in-Digital-Markets_FINAL.pdf> accessed 1 April 2025.

59 We understand market failure in the economic sense. Recognized instances of market failure are: externalities, imperfect information, market power and adjustment deficiencies, see: Michael Fritsch, 'Marktversagen und Wirtschaftspolitik' (2011 Vahlen) 72-73.

60 Wolfgang Kerber, Heike Schweitzer, 'Interoperability in the Digital Economy' [2017] 8 JIPITEC 39, 43.

61 Case T-201/04 *Microsoft v Comission* [2007] ECR II-3619.

62 Antonio Manganelli, Daniel Schnurr, 'Competition and Regulation of Cloud Computing Services' (2024), Centre on Regulation in Europe, 57, 80, 85 <https://cerre.eu/wp-content/uploads/2024/02/REPORT.CERRE_.FEB24.CLOUDS.pdf> accessed 1 April 2025.

63 Heike Schweitzer and Axel Metzger, 'Data Access under the Draft Data Act, Competition Law and the DMA: Opening the Data Treasures for Competition and Innovation?' [2023] GRUR International 337, 338.

64 See: part C and D.

65 Common European data spaces, defined in Article 33 DA as "purpose- or sector-specific or cross-sectoral interoperable frameworks for common standards and practices to share or jointly process data for, inter alia, the development of new products and services, scientific research or civil society initiatives", are specific projects coordinated by the Commission itself, such as the "Common European health data space" and the "Common European agriculture data space", see Commission, 'Commission Staff Working Document on Common European Data Spaces', SWD(2024)

sum, Article 33 (1) stipulates that the participants of data spaces are obliged to fulfil certain essential requirements, which are mainly obligations to describe data, in order to enable interoperability (of data, common European data spaces etc.).

40 Since these "essential requirements" are only described in broad terms, the provision provides for the development of standards to concretise the obligations and facilitate compliance. Article 33[66] lays down the procedure for arriving at standards. The Commission must request a European standardisation organisation to develop a *harmonised standard*. A harmonised standard is "a European standard adopted on the basis of a request made by the Commission for the application of Union harmonisation legislation" (Article 2(1)(c) Regulation 1025/2012 on standardisation). If this fails, the Commission itself can take action and adopt *common specifications* instead. Article 2(42) of the DA defines common specifications as "a document, other than a standard, containing technical solutions providing a means to comply with certain requirements and obligations established under this Regulation". In summary, the provision gives preference to standards developed by the standardisation organisations, but it includes a fall-back option fulfilling the same purpose.[67]

41 If participants of data spaces meet the harmonised standards or the common specifications (depending on what has been established), then conformity with the requirements of paragraph 1 is presumed.[68] As is typical in European standard-setting, the standards are not directly binding, but since they create legal certainty for the addressees through the presumption of conformity, they are expected to be very influential nonetheless.

42 As we have noted in the introduction, a crucial piece of the puzzle is missing here: Who is affected by these obligations? The summary of the provision has shown that it all boils down to the meaning of the term "data space", because the addressees of the rule are the participants of data spaces. The DA gives no statutory definition of this term. Other laws, such as Regulation (EU) 2021/694 establishing the Digital Europe Programme, which also use the term "data space", do not define it either. Since the DA is a Regulation - meaning that it is directly applicable according to Article 288 TFEU - this is surprising. One can only speculate as to why the legislator decided to omit such a central definition. Regardless of whether the term was left deliberately open to anticipate future developments, or because it was seen as sufficiently clear on its own, the legislator has, in any case, left it to the courts to define the term. Despite the lack of an internal definition, it is clear that the term must be given an autonomous and uniform interpretation in EU law.[69] In consequence, national courts will need to refer the question to the CJEU.

43 Since the wording is abstract, various interpretative options are possible. Hence, it is not surprising that what has been written about data spaces varies widely, from only encompassing common European data spaces[70], which again is just a particular Commission initiative[71], to describing "every open offering of data or data-based services on the market".[72]

I. Objectives of the Provision

44 Here, the importance of understanding the provisions' goals and intended effects becomes acutely relevant. This is true both for the question of what the goals are, but also what they cannot be. In contrast with many other interoperability mandates, the point of this specific provision cannot be to *remedy market concentration*. This is clear from the fact that it addresses persons who have *already* decided to share data. Contrast this with the countless provisions in the DA and beyond aiming to encourage or force the sharing of data in the first place. It is clear that Article 33 does not deal

21 final, 3. The term "Common European data *space*" (singular form) is also an unrelated term, and used by the Commission to describe its vision of a common market for data in general, see Commission, 'Towards a common European data space' (Communication) COM(2018) 232 final; Commission, 'A European strategy for data' (Communication) COM(2020) 66 final, 6.

66 Data Act, Art 33 (4-7), (9).

67 Data Act, recital 103.

68 Data Act, Art 33 (4) and (8).

69 The *Infopaq* case-law (Case-5/08 *Infopaq* [2009] ECLI:EU:C:2009:495, para 27) makes it clear that terms in EU law are generally to be interpreted autonomously and uniformly. There Is also no indication to suggest otherwise in this case, since the DA does not point to any national laws and the term "data space" does not seem to be based on the legal traditions of any Member State. See also Karl Riesenhuber in Karl Riesenhuber (ed), *European Legal Methodology* (Intersentia 2021) 252-253.

70 Although ambiguous, the example given indicates this understanding: Kristina Schreiber, Patrick Pommerening, Philipp Schoel, Der neue Data Act (2nd edn, Nomos 2024) 112. The narrow understanding might be interrelated with their assumption that the operators of data spaces are the addressees of the provision, as it was in the proposal.

71 Commission, 'Commission Staff Working Document on Common European Data Spaces', SWD(2024) 21 final, 3.

72 Jonas Siglmüller, 'Standardisierungsbestrebungen für das Rückgrat der europäischen Digitalwirtschaft' [2024] Zeitschrift für IT-Recht und Recht der Digitalisierung 112, 113.

primarily with "reluctant parties" – the quality of forcibly shared data is already regulated specifically in Article 13 DA, and the quality of contractually shared data falls under the scope of the Digital Products Directive.[73] In contrast, Article 33 deals with the quality of a voluntary data *offering* itself.

45 We have seen that the overarching goal of the DA is to promote data sharing and to build a well-functioning single market for data.[74] What motive then, could justify placing obligations on the "good guys" who have already decided to share data by their own volition? The objective can only be the anticipated benefit of the circulation of "more interoperable" (i.e., better documented) data as such. For one, better documented data offerings increase market transparency. Potential users of the data can better compare offerings and make the right choice about which one to use. The text of the provision in Article 33(1)(a) speaks explicitly about letting recipients "find, access, and use the data". Here, the legislator is aiming to achieve an *economic* objective by aiming to make the market work more efficiently. In the same vein, the requirement to ensure compatibility with automated data sharing agreements is also meant to increase efficiency by decreasing transaction costs.

46 Apart from economic justifications, another objective may be the limitation of risks from bad data – Article 33(1)(a) also mandates the disclosure of "data collection methodology, data quality and uncertainty". The proliferation of poorly documented data has been cited as a source of safety concerns regarding the automated systems trained on that data.[75] Conversely, increasing documentation can also increase trust (cf rec. 102 DA), promoting data sharing. In this respect, the provisions are pursuing *public interest objectives* such as product safety.[76]

47 Whether these objectives are sufficient to justify the obligation, is a serious question. When contrasting this provision with other interoperability mandates, it is apparent that the justification for its existence is much more tenuous. With respect to the economic objectives, it is neither justified by a specific market failure nor by the perceived need to pre-emptively counteract evolving market concentration. Moreover, overly burdensome obligations risk discouraging data sharing, perhaps the most undesirable outcome considering the overarching goals of the DA.[77]

48 Thus, the principle of practical effectiveness requires a restrictive interpretation whilst allowing the salient public interest justifications to adequately manifest themselves.

II. The Term "Data Space"

49 It has been suggested in the literature that the term "data space" should cover "every open offering of data or data-based services on the market".[78] In our view, this interpretation is too wide. For one, the Commission's proposal originally only targeted "operators" of data spaces.[79] This strongly suggests that a data space, by virtue of having an operator, needs to have a certain infrastructural element and is not just a stand-in for the market for data in general. During the committee stage in Parliament, the provision was widened to address any "participant" in a data spaces, but this in no way suggests that the original conception of the data space as such has changed.

50 Therefore, a data space within the meaning of Article 33 should be a *platform* whose purpose is to allow users to share data with a large number of other users. These platforms already exist today; an example would be *huggingface.co*, currently the most popular platform for the AI and machine learning industry. It is likely that the Commission intended to dedicate Article 33 to this emerging phenomenon.

51 This is also in line with the effects-oriented approach outlined above. Keeping in mind the public interest objectives of the provision, data sharing on a platform differs from other forms of public offerings in three major ways. First, data offerings on a platform can quickly reach a wider audience. In addition, due to the ease of use, users are more likely to incorporate a data offering into their own project without much afterthought. In other words, the threshold for widespread sharing is reduced. This both increases the risk that badly documented data poses and makes the added value of any single documentation higher. Second, data spaces imply a certain degree of automation of data sharing. This is highlighted by the explicit reference to automated

73 Directive (EU) 2019/770 of the European Parliament and of the Council of 20 May 2019 on certain aspects concerning contracts for the supply of digital content and digital services [2019] OJ L 136.

74 cf. part B.I.

75 Dario Amodei and others, 'Concrete problems in AI safety' (2016) <https://arxiv.org/abs/1606.06565>.

76 Cf. Article 169(1) TFEU.

77 cf. part B.I.

78 Jonas Siglmüller, 'Standardisierungsbestrebungen für das Rückgrat der europäischen Digitalwirtschaft' [2024] Zeitschrift für IT-Recht und Recht der Digitalisierung 112, 113, our translation.

79 European Commission, Proposal for a Regulation of the European Parliament and of the Council on harmonised rules on fair access to and use of data (Data Act) [2022] COM/2022/68 final, Art 28.

data sharing agreements in Article 33(1)(d), which are also a means of automation. Whereas even public offerings of data outside of a platform usually involve some kind of dedicated customer contact, where a prospective customer could ask questions about the product, this is not (always) the case in data spaces. Lastly, the restrictive interpretation of data spaces as platform related ensures that the provision only targets dedicated data sharing, and not data shared as part of some other product. This reading therefore helps to reduce unintended burdens on market participants, whilst focusing on an area where a mandate may have the biggest cumulative benefit.

D. Article 34 and 35: Interoperability of Data Processing Services

52 By far the most far-reaching provisions of the interoperability chapter in the DA are Articles 34 and 35. They deal with the interoperability of "data processing services", which – inter alia – include *cloud services*.[80] As already mentioned, the definition of the term "data processing services" is cryptic. After setting out the specific goals of Articles 34 and 35 in the following paragraphs (see part D.I), we will decipher the term "data processing service" (see part D.II) along with other ambiguities in the provisions (D.III-IV).

53 It has long been known that the cloud market tends to suffer from lock-in effects, a propensity that the EU legislator also referenced in the context of the Data Act.[81] In general, customers are locked in when they decide to pursue a course of action, but they cannot change the course towards a preferable alternative later on, because the switching costs tie them to the inferior original choice.[82] In the cloud service market, lock-in effects result mainly from financial and technical barriers to switching.[83] Since a customer of a cloud service loses physical control over the data, customers can enter into a situation in which they generate data without being able to easily transfer it to other providers, which leads to data-induced switching costs.[84] This, along with other characteristics of cloud services such as high customizability, creates a dependency of businesses on the cloud service. For instance, in 2020, 59% of the businesses using cloud computing services said that they were "highly dependent".[85] In this context, interoperability can ameliorate lock-in effects by reducing technical barriers between services. Mandated interoperability gives customers the option to build a cloud system comprised of cloud services from different providers (multi-cloud approach).[86] Customers can migrate one cloud service to a different provider whilst keeping the rest of the services where they are. Due to interoperability, the whole cloud ensemble then still works together. This decreases the dependence of customers from specific cloud providers and increases competition.

54 To this end, the DA first includes a series of rules aiming to facilitate *switching* between providers in Chapter VI. Chapter VIII then complements this regime by also targeting the in-parallel use of multiple services, i.e. interoperability.

55 Article 34(1) lays down that certain provisions from Chapter VI about *switching* between data processing services "also apply *mutatis mutandis* to providers of data processing services to facilitate interoperability for the purposes of in-parallel use of data processing services." In layman's terms, the Data Act, on the one

80 Admittedly, the understanding presented above that Article 33 on data spaces and Articles 34 and 35 on data processing services are discrete obligations with diverging application scopes is contested due to the nebulous systematic structure of the chapter. It has been proposed to consider Article 33 the general rule that is then specified by Articles 34 and 35. It was argued that Article 33 mentions the term "data service", which could theoretically be an umbrella term encompassing data processing services, see Jonas Siglmüller, 'Standardisierungsbestrebungen für das Rückgrat der europäischen Digitalwirtschaft' [2024] Zeitschrift für IT-Recht und Recht der Digitalisierung 112, 113. Yet, this reasoning is not convincing. In Article 1 (3) the Data Act clearly distinguishes between the providers of data processing services and the participants of data spaces when describing who the Regulation applies to. Moreover, no indication of such a structure can be found in the legislative material. Above all, the consequences of the suggested hierarchy of provisions militate against it. An obligation for cloud service providers or users to describe shared data could not be justified.

81 Commission, 'Proposal for a Regulation of the European Parliament and of the Council on harmonised rules on fair access to and use of data (Data Act)' COM (2022) 68 final, 14.

82 Edward F Sherry, 'Lock-In Effects' in Mie Augier and David J Teece (eds), *The Palgrave Encyclopedia of Strategic Management* (Palgrave Macmillan UK 2016).

83 Antonio Manganelli, Daniel Schnurr, 'Competition and Regulation of Cloud Computing Services' (2024), Centre on Regulation in Europe, 79 <https://cerre.eu/wp-content/uploads/2024/02/REPORT.CERRE_.FEB24.CLOUDS.pdf> accessed 1 April 2025.

84 Ibid 70.

85 Commission, 'Impact Assessment Report Accompanying the document "Proposal for a Regulation of the European Parliament and of the Council on harmonised rules on fair access to and use of data (Data Act)"' (Commission Staff Working Document) SWD (2022) 34 final, 14ff.

86 Antonio Manganelli, Daniel Schnurr, 'Competition and Regulation of Cloud Computing Services' (2024), Centre on Regulation in Europe, 97 <https://cerre.eu/wp-content/uploads/2024/02/REPORT.CERRE_.FEB24.CLOUDS.pdf> accessed 1 April 2025.

hand, aims at facilitating the transfer of your photos in the cloud storage to a different cloud storage (switching through portability). By declaring these rules on switching applicable to the in-parallel use of data processing services, the DA aims at making your photo storage and another photo storage or a different cloud service, for example for editing your photos, work together (interoperability for parallel use). The underlying idea behind Article 34 is that different data processing services, such as cloud services, could be used together — if interoperability is enabled— to create a multifaceted but seamless cloud environment.[87]

56 The most important cross reference in Article 34 to the Chapter on switching is the one to Article 30 (2-5), because this leads to the *obligation to offer open interfaces* and *comply with open interoperability specifications or harmonised standards*, once they are established. Due to this cross reference, the scope of which is ambiguous (see part D.III), it is necessary to look at Article 30 first.

57 The referenced provision is captioned with "Technical aspects of switching". According to Article 30, data processing services must offer open interfaces (Art 30 (2)) and comply with certain technical specifications or standards (Art 30 (3)). Whether these obligations shall only effectuate interoperability between services of the same service type or also between complementary cloud services is contested (see part D.IV).

58 More specifically, Article 30 (2) requires data processing services to make open interfaces available for their customers, as well as the destination provider a customer wants to switch to. Open interfaces act as bridges for data flow. They include Application Programming Interfaces (APIs), which are "sets of protocols defining "how software components communicate with one another."[88] Theoretically, this would be a sufficient technical route to interoperability, but the following paragraph goes further.

59 Article 30 (3) states that the data processing services "shall ensure compatibility with *common specifications* based on open interoperability specifications or harmonised standards for interoperability". Interestingly, the wording of the provision requires only "compatibility" and not "conformity" [89] or "compliance"[90] suggesting that there might be some flexibility in applying the standard. Yet, the purpose of the obligation and the legislative material suggest otherwise. In practice, it is difficult to imagine any case in which a service is fully compatible without conforming with the standard.[91] Moreover, recital 100 mentions that the Commission can mandate the usage of those specifications and standards through a reference to them. Therefore, Article 30(3) is considered to make the aforementioned specifications and standards binding.[92]

60 Systematically confusingly, the requirements for these standards and specifications are laid down in Article 35. These are relatively broad. For example, it is stipulated that "open interoperability specifications and harmonised standards for the interoperability of data processing services shall achieve, where technically feasible, interoperability between different data processing services that cover the same service type."

61 In sum, the short provision of Article 34 prescribing interoperability for the purpose of in-parallel use of data processing services might seem mild as a dove at first glance and the term "standards" has connotations of voluntariness. However, the cross reference to the rules on switching creates hard and far-reaching obligations for cloud providers to enable interoperability. Article 34 obligates data processing services to, on the one hand, make open interfaces available (via Art 30 (2)), and on the other hand, fulfil technical specifications or standards (via Art 30 (3)). The requirements for the latter and the procedure to draft them are set out in Article 35. Evidently, the precise content of the obligation hinges upon these technical norms that are still to be produced. Until then, the providers of data processing services must at least "export all exportable data in a structured, commonly used and machine-readable format"[93] upon request, which however only leads to data portability.

62 Finally, it should be mentioned that Article

87 Daniel Schnurr, 'Switching and Interoperability between Data Processing Services in the Proposed Data Act' in Jan Krämer and others (eds), *Data Act: Towards a Balanced EU Data Regulation* (Centre on Regulation in Europe 2023) 83 <https://cerre.eu/wp-content/uploads/2023/03/230327_Data-Act-Book.pdf> accessed 6 December 2024.

88 Oscar Borgogno, Giuseppe Colangelo, 'Data sharing and interoperability: Fostering innovation and competition through APIs' (2019) 35(5) Computer Law & Security Review 1, 3.

89 cf. Art 33 (3): "conformity with essential requirements".

90 This wording is often used in the context of standards: Regulation 1025/2012 on standardisation, recital 1.

91 This can be illustrated with an analogy to the USB-C-standard for chargers: How should a product be compatible with USB-C without adhering to the standard? Partial compatibility at the most can be reached if the standard is not implemented fully. For example, a charger cable that is not implementing the full standard may only work with certain devices or have restricted functionalities.

92 cf. Gregor Lienemann in Moritz Hennemann and others (eds), *Data Act, An Introduction* (Nomos 2024) 219.

93 Data Act, Art 30 (3).

30 contains a restricting paragraph, whereby "Providers of data processing services shall not be required to develop new technologies or services, or disclose or transfer digital assets that are protected by intellectual property rights or that constitute a trade secret, to a customer or to a different provider of data processing services or compromise the customer's or provider's security and integrity of service."[94] This defence will have a strong bearing on the effectiveness of the rules[95] considering, for example, that APIs that have been kept secret so far will often qualify as a trade secret, pursuant to the broad definition of Article 2 (1) of the Trade Secrets Directive.[96] Yet, it has been argued that at least one interface must be provided to accord the provision some practical effectiveness.[97] In general, the relationship between the DA and IP law is an intricate issue[98] that, however, goes beyond the scope of this Article.

I. Objectives of the Provision

63 Against the backdrop of the overall goals of the DA, the Commission argues in its Impact Assessment that data processing infrastructure is a prerequisite for data sharing.[99] The Commission further elaborates: "Not having a competitive market for cloud and edge services in place is an additional obstacle in the value creation on the basis of data for many actors. Therefore, access to competitive cloud and edge services needs to be ensured for stakeholders in the data economy."[100] This already indicates that, in contrast to Article 33, Articles 34-35 are provisions whose primary purpose is to foster competition, with a view to the risk of market concentration.

64 As mentioned above, the cloud interoperability provisions are intended to tackle the problem of lock-in effects, which was referenced by the Commission in its proposal as well as in the recitals.[101] According to recital 90, reducing lock-in effects is intended to increase innovation and promote competition.

65 Alongside lock-in effects, the second major competition-related characteristic of the cloud computing market are economies of scope and scale.[102] These scope and scale advantages drive concentration and reduce the intensity of competition, because it means that integrated and large firms have a cost advantage in producing their service.[103] Whilst the offering of a whole ecosystem of connected cloud services can thereby create efficiencies, the tendency towards product bundles could also erect entry barriers to specific service markets,[104] because firms without the ability to offer a wide range of service could be unable to compete. Interoperability as mandated by Article 34 can counteract these tendencies by allowing specialised firms to offer a single cloud service without the need to provide a whole ecosystem encompassing less efficient services.

66 In this vein, recital 78 states that the provisions on switching and interoperability of cloud services are "a key condition for a more competitive market with lower entry barriers for new providers of data processing services, and for ensuring further resilience for the users of this service". Interestingly, the last clause of this recital also demonstrates that promoting competition is not the only goal. The proposal for the Data Act by the Commission states that Chapter VIII is designed to foster a "seamless multi-vendor cloud environment"[105]. These multi-cloud environments of complementary services do

94 Data Act, Art 30 (6). Although Art 34 DA does not reference Art 30 (6) DA, the wording suggests that only the "requirements" are explicitly referenced, and the limitations implicitly apply. Since mandated interoperability is generally even more intrusive for the addressed service providers it would be inconsistent to only have limitations for the switching obligation.

95 Gregor Lienemann in Moritz Hennemann and others (eds), *Data Act, An Introduction* (Nomos 2024) 219.

96 Directive (EU) 2016/943 of the European Parliament and of the Council of 8 June 2016 on the protection of undisclosed know-how and business information (trade secrets) against their unlawful acquisition, use and disclosure [2016] OJ L 157.

97 Ibid 219.

98 cf. Matthias Leistner, Lucie Antoine, 'IP Law and Policy for the Data Economy in the EU' (2023) 17 (1) Economics E-Journal.

99 Commission, 'Impact Assessment Report Accompanying the document "Proposal for a Regulation of the European Parliament and of the Council on harmonised rules on fair access to and use of data (Data Act)"' (Commission Staff Working Document) SWD (2022) 34 final, 13-15.

100 Commission, 'Impact Assessment Report Accompanying the document "Proposal for a Regulation of the European Parliament and of the Council on harmonised rules on fair access to and use of data (Data Act)"' (Commission Staff Working Document) SWD (2022) 34 final, 14.

101 Data Act, recitals 78 and 90.

102 Antonio Manganelli, Daniel Schnurr, 'Competition and Regulation of Cloud Computing Services' (2024), Centre on Regulation in Europe, 80 <https://cerre.eu/wp-content/uploads/2024/02/REPORT.CERRE_.FEB24.CLOUDS.pdf> accessed 1 April 2025.

103 Ibid.

104 Ibid.

105 Commission, 'Proposal for a Regulation of the European Parliament and of the Council on harmonised rules on fair access to and use of data (Data Act)' COM (2022) 68 final, 16. In a similar vein, recital 99 stresses the importance of multi-cloud strategies, which require interoperability.

not only have the potential to increase competition, but also to improve cyber-resilience, because the customer can deploy several cloud services in parallel.[106]

67 In summary, the objectives of these provisions are mainly focused on economic effects and try to prevent a potential market failure resulting from lock-in effects and economies of scale and scope, aiming to prevent further market concentration. Secondarily, they pursue public interest goals like higher cyber-resilience.

II. The Term "Data Processing Services"

68 The terminological fulcrum in Articles 34 and 35 is the term "data processing services" itself. These are defined in Article 2(8) as "a digital service that is provided to a customer and that enables *ubiquitous* and on-demand network access to a shared pool of *configurable, scalable* and *elastic* computing resources of a centralised, distributed or highly distributed nature that can be rapidly provisioned and released with minimal management effort or service provider interaction".

69 Recital 80 gives definitions for each of the technical terms used in this definition. Computing resources include "networks, servers or other virtual or physical infrastructure", but also "software, [...], applications and services". Computing resources are "scalable" if they are flexibly allocated by the provider of the data processing service to handle fluctuations in demand; they are "elastic" if they are provisioned and released in order to rapidly increase or decrease resources available depending on workload. Finally, resources are "ubiquitous" if they can be accessed through the network using a wide range of end devices.

70 Despite these descriptions, it remains extremely unclear what types of services actually qualify as "data processing services".[107] It is apparent from the recitals, the legislative documents, and the literature that the intended targets of this definition are "cloud services".[108] Indeed, the language of the definition is extremely similar to the definition of a "cloud computing service" in Article 6(30) of the NIS-2-Directive[109], which is also used by the Digital Markets Act (see Art 2(13) DMA). However, this does not do anything to alleviate the uncertainty.

71 From a practical perspective, it might seem obvious that services which are part of the cloud *infrastructure* such as those typically provided by Amazon Web Services, Google Cloud, or Microsoft Azure should generally be covered.[110] But do products that are merely *hosted* on the cloud, like consumer products such as Microsoft Office 365[111] or Google Docs, or

106 Data Act, recital 99.

107 Josef Drexl and others, 'Position Statement of the Max Planck Institute for Innovation and Competition of 25 May 2022 on the Commission's Proposal of 23 February 2022 for a Regulation on harmonised rules on fair access to and use of data (Data Act)' (2022) paras 169ff.; Philippe Heinzke, 'Data Act: Neue Regeln für Cloud-Service-Provider' [2024] Betriebs-Berater 1291, 1292.

108 Patrick Pommerening and Michèle Nickel, 'Wechsel zwischen Datenverarbeitungsdiensten nach dem Data Act' (2024) Recht Digital 289, paras 8-9; Jonas Siglmüller, 'Standardisierungsbestrebungen für das Rückgrat der europäischen Digitalwirtschaft' [2024] Zeitschrift für IT-Recht und Recht der Digitalisierung 112, 114; Daniel Schnurr, 'Switching and Interoperability between Data Processing Services in the Proposed Data Act' in Jan Krämer and others (eds), *Data Act: Towards a Balanced EU Data Regulation* (Centre on Regulation in Europe 2023), 79 <https://cerre.eu/wp-content/uploads/2023/03/230327_Data-Act-Book.pdf> accessed 6 December 2024; Sean F Ennis and Ben Evans, 'Cloud Portability and Interoperability under the EU Data Act: Dynamism versus Equivalence' (2024) <https://ssrn.com/abstract=4395183> accessed 6 December 2024; David Bomhard, 'Auswirkungen des Data Act auf die Geschäftsmodelle von Cloud-Anbietern' [2024] Zeitschrift für IT-Recht und Recht der Digitalisierung 109; Josef Drexl and others, 'Position Statement of the Max Planck Institute for Innovation and Competition of 25 May 2022 on the Commission's Proposal of 23 February 2022 for a Regulation on harmonised rules on fair access to and use of data (Data Act)' (2022) paras 164ff.; Hans Hermann Schild in Stefan Brink, Heinrich Amadeus Wolff, and Antje von Ungern-Sternberg (eds) BeckOK Datenschutzrecht (49th edn, CH Beck 2024), Data Act Art 2 para 58.

109 Directive (EU) 2022/2555 of the European Parliament and of the Council of 14 December 2022 on measures for a high common level of cybersecurity across the Union, amending Regulation (EU) No 910/2014 and Directive (EU) 2018/1972, and repealing Directive (EU) 2016/1148 (NIS 2 Directive) [2022] OJ L333/80; Sean F Ennis and Ben Evans, 'Cloud Portability and Interoperability under the EU Data Act: Dynamism Directive (EU) 2019/770 of the European Parliament and of the Council of 20 May 2019 on certain aspects concerning contracts for the supply of digital content and digital services [2019] OJ L 136 versus Equivalence' (2024), 2 <https://ssrn.com/abstract=4395183> accessed 6 December 2024; Patrick Pommerening and Michèle Nickel, 'Wechsel zwischen Datenverarbeitungsdiensten nach dem Data Act' (2024) Recht Digital 289, 291.

110 Patrick Pommerening and Michèle Nickel, 'Wechsel zwischen Datenverarbeitungsdiensten nach dem Data Act' (2024) Recht Digital 289 para 7.

111 As suggested by Martin Schallbruch, 'Die EU-Richtlinie über Netz- und Informationssicherheit: Anforderungen an digitale Dienste' [2016] Computer und Recht 663, 666 for the NIS-2-Directive.

even simple websites, also qualify, and if not, how does one reliably differentiate between services which *are* the cloud and those which are merely hosted on it?

72 This question is more difficult than it appears, and indeed there is no consensus on it in the literature. In fact, most of the literature on the equivalent definition in the DMA and NIS-2-Directive seem to suggest that any service hosted on the cloud should be covered.[112] And constructively, the definition in the Data Act appears to only widen the DMA cloud computing term in that it also includes edge computing (which refers to when computing resources are highly geographically distributed across many devices).[113] However, unlike the DMA, which contains further stringent requirements before mandates apply, the DA contains far-reaching mandates for *all*[114] data processing services. This means that an overly wide definition could have a much larger negative impact. Therefore, in he context of the Data Act, other authors have questioned whether a contractual view should be taken instead of the technical view[115], or whether "configurability"[116] could be a tool to narrow down he definition.

73 Equipped with the methodological tools described above, we can now approach this conundrum in a more coherent way.

1. Phenomenological Background of the Provisions

74 As discussed above[117], an effects-oriented approach requires us to closely understand the mechanism of action of the policy tool on a particular market. Thus, the properties of the actual cloud market on which effects are expected must be considered. In the context of understanding the term "data processing services", it is therefore crucial to understand the current landscape of services being offered on the market. From this, we can then draw conclusions on the abstract interpretation of the provisions.

75 The original birth of the modern cloud computing market was the 2006 launch of Amazon's Simple Storage Service (S3), which allowed customers to store large objects on Amazon's infrastructure.[118] Users did not need to provision a fixed amount of storage in advance, rather, they simply uploaded and downloaded their stored files as needed and were charged based on the resources actually used – originally $0.15 per GB of storage per month and $0.20 per GB of data transferred.[119]

76 A few months later in August 2006, AWS released their second bombshell service, the Elastic Compute Cloud (EC2).[120] With EC2, customers could provision virtual computers that were hosted on Amazon's infrastructure.[121] These virtual machines could be provisioned and released at any time, and users were charged $0.10 for every hour the machine was "on".[122] In the blog post[123] announcing the product, Amazon "Evangelist" Jeff Barr listed a few use cases for the new service: instead of purchasing enough computer hardware to accommodate a customer's peak usage, they would only need to pay for the computational resources actually used. For example, a customer might want to "experiment with some radical new parallel processing algorithm for a week or two"[124], or do their "end-of-month accounting"[125]. With EC2, they could flexibly provision the computational resources they needed, only when they needed it. Crucially, he addressed another group of users – developers of web applications who needed to scale up processing power based on demand.[126] With traditional on-premises hosting, he wrote, "your

112 Philipp Bongartz and Alexander Kirk in Rupprecht Podszun (ed), *Digital Markets Act* (Nomos 2023), Art 2 para 72; Martin Schallbruch, 'Die EU-Richtlinie über Netz- und Informationssicherheit: Anforderungen an digitale Dienste' [2016] Computer und Recht 663, 666; Christian Heinze and Tom Kettler in Björn Steinrötter (ed), *Europäische Plattformregulierung* (Nomos 2023) 325 with further references; Carsten König in Björn Steinrötter (ed), *Europäische Plattformregulierung* (Nomos 2023) 382.

113 Gregor Lienemann in Moritz Hennemann and others (eds), Data Act, An Introduction (Nomos 2024) 181.

114 Except for minor exceptions in Art 31.

115 Jonas Siglmüller, 'Standardisierungsbestrebungen für das Rückgrat der europäischen Digitalwirtschaft' [2024] Zeitschrift für IT-Recht und Recht der Digitalisierung 112, 114.

116 Robert Weinhold and Christian Schröder, 'Data Act – (R) Evolution oder vergebene Chance?' [2024] Zeitschrift für Datenschutz 306, 307.

117 Supra, part B.

118 Amazon.com Inc, 'Amazon Web Services Launches' (14 March 2006) <https://press.aboutamazon.com/2006/3/amazon-web-services-launches> accessed 6 December 2024.

119 Ibid.

120 Jeff Barr, 'Amazon EC2 Beta' (25 August 2006) <https://aws.amazon.com/blogs/aws/amazon_ec2_beta/> accessed 6 December 2024.

121 Ibid.

122 Nik Cubrilovic, 'Almost Exclusive: Amazon Readies Utility Computing Service' TechCrunch (24 August 2006) <https://techcrunch.com/2006/08/24/exclusive-amazon-readies-utility-computing-service/> accessed 6 December 2024.

123 Jeff Barr, 'Amazon EC2 Beta' (25 August 2006) <https://aws.amazon.com/blogs/aws/amazon_ec2_beta/> accessed 6 December 2024.

124 Ibid.

125 Ibid.

126 Ibid.

chance at fame and fortune may very well pass, as thousands of would-be users are greeted with a 'site too busy' message."[127]

77 This message resonated with developers – today, countless websites, platforms, and web apps are hosted on an external cloud infrastructure. For example, AWS' website lists Salesforce as a "case study".[128] The firm collects and processes large amounts of marketing data on behalf of its customers in order to provide them with strategic insights on how their business is performing, and this is done using a variety of AWS products, including EC2. Other listed customers include Netflix, Snapchat, and Expedia.[129] In theory (and in practice), any service ranging from simple websites, games, social networks, and video sharing platforms, to search engines could be (and already are) hosted "in the cloud".

78 At the same time, AWS itself also began to diversify its portfolio of services, developing more and more dedicated services that not only provided general-purpose infrastructure, but concrete applications. For example, AWS Relational Database Service and AWS DynamoDB are so-called "database-as-a-service" products, which do not only provide storage, but also database software that manages and maintains a certain database structure and allows efficient filtering and retrieval of datapoints.[130] The user only sees and interacts with a single database software instance, but this is managed across a distributed infrastructure behind the scenes.[131] Recently, AWS products have become more and more application-specific, even including marketing tools[132] and software development tools.[133]

79 It is against this phenomenological backdrop that the European legislators created the Data Act's switching and interoperability provisions based on the term "data processing services". Armed with this knowledge, we can now better elucidate what "data processing services" should mean in general, by comparing the practical effectiveness of different interpretive options on this industry (cf. B.II).

2. Even Application-Specific Services Are Covered

80 To begin with, it is quite evident that the intention of the European legislators was to capture a large majority of the AWS services we mentioned, even those which are not infrastructural, but consumer- or application-oriented. Recital 81 clearly states that data processing services can be both "Infrastructure-as-Service", "Platform-as-a-Service", and "Software-as-a-Service" products, and should cover "a very broad range of different purposes, functionalities and technical set-ups". Article 30 also differentiates between services "limited to infrastructural elements" and those which also provide access to "the operating services, *software and applications* that are stored, otherwise processed, or *deployed on* those infrastructural elements". The principle of practical effectiveness implies that both of these categories must have some reasonable scope of application. For the latter category, legislators were clearly envisioning the applicability to at least some of the more application-specific AWS services. Therefore, whether a service is general-purpose or application-specific is clearly not a valid criterion. Even a consumer-oriented service that only has one function is not precluded from being a data processing service.

3. Shared Pool of Computing Resources

81 This is made further clear by the fact that the term "computing resources" as defined in Recital 80 also already encompasses "software, including software development tools, [...] applications and services" and not just physical hardware.

82 In the case of S3 and EC2-like services, the shared pool of computing resources is simply the physical infrastructure in Amazon's datacentres, as well as the software needed to allow customer access to them. For database-as-a-service products, the database software itself is also a shared computing resource. For the inclusion of software as a possible shared computing resource to make sense, one must imagine that software and applications are already "shared" when any software running on the provider's infrastructure handles inputs from multiple users. Source code itself is a non-rivalrous

127 Ibid.

128 Amazon Web Services, 'AWS Partner Story: Salesforce DMP' <https://aws.amazon.com/partners/success/salesforce-case-study/> accessed 6 December 2024.

129 Amazon Web Services, 'Amazon EC2 customers' <https://aws.amazon.com/ec2/customers/> accessed 6 December 2024.

130 Manar Abourezq and Abdellah Idrissi, 'Database-as-a-Service for Big Data: An Overview' [2016] 7 International Journal of Advanced Computer Science and Applications 157; <https://aws.amazon.com/dynamodb/>; <https://aws.amazon.com/rds/>.

131 Ibid.

132 E.g. Amazon Simple Notification Service, which is a framework that allows businesses to send communications to their customers using Email or SMS.

133 E.g. Amazon Sagemaker, which is a framework for developing machine learning models.

resource[134] that cannot form a "shared pool" in any meaningful sense, but instances of running software can be thought of as a rivalrous resource that can be, in some sense, shared.

83 Here, it is important to note that many forms of computing resources listed, including software and storage, are not separable into discrete packets, but are continuous quantities. It is therefore not a requirement that a shared pool must contain a numerical plurality of resources (as in "two or more computers"), since this requirement would make no sense for continuous computing resources (it makes no sense to say "two or more storage").

84 The conclusion from this wide definition is that essentially any online service that serves multiple customers involves a "shared pool of computing resources" in some form. Even a simple web server contains software and hardware that is used to serve requests from multiple clients. Hence, this criterion from the legal definition does not do much to narrow down the overly wide term.

4. Access to the Shared Pool

85 A tempting approach to narrow down the definition may be to consider what it means to provide "access" to the shared pool of computing resources within the meaning of Article 2 (8). One approach would be to require that the user gain some degree of control over a subset of the pool. However, this would lead to an overly narrow interpretation, which clashes with defining features of cloud computing. Even in the basic case of hosting services like EC2, the user only gains control over a virtual machine – a resource that is *not* shared. When it comes to the shared computing resources, such as the physical central processing units (CPUs) and hard drives, the customer has no meaningful control. For more specific services like databases, this becomes even clearer. Here, the user does not even need to be aware of the physical computing resources they are using, and their only means of controlling them is by controlling their own amount of usage.

86 One of the core innovations of cloud computing has been to abstract computing services away from the management of resources, and specifically to remove the necessity of "ownership" of resources. Therefore, it would be incoherent to require any degree of control over the resources that goes further than simply the possibility of using them.

5. Scalable and Elastic Computing Resources

87 However, the computing resources in the shared pool must also be "scalable" and "elastic" within the meaning of Article 2(8). Although the literal text of the definition suggests that these are properties of the computing resources, they are in reality properties of the method in which they are used – scalable resources are flexibly allocated based on demand, and elastic resources are provisioned and released quickly according to workload.[135]

88 The difference between "scalability" and "elasticity" is not immediately clear from the definition. However, the fact that the definition of elasticity involves the "provision and release" of resources to "increase or decrease" them suggest that whilst scalability describes the flexible allocation of resources on a global level, elasticity means the increase and decrease of resources available to *specific users* based on *their workload*. "Provisioning" usually describes the self-allocation of resources by the customer, and an "increase or decrease" of resources available only makes sense at the user level, since the totality of resources available is usually fixed.

89 Whilst scalability is also an extremely broad term – every web server flexibly allocates computing resources to incoming requests – our reading of elasticity may provide the first real opportunity to give "data processing services" a somewhat hard edge. Since elasticity requires that the distribution of computing resources must change in response to a *single user's workload*, we can successfully eliminate services like simple websites where a single user's workload is essentially constant. Rather, the service provided to the user must at least theoretically be open to scaling, such that a single user could (within a certain range) self-provision a flexible amount of computing resources depending on their needs.[136] As we have seen above, this provisioning may occur fully automatically and without the need for user supervision or even awareness. At the same time, a manual provisioning and release can also suffice, provided that the process is sufficiently flexible. Therefore, both the possibility of rapid but manual provisioning of additional EC2 virtual machines and the automatic allocation of more computational resources to cloud databases during a spike in traffic, are examples of elasticity.

90 The term "elasticity" thus provides a logical nexus between the service provided to the customer and the

134 James Bessen, 'Open source software: Free provision of complex public goods.' in Jürgen Bitzer and Philipp JH Schröder (eds), *The economics of open source software development* (Elsevier 2006) 57-81.

135 Data Act, recital 80.

136 See similarly Patrick Pommerening and Michèle Nickel, 'Wechsel zwischen Datenverarbeitungsdiensten nach dem Data Act' (2024) Recht Digital 289 para 12.

flexibility of the underlying technical infrastructure. In view of this finding, it becomes easier to deal with SaaS services as well. A simple website *hosted* on a cloud service like EC2 would not be a data processing service. Although users gain access to a shared pool of computing resources (the website provider's software as well as the EC2 infrastructure), these resources are not elastic *to them* – every user always roughly uses the same amount and there is no way for a user to self-provision more resources.

91 However, the scope of elastic services is still extremely wide. Not only would a service like those provided by Salesforce fall under the term, where arbitrary amounts of user data can be processed, but even remote-hosted cloud applications like Microsoft Office 365 could still qualify. On its own, a text editor like Microsoft Word in the cloud might not present enough potential for elasticity, since every user's computational usage would be roughly the same, but when combined with the possibility of storing and editing large documents, and the possibility of collaboration with a large number of other users, the service could be considered elastic. The same could be said for project management software. Even social media platforms like video-sharing platforms could be considered data processing services, at least from the perspective of content creators, since these platforms provide them with a shared and highly resource-intensive infrastructure to store and distribute their content, and the computational resources "allotted" to each content creator can vary widely based on their number of viewers.

6. Economic Criteria and Global Assessment

92 Although elasticity provides us with a way to somewhat trace the outline of "data processing services" as a term, it is not fully unambiguous on its own. Since every user of an online service can at least choose *whether* or not to use it and *how long* to use it for, some degree of elasticity is present even in our simple website's case. Put simply, the degree of elasticity needed is a *quantitative* question that cannot be answered with technological definitions alone. In fact, this is not just the case for elasticity, but also for the other technical features mentioned in the definition – scalability, ubiquity, and configurability. None of these features are strictly binary but rather exist on a spectrum.

93 Thus, these technical features cannot be read simply as a set of individually necessary and jointly sufficient conditions. Rather, a specific economic and effects-oriented evaluation in every case, taking into account the degree and effect of the elasticity, as well as scalability, ubiquity, and configurability present in a particular service, is needed. Similar to the approach taken in other fields of EU law such as trademark law [137], these features should be understood as a set of interdependent factors forming part of a global assessment, such that a higher degree in one feature can compensate for a lower degree in another feature.

94 Moreover, the key to this evaluation is that the technical features mentioned in the definition – elasticity, scalability, ubiquity, and configurability – have corresponding economic effects, and it is these effects, not the technical features themselves, which should be decisive.

95 To understand this, one must again turn back to the analysis of the goals of the Data Act's switching and interoperability provisions given above. The defining economic feature of cloud services is the efficiency gained by amortising the usage of computing resources across many customers. This fact is also at the centre of the definition in Article 2(8). As described in the original AWS blog post,[138] this eliminates fixed costs and reduces the risk of investment. In turn, the uptake of cloud services becomes cheap, easy, and attractive, particularly for smaller players. The flip-side of this equation is the risk of severe technological lock-in effects.[139] Since cloud services are easily combinable into ecosystems, large cloud providers also benefit from the positive scaling effect of offering a large number of services, whereas their customers may find it difficult to switch single services to other providers.[140] Here, it is worth noting that these effects are not necessarily confined to "classical" cloud providers like AWS. Even business or consumer cloud applications can benefit from amortisation and ecosystem effects in the same way, even if the customer is never aware of it.

96 These economic effects are the reflections of the technical features of scalability, elasticity, ubiquity, and configurability given in the definition in Article 2(8). Scalability allows amortisation across the many users of a data processing service, and elasticity

137 Case C-39/97 *Canon Kabushiki Kaisha v Metro-Goldwyn-Mayer Inc.* [1998] ECR I-5525 para 17.

138 Jeff Barr, 'Amazon EC2 Beta' (25 August 2006) <https://aws.amazon.com/blogs/aws/amazon_ec2_beta/> accessed 6 December 2024.

139 Justice Opara-Martins, Reza Sahandi, and Feng Tian, 'Critical Analysis of Vendor Lock-in and its Impact on Cloud Computing Migration: A Business Perspective' (2016) 5(4) Journal of Cloud Computing: Advances, Systems and Applications 1, 14.

140 Gregor Lienemann in Moritz Hennemann and others (eds), *Data Act, An Introduction* (Nomos 2024) 178-17; Netherlands Authority for Consumers and Markets, Market Study Cloud Services (2022) ACM/INT/440323, 62.

negates the need of each customer to accurately predict the resources they need in advance, reducing investment risk. Similarly, ubiquity also decreases risk by increasing technological flexibility. And finally, increased configurability and customizability of a service means that during configuration, customers make more investments specific to a particular service (e.g. the time and energy needed to customize the service to their needs and uploading data).[141] The resulting product differentiation also increases lock-in effects.[142] Therefore, the degree to which these technical features are present must in fact be evaluated based on their economic effects.

97 Against this background, several criteria for evaluating typical cases can be developed. For one, the magnitude of amortisation benefits can be considered. These will tend to be higher the more computationally intensive a service is. Service models like cloud gaming, where a consumer essentially runs a conventional video game in the cloud in real time, rely heavily on amortisation – the main promised benefit to the consumer is that they can forego purchasing expensive gaming hardware, and instead efficiently share a computing infrastructure with a large number of other users over a large area.[143] Since gaming is so computationally intensive, even the elasticity in the user merely being able to choose when and how long to use the infrastructure, when coupled with the scalability of the infrastructure, is sufficient to justify the service model.[144] In this case, it may be justified to mandate interoperability for the service.

98 Second, the concrete risk of lock-in effects in the context of the ecosystem must be considered. An auxiliary service which itself may not be very computationally intensive, but plays a significant role in mediating different services inside an ecosystem (such as a security-relevant service[145]), might provide more reason for its classification as a data processing service.

99 Lastly, cloud services differ from other types of digital services in their infrastructural role as providers of computational power. A service which has a high importance for downstream markets (similar to the DMA's gatekeeper status) could deserve more intense regulation.

7. Summary

100 In summary, a correct understanding of the term "data processing services" is predicated on the insight that elasticity, scalability, and ubiquity are reflections of economic effects, and that they can exist on a continuous sliding scale. In order to make the final assessment, a technical understanding is necessary but not sufficient. Rather, a case-by-case evaluation focusing on the economic effects and the objectives of the provisions is needed. First, the elasticity, scalability, and ubiquity of the service should be quantified. Then, their corresponding economic effects – the degree of amortisation and risk minimization – must be evaluated. Finally, an effects-oriented case-by-case global assessment is unavoidable. This will, of course, come at the cost of reduced legal certainty, but given the cross-sectoral nature of the provisions, no other approach can guarantee a cogent application across their entire scope. Here, the criteria we have derived in the section above – high computational power, concrete danger of lock-in effects, and broader infrastructural role in the data economy – can serve as guideposts for the evaluation in typical constellations.

III. Scope of the Reference in Article 34 to Article 30 in Particular

101 Apart from the general definition of data processing services used in many provisions of the DA, it is unclear if the obligations to make open interfaces available and follow technical norms (cf. Art 30 (2) and (3)) apply to *all* data processing services when referenced by Article 34.

102 Article 30 itself differentiates between services "limited to infrasructural elements" (known as Infrastructure as a Service, IaaS), which are targeted

141 Jasper Sluijs and Pierre Larouche and Wolf Sauter, 'Cloud Computing in the EU Policy Sphere: Interoperability, Vertical Integration and the Internal Market' (2012) 3 JIPITEC 12, 15.

142 Ibid.

143 cf. *Microsoft/Activision Blizzard* (Case M.10646) Commission Decision C/2023/3199 final [2023] OJ C285/8, para 563; Competition and Markets Authority, 'Mobile Browsers and Cloud Gaming: Provisional Decision Report' (22 November 2024) para 12.85.

144 cf. on the role of computational intensity Compl. *United States v Apple Inc*, No. 2:24-cv-04055 (D.N.J. 21 March 2024), paras 71ff.; cf. on scalability Iryanto Jaya, 'Resource allocation in cloud gaming' (Doctoral thesis, Nanyang Technological University, Singapore 2023); additionally, ubiquity also plays a large role in cloud gaming, since a main selling point to consumers is that they are no longer tied to specific hardware, but can rather enjoy games regardless of geographical location, cf. Competition and Markets Authority, 'Mobile Browsers and Cloud Gaming: Provisional Decision Report' (22 November 2024) para 12.10; *Microsoft/Activision Blizzard* (Case M.10646) Commission Decision C/2023/3199 final [2023] OJ C285/8, para 563.

145 Daniel G Arce, 'Security-Induced Lock-In in the Cloud' (2024) 64 Business & Information Systems Engineering 505.

in Article 30(1), from services which also provide access to "the operating services, software and applications", which are targeted in the subsequent paragraphs (2)-(5) with the phrase "data processing services other than those referred to in paragraph 1". Interestingly, Article 34 only references "Article 30(2) to (5)", leaving out paragraph 1. One interpretation would therefore be that the legislator intends for only non-IaaS services to be subject to the *mutatis mutandis* application.

103 A different interpretation, however, would be that Article 34 (which itself specifies that it should apply for "data processing services") intends to extend the switching obligations placed on non-IaaS services in Article 30(2)-(5) to *all* data processing services when in the context of in-parallel use.

104 In other words, the question is whether the reference in Article 34 to Article 30 includes Article 30's specific scopes of application in terms of its addressees or is only targeted at its consequences.[146]

105 This question can be answered knowing the difference between the policy tools of interoperability and data portability. In contrast to interoperability, data portability is only about the export of data from one system to another system.[147] Whereas switching services primarily requires data portability, interoperability is necessary to allow parallel use. Put differently, interoperability constitutes a different, generally higher degree of connectedness. The DA recognizes this distinction,[148] but creates ambiguities due to the systematically unavailing cross reference from the interoperability provisions back to the rules for switching.

106 When understanding the difference between interoperability and portability, it becomes clear that Article 30 (2-5) – when referenced by Article 34 – must concern all data processing services. Regarding switching, the Data Act puts *stricter obligations on IaaS*, requiring "functional equivalence in the use of the destination data processing service", according to Article 30 (1).[149] In comparison, services that also provide access to "the operating services, software and applications" merely have to make open interfaces available[150] and follow technical norms.[151] Thus, the obligations for IaaS providers to facilitate switching are *more burdensome*, because they are outcome-oriented. Since the service delivery model of IaaS is treated more strictly than other services in the portability provisions, it would be inconsistent to completely exempt them regarding the higher form of interconnectedness, namely interoperability. Therefore, it is more plausible to interpret Article 30 (2ff.) in the context of Article 34 as a provision addressing all data processing services.

IV. Interoperability Across Service Types

107 A similar question is whether Article 34 DA only pursues interoperability between services of the same service type. For instance, does a storage service only need to be interoperable with other storage services, or also complementary services like web hosting? The answer to this question significantly changes the application scope of the provision.

108 Article 34 (1) itself simply states that "interoperability for the purpose of in-parallel use of data processing services" shall be facilitated. The provision does not specify whether it only covers the horizontal in-parallel use of services belonging to the same service type or also vertical interoperability between complementary services.

109 Yet, a controversy[152] about the application scope of Article 34 arose due to the fact that many of the switching provisions in Chapter VI that are referenced by Article 34(1) only apply to horizontal constellations. For example, Article 34(1) refers inter alia to the blanket clause on removing obstacles to effective switching (Art 23), which mandates providers to "enable customers to switch to a data processing service, *covering the same service type.*"

146 In German, "Rechtsfolgenverweisung" or "Rechtsgrundverweisung"

147 Daniel Schnurr, 'Switching and Interoperability between Data Processing Services in the Proposed Data Act' in Jan Krämer and others (eds), *Data Act: Towards a Balanced EU Data Regulation* (Centre on Regulation in Europe 2023) 85-86 <https://cerre.eu/wp-content/uploads/2023/03/230327_Data-Act-Book.pdf> accessed 6 December 2024.

148 Recital 99 distinguishes between the one-off egress of data required for the switching process and interoperability for in-parallel use.

149 Data Act, Art 30 (1).

150 Data Act, Art 30 (2).

151 Data Act, Art 30 (3).

152 Arguing that interoperability between data processing services mandated by Art 34 is limited to the same service type: Jonas Siglmüller, 'Standardisierungsbestrebungen für das Rückgrat der europäischen Digitalwirtschaft: Erste Einordnung von Begrifflichkeiten, Systematik und praktischen Herausforderungen' [2024] Zeitschrift für IT-Recht und Recht der Digitalisierung (MMR)) 112, 115. His opinion is predicated on the understanding that Art 35 is the general provision on interoperabiltiy of data processing services and Art 34 regulates a specific case. However, the wording of Art 35 is unambiguous insofar that it sets out the requirements and the procedure for standardisation without mapping out a discrete obligation. Therefore, Art 34 is the main interoperabiltiy provision.

The fact that here, switching is constrained to "the same service type", may lead us to conclude that "in-parallel use of data processing services" within the meaning of Article 34(1) is similarly constrained to the same service type. Moreover, the fact that the subsequent Article 35 explicitly constrains itself to standards covering interoperability within a service type might also lead one to consider that Article 34(1) likewise only covers interoperability within a service type.[153]

110 In contrast, the aforementioned important references to Article 30 (2-5) do not contain such a restriction, whereas the not-referenced Article 30 (1) is limited to services covering the same service type. This argumentative standoff requires a deeper look into the policy tool of interoperability and its effects as suggested above (see part B.II). In general, two types of interoperability can be differentiated. Horizontal interoperability refers to interoperability between products and systems on the same level of the value chain,[154] for example between messaging services, as stipulated by the Digital Markets Act. In this case, mandated interoperability allows every user to reach users from all other interoperable services, thereby reducing network effects. Network effects arise when the attractivity of a product or system increases with the number of users.[155] If strong network effects are present in a market, horizontal interoperability can lower entry barriers and resolve lock-in effects.[156] Entrants do not have to reach a critical mass to compete and switching is less problematic because the same network can still be reached.[157] However, in situations without network effects, horizontal interoperability may not be pro-competitive in an effective way. In contrast, vertical interoperability pertains to different levels of the value chain.[158] It is associated with increased innovation, because customers can "mix and match" components.[159]

111 The question of whether the interoperability provisions for data processing services in the DA only apply to services of the same "service type" is an expression of this distinction. The question can therefore be rephrased as asking whether Article 34 can only mandate horizontal interoperability, or if it also mandates vertical interoperability.

112 Based on the goals of the provisions and the technical background of the market, we argue that Article 34(1) should not be constrained to horizontal interoperability.

113 First, the Data Act itself suggests at many points that both vertical and horizontal interoperability are intended. In Recital 99, the Data Act describes "in-parallel use of multiple data processing services with *complementary* functionalities" when referring to Article 34, a strong indication that vertical interoperability should be covered. And in Article 2(34), the definition of "switching" explicitly covers switching to "using another data processing service of the *same service type, or other service, ...*". Thus, even the notion of switching in the Data Act is not purely horizontal.

114 Second, recital 90 indicates that the legislator also pursued the *effects* of vertical interoperability. The recital states that "an ambitious and *innovation-inspiring* regulatory approach to interoperability is needed to overcome vendor lock-in, which undermines competition and the *development of new services*.[160] Whereas horizontal interoperability has no clear nexus with dynamic efficiencies, vertical interoperability enables product differentiation and increases the chances of specialised services to gain customers. Therefore, interoperability regulation aiming at innovation requires vertical interoperability.

115 Third, the actual need for horizontal interoperability in the industry is low.[161] The practice of using multiple equivalent cloud services, called "multi-homing",

153 Jonas Siglmüller, 'Standardisierungsbestrebungen für das Rückgrat der europäischen Digitalwirtschaft' [2024] Zeitschrift für IT-Recht und Recht der Digitalisierung 112, 115.

154 Marc Bourreau, Jan Krämer, Miriam Buiten, 'Interoperability in Digital Markets' (Report, Centre on Regulation in Europe 2022) 7 <https://cerre.eu/wp-content/uploads/2022/03/220321_CERRE_Report_Interoperability-in-Digital-Markets_FINAL.pdf> accessed 6 December 2024.

155 Justus Haucap, Ulrich Heimeshoff, 'Google, Facebook, Amazon, eBay: Is the Internet driving competition or market monopolization?' (2014) 11 Int Econ Econ Policy (2014) 49, 51.

156 Marc Bourreau, Jan Krämer, Miriam Buiten, 'Interoperability in Digital Markets' (Report, Centre on Regulation in Europe 2022) 19 <https://cerre.eu/wp-content/uploads/2022/03/220321_CERRE_Report_Interoperability-in-Digital-Markets_FINAL.pdf> accessed 6 December 2024.

157 Ibid.

158 Marc Bourreau, Jan Krämer, Miriam Buiten, 'Interoperability in Digital Markets' (Report, Centre on Regulation in Europe 2022) 7 <https://cerre.eu/wp-content/uploads/2022/03/220321_CERRE_Report_Interoperability-in-Digital-Markets_FINAL.pdf> accessed 6 December 2024.

159 Ibid 26.

160 Data Act, recital 90.

161 Gregor Lienemann in Moritz Hennemann and others (eds), Data Act, An Introduction (Nomos 2024) 189-190; Daniel Schnurr, 'Switching and Interoperability between Data Processing Services in the Proposed Data Act' in Jan Krämer and others (eds), *Data Act: Towards a Balanced EU Data Regulation* (Centre on Regulation in Europe 2023) 86, 93 <https://cerre.eu/wp-content/uploads/2023/03/230327_Data-Act-Book.pdf> accessed 6 December 2024.

may be a valid tool to insure oneself against outages and increase resilience.[162] However, when it comes to combating lock-in effects, it does not confer a significant added benefit compared to being able to switch completely.[163] The practice of "multi-homing" alone would not be sufficient to justify the added burden of mandating interoperability, instead of just portability alone, at least on the cloud market. This is related to the fact that there are no significant, direct network effects arising in the cloud service market. Rather, as we have seen, the market is characterized by economies of *scope*, which foster the emergence of larger ecosystems with more *types* of services[164]

116 This brings us to our final argument: even if one were to interpret the *switching* provisions as solely horizontal, across the same service type, the interoperability provisions must be understood vertically to achieve effective horizontal switching. In an ecosystem setting, if a customer wants to horizontally switch from one service to another service of the same type, away from their current ecosystem to a new provider, they can only do so if the switched service can still interoperate with the other services left in the old ecosystem.[165] Otherwise, the ability to switch a single service is effectively useless. Simply put, horizontal portability implies some degree of vertical interoperability to achieve practical effectiveness. The presence of large ecosystems amplifies lock-in effects in a way that can only be effectively counteracted by vertical interoperability. To truly complement the rules on switching that it references, Article 34 must therefore also cover vertical interoperability. In fact, a policy mandating *only* horizontal and not vertical interoperability would in some sense be "the worst of both worlds" – not only would it not effectively achieve its policy goals, it would likely not even be meaningfully less burdensome on service providers, at least on a technical level, since the interfaces needed for interoperability still need to be developed.

117 Considering this analysis, one must conclude that the points where the DA constrains itself to the "same service type" are isolated occurrences that are justified by the specific nature of the provision in question, and should not be generalized to other provisions, at least in the realm of interoperability. For example, Article 35 only allows standard-setting for data processing services of the same service type, but this is owed to the nature of standard setting: a technical standard can usually by nature only address a particular service type. Moreover, standard-setting has a higher potential to overly restrict innovation, which justifies the higher requirements for its use.[166]

118 In sum, "interoperability for the purpose of in-parallel use of data processing services" within Article 34 is not limited to services of the same service type. In combination with the referenced obligations to make open interfaces available and follow interoperability standards (see Art 30 (2 and 3)), this means that far-reaching interoperability obligations will soon apply to cloud and edge services.

E. Conclusion

119 Clouds connecting Europe — the Data Act aims towards this ideal by reducing technical and economic barriers to an internal market for data and data related services. The Regulation aims to tap the full potential of data by laying down a harmonised framework for the use of and the access to data as well as engaging in tech regulation for cloud services to tackle competition-related problems.

120 The interoperability provisions in the Data Act are frequently overlooked, but highly important, because they are far-reaching and concern industries relevant for innovation and competitiveness. Yet, understanding these provisions is complicated. It is not even clear who the addressees are. Similar challenges arise in other data-related frameworks as well, because the subject matter is technical, abstract and dynamic. We suggest an interpretative method based on the characteristics of regulatory law to identify the understanding which increases the practical effectiveness of the provision. First, this approach requires a particularly careful analysis of the pursued goals — of the provision itself, but equally important of the entire framework and the background of primary EU law. Second, the focus on

162 Gregor Lienemann in Moritz Hennemann and others (eds), *Data Act, An Introduction* (Nomos 2024) 189-190.

163 cf. Daniel Schnurr, 'Switching and Interoperability between Data Processing Services in the Proposed Data Act' in Jan Krämer and others (eds), *Data Act: Towards a Balanced EU Data Regulation* (Centre on Regulation in Europe 2023) 93 <https://cerre.eu/wp-content/uploads/2023/03/230327_Data-Act-Book.pdf> accessed 6 December 2024.

164 Daniel Schnurr, 'Switching and Interoperability between Data Processing Services in the Proposed Data Act' in Jan Krämer and others (eds), *Data Act: Towards a Balanced EU Data Regulation* (Centre on Regulation in Europe 2023) 82-83, 93-94 <https://cerre.eu/wp-content/uploads/2023/03/230327_Data-Act-Book.pdf> accessed 6 December 2024; Gregor Lienemann in Moritz Hennemann and others (eds), *Data Act, An Introduction* (Nomos 2024) 178-17; Netherlands Authority for Consumers and Markets, Market Study Cloud Services (2022) ACM/INT/440323, 62.

165 Netherlands Authority for Consumers and Markets, Market Study Cloud Services (2022) ACM/INT/440323, 5.

166 Gregor Lienemann in Moritz Hennemann and others (eds), *Data Act, An Introduction* (Nomos 2024) 219.

the actual effects of a rule implies an interdisciplinary perspective on the regulated industry and the need for understanding a policy tool like interoperability as a whole.

121 We have shown that using this method, we can gain valuable insights into specific problems of interpretation in the Data Act. An effects-oriented approach makes it clear that Article 33 must be interpreted narrowly in accordance with its limited objectives, such that its application is only justified for data spaces with a certain degree of infrastructural sophistication. Crucially, it must not hamper the overarching goals of the rest of the Data Act by inadvertently discouraging data sharing.

122 Furthermore, we have seen that the confusing but central term "data processing services" can be elucidated by considering that the technical terms scalability and elasticity are reflections of economic effects – the amortisation of fixed costs and the reduction of investment risks – that play a key role in the legislative intention behind the provisions. It thus follows that the most appropriate approach to this definition is to consider the degree of elasticity and scalability in each case against economic criteria in a global assessment as a set of interdependent factors. Lastly, we have shown that an effects-oriented analysis of horizontal and vertical interoperability, when applied to the specificities of the cloud market, can lead us to a more reasonable answer on whether the restrictions to the "same service type" have a broad or narrow applicability. Unlike in other markets, the structure of the cloud market, with its economies of scope, tend to justify vertical interoperability mandates, even when only considering horizontal switching scenarios.

123 In sum, a stringent method focused on practical effectiveness is crucial for interpreting the interoperability provisions in the Data Act such that they manifest their desired goals whilst avoiding pitfalls. It might be a distressing insight that data-related regulation is of such technical complexity. At the same time, one cannot lose sight of the fact that, at the end of the day, the policy goals of the Act lie in the economic and public interest *effects* of that technology. If interpreted skilfully, the promising rules on interoperability could benefit end consumers, software developers, European companies and the EU's competitiveness and make it worthwhile that the EU legislator has ventured into this complicated field.