Cloud Portability and Interoperability under the EU Data Act: Dynamism versus Equivalence[*]

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Abstract: This paper examines the provisions of the EU proposal for a Data Act relating to cloud portability and interoperability through a joint economic and legal lens. It suggests that the minutiae of the definition of 'equivalence', designed to protect firms consuming cloud computing services, are quite different from portability and interoperability rules for simple products due to product complexity and ongoing innovation. While a certain level of portability and interoperability are natural and essential for customers, the breadth of net cast by 'equivalence' as proposed could yield unintended consequences that not only lead to operational challenges in transferring customer assets but even product simplification to a lowest common denominator, reducing availability of the cloud computing service variety that customers seek. In the worst case, an overly expansive definition of 'equivalence' could create a race to the bottom that harms dynamic competition and innovation and limits cloud computing service availability in regions covered by the regulation.

Keywords: data, portability, interoperability, cloud, switching

JEL Codes: K20, L51, L86, O31

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1. Introduction

As cloud computing services have become more important to business, various kinds of regulatory proposals over these services have emerged and are gaining real traction given the current policy focus on ensuring that long-term rules establishing good governance of the data economy, and appropriate incentives to innovate, are in operation.[1] One type of rule that is being considered relates to portability and interoperability between cloud services, seemingly mirroring rules in certain regulated sectors. The applicability of broad standardised concepts to highly customised domains may nonetheless pose risks. In particular, the definitions underlying portability and interoperability rules can have surprisingly significant effects on both current product offerings and future innovation. The criticality of these considerations for future European cloud offerings and for European companies consuming cloud services merits a combined economic and legal analysis such as that provided by this paper.

Multiple jurisdictions are considering ways to encourage and oversee data portability and interoperability.[2] In one major effort in establishing part of the governance framework for data, the European Commission has proposed a Data Act ('Commission text'),[3] which contains many valuable provisions that are worthy of implementation. In addition to the Commission text, the amended legal texts adopted by the European Parliament (Parliament text')[4] and European Council ('Council text')[5] provide for strict rules over portability and interoperability between cloud service providers. We focus particularly on the implications of such rules for innovation and competition. One of the key proposals entails the establishment of 'equivalence' between cloud computing services. This assumes the existence of sets of equivalent services and extends, under certain conditions, to the achievement of 'functional equivalence' across those services. Such an equivalence could facilitate the overarching objective of enabling cloud customers to switch relatively easily from one provider to another and to interoperate between different cloud providers. While laudable in principle, an expansive definition of 'equivalence' could have unintended consequences that risks a chilling effect on innovation and competition by smaller cloud providers, and more generally upon those cloud computing services that are competing most assiduously to meet customer needs. Indeed, we are concerned that cloud service providers may respond to the proposed regulation by retrenching to a 'lowest common denominator' with diminished innovation.

Ensuring an appropriate regulatory treatment of cloud computing services is important because of their increasing relevance to the economy. Adoption rates continue to rise with 96% of firms using public cloud services and 87% using multi-cloud services in 2022, according to a leading industry survey.[6] Cloud services have revolutionised international commerce and enable customers to

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[1] See, for example: I. Graef and J. Prüfer, 'Governance of data sharing: A law & economics proposal', Research Policy, Volume 50, Issue 9 (2021). Available at: https://www.sciencedirect.com/science/article/pii/S004873332100130X?via%3Dihub (accessed 28 March 2023).

[2] See, for example: R. Buckley, N. Jevglevskaja and S. Farrell, 'Australia's Data-Sharing Regime: Six Lessons for the World' (2021) UNSW Law Research Paper No. 21-67. Available at: https://ssrn.com/abstract=3946668 (accessed 28 March 2023).

[3] 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) COM/2022/68 final ('Commission text').

[4] Amendments adopted by the European Parliament on 14 March 2023 on the 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)0068 – C9-0051/2022 – 2022/0047(COD)) ('Parliament text').

[5] European Council mandate for negotiations with the European Parliament, 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) 2022/0047(COD) ('Council text').

[6] Flexera, 'State of the Cloud Report 2023' (2023). Available at: https://info.flexera.com/CM-REPORT-State-of-the-Cloud (accessed 28 March 2023).

transform information technology capital expenditure into operating expenditure.[7] From a technical perspective, cloud services fundamentally enable "on-demand administration and broad remote access to a scalable and elastic pool of shareable computing resources, including where such resources are distributed across several locations."[8] This on-demand administrability of scalable resources is increasingly crucial for many businesses.

Cloud services have often been considered as characterizable into three service models.[9] The first model is infrastructure as a service (IaaS), according to which the provider 'rents' infrastructure services, typically a combination of physical and virtual machines, networking and storage, to customers. Platform as a service (PaaS) is at the next layer and may be characterised as providing the 'building-blocks' necessary for the programming and deployment of applications that are hosted thereon.[10] Although theoretically differentiated by the extent to which customers are active in managing the underpinning infrastructural resources, in practice no bright line exists between the PaaS and IaaS layers. Kuan Hon et al. underscore the reality that some IaaS providers have started to offer customers greater functionalities and that some PaaS providers offer customers much deeper control.[11] Software as a service (SaaS) sits at the top of the pyramid and is generally consumed by far less sophisticated customers, generally seeking certain functionalities from applications which may be customisable to a rather limited degree. Despite the prevalence of this tripartite distinction in the literature, we are aware that customers of cloud computing services do not routinely engage with and choose services using this taxonomy. Indeed, the lines between the respective service models are increasingly blurred and, reflecting industry dynamism, novel models are emerging to the extent that is has become commonplace to refer to 'XaaS'. The regulation builds in this tripartite distinction. Embodying distinctions that are non-operative for customers within regulation that is designed to protect those self-same customers risks creating regulation that is designed for the past more than the future.

Some of the proposed portability and interoperability rules appear to have been inspired to some extent by experiences with open banking, a concept first implemented by the UK in the context of an effort to open up competitive pressures in banking which were otherwise judged weak.[12] The open banking effort involved the creation of APIs that would allow secure portability and interoperability between different financial service providers, thus reducing entry barriers and switching costs for

[7] W. Kuan Hon, C. Millard, and J. Singh, 'Cloud Technologies and Services', in C. Millard (Ed.), *Cloud Computing Law* (OUP 2021).

[8] National Institute of Standards and Technology, US Department of Commerce, E. Simmon 'Evaluation of Cloud Computing Services Based on NIST SP 800-145, Special Publication 500-322' (2018) 3. Available at: https://www.nist.gov/publications/evaluation-cloud-computing-services-based-nist-sp-800-145 (accessed 28 March 2023). This definition has also been adopted by the EU, for example: Directive (EU) 2022/2555 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), Article 6 (30).

[9] National Institute of Standards and Technology, US Department of Commerce, P. Mell and T. Grance, 'The NIST Definition of Cloud Computing, Special Publication 800-145' (2011) 2. Available at: https://csrc.nist.gov/publications/detail/sp/800-145/final (accessed 28 March 2023).

[10] W. Kuan Hon, C. Millard, and J. Singh, 'Cloud Technologies and Services', in C. Millard (Ed.), *Cloud Computing Law* (OUP 2021).

[11] Ibid.

[12] Independent Commission on Banking, Final Report and Recommendations, 7th September 2011. Available at: https://www.gov.uk/government/news/independent-commission-on-banking-final-report (accessed 28 March 2023).

customers.[13] After years of preparation, the system has ultimately worked relatively smoothly.[14] This experience is sometimes used as an analogy for what could happen with broader portability and interoperability across different digital activities, and it is used to justify efforts for creating *inter alia* horizontal and symmetric portability and interoperability rules. Yet such analogies are not necessarily appropriate, particularly between cloud computing services, which exhibit high degrees of feature complexity and innovation, and banking services, which exhibit both a limited number of key features and a relatively low level of innovation. We would suggest that these two differences are critical for considering the nature and focus of future cloud regulation and may limit the value of analogies to prior experiences with portability and interoperability.

This paper explains why equivalence can have such a surprising unintended consequence, and points out that a Brussels effect need not, in this instance, involve a raising of the bar but could easily result in a lowering of the bar and the creation of markets providing only 'lowest common denominator' features. We are concerned that the provisions of the Data Act risk putting European customers and cloud computing service providers at an innovation disadvantage compared to companies from other jurisdictions. Ultimately, we believe that extreme care is needed to avoid unintended detriment to innovation and to avoid the risk that European companies end up receiving a less full-featured set of options for cloud services than companies in other jurisdictions.

2. The EU Data Act

Under the proposed Data Act, cloud computing services would fall within an umbrella class of 'data processing services'.[15] While a general definition is common across the Commission, Parliament and the Council texts, the Parliament text advances two discrete definitions of 'data processing services', one of which is for the purpose of Chapter VI Switching between Data Processing Services.[16] This definition reads as inapplicable to Chapter VIII Interoperability, Article 29 of which has been amended to cover both interoperability and portability.[17] Table 1 compares the definitions.

Table 1. Definitions of 'data processing services'.

Commission, Parliament, and Council texts	**Parliament text**
Article 2 (12)	**Article 22a (1)**
"[A] digital service *other than an online content service as defined in Article 2(5) of Regulation (EU) 2017/1128*, provided to a customer, which enables on-demand *administration* and broad remote access to a scalable and elastic pool of shareable computing resources of a centralised, distributed or highly distributed nature." (emphasis added)	"[A] digital service enabling *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, provided to a customer, *that can be rapidly provisioned and released with minimal management effort or service provider interaction*." (emphasis added)

The provisions relating to portability and interoperability rely upon the establishment of a certain level of 'equivalence' between services. Equivalence in the proposed Data Act takes the form of two

[13] M. Zachariadis and O. Pinar, 'The API Economy and Digital Transformation in Financial Services: The Case of Open banking' (2017) SWIFT Institute Working Paper No. 2016-001. Available at: http://dx.doi.org/10.2139/ssrn.2975199 (accessed 28 March 2023).

[14] Competition and Markets Authority, Update on Open banking, 5th November 2021. Available at: https://www.gov.uk/government/publications/update-governance-of-open-banking/update-on-open-banking (accessed 28 March 2023).

[15] Commission text, Article 2 (12); Parliament text, Article 2 (12); Council text, Article 2 (12).

[16] Parliament text, Article 22a (1).

[17] Ibid., Article 29.

interlinked concepts. Firstly, the concept of 'service type' or 'equivalent service'.[18] The latter term is particular to the Parliament text, which uses the terms 'service type' and 'equivalent service' interchangeably, notably in Article 26.[19] Despite 'equivalent service' being limited by definition in the Parliament text to Chapter VI Switching between Data Processing Services, it is used in Chapter VIII Interoperability, notably in Article 29.[20] Table 2 compares the definitions.

Table 2. Definition of 'service type' and 'equivalent service'.

Service type		**Equivalent service**
Commission and Parliament texts	**Council text**	**Parliament text**
Article 2 (13)	**Article 2 (13)**	**Article 22a (3)**
"[A] set of data processing services that share the same primary objective and *basic data processing service model*." (emphasis added)	"[A] set of data processing services that share the same primary objective and *main functionalities*." (emphasis added)	"[A] set of data processing services that share the same primary objective and *data processing service model*."

The assumption that such a set of data processing services exist represents a significant analytical short-cut on the part of the legislator.[21] Attempts are made both in the Parliament text[22] and Council text[23] to exemplify a distinction between sets of services; however, in each instance, the examples provided would appear incapable of establishing a sufficiently clear standard that may be applied across the rich and diverse array of cloud computing services. It is apparent that 'service type' and 'equivalent service' are legal concepts divorced from the technical realities of the cloud industry, which is characterised by high levels of service innovation driven by the changing needs and demands of customers. We find that 'equivalent service' and 'service type', as defined, are fit only to serve as an initial filter to capture broad families of services with which cloud customers may identify. Beyond 'equivalent service' and 'service type', a far more granular approach is necessary and should ultimately be reflective of the level of discernment exhibited by cloud customers.

The question has already been posed by others as to whether data analytics services that employ different statistical approaches should be considered as the same 'service type', or 'equivalent services'.[24] In this case, to answer in the affirmative would lead to the absurd application of a legal finding of equivalence to technically heterogenous cloud computing services. We would underscore the concern that even where notional equivalence between functionalities may be identified, any given functionality is likely to be implemented divergently by different cloud computing service providers and that, critically, such divergence is reflective of the reality that "developers understand differently the needs of the same customers".[25] We would also note that equivalence should not be

[18] Commission text, Article 2 (13); Parliament text, Article 2 (13) and Article 22a (3); Council text, Article 2 (13).
[19] Parliament text, Article 26.
[20] Ibid., Article 29.
[21] This is compounded by an attempt in the Parliament text to explain that equivalence is "not related to the service operational characteristics" so that "equivalent services may have different and competing characteristics such as performance, security, resilience, and quality of service." Parliament text, Recital 71a.
[22] "[T]wo databases might appear to share the same primary objective, but after considering their data processing model, distribution model and targeted use-case, such databases should fall into a more granular subcategory of equivalent services." Parliament text, Recital 71a.
[23] "Examples of such service types could be customer relationship management systems, office suites or cloud-based software suites tailored to a specific sector, such as cloud-based banking software." Council text, Recital 71a.
[24] D. Schnurr, Centre on Regulation in Europe: Switching and Interoperability Between Data Processing Services in the Proposed Data Act Report (2022), p. 18.
[25] D. Geradin, K. Bania; D. Katsifis and A. Circiumaru, 'The regulation of cloud computing: Getting it right' (2022), p. 15. Available at: https://ssrn.com/abstract=4285731 (accessed 28 March 2023).

restricted to the same data processing service model, given the aforementioned problems inherent in the prevailing service model taxonomy. Although in this regard the definition contained in the Council text represents a minor advancement, it should be regarded that Recital 71a regresses to the position that "[t]ypically, services falling under the same service type also share the same data processing service model."[26]

The second concept is that of 'functional equivalence', which hinges on a finding of 'equivalent services' or the same 'service type' and is defined in two discrete ways in the Parliament text. According to the general definition, which follows the definitions contained in the Commission and Council texts, the concept means "the maintenance of a minimum level of functionality in the environment of a new data processing service after the switching process, to such an extent that, in response to an input action by the user on core elements of the service, the destination service will deliver the same output at the same performance and with the same level of security, operational resilience and quality of service as the originating service at the time of termination of the contract".[27] The second definition advanced in the Parliament text for the purpose of Chapter VI Switching between Data Processing Services, focuses on the 'customer's data' as the basis for "re-establish[ing] a minimum level of functionality."[28] Again, this definition reads as inapplicable to Chapter VIII Interoperability, notably Article 29.[29] Table 3 compares the definitions.

Table 3. Definitions of 'functional equivalence'.

Commission, Parliament, and Council texts	**Parliament text**
Article 2 (14)	**Article 22a (7)**
"[T]he maintenance of a minimum level of functionality in the environment of a new data processing service after the switching process, to such an extent that, *in response to an input action by the user on core elements of the service,* the destination service will deliver *the same output at the same performance and with the same level of security, operational resilience and quality of service as the originating service at the time of termination of the contract*." (emphasis added)	"[T]*he possibility to re-establish on the basis of the customer's data* a minimum level of functionality in the environment of a new data processing service after the switching process, where the destination service delivers *comparable outcome in response to the same input for shared functionality* supplied to the customer *under the contractual agreement*." (emphasis added)

Overall, the development of the functional equivalence criterion in the Parliament text should be viewed as an advancement over the Commission and Council texts. In particular, the qualification that cloud service providers should only be expected to facilitate the achievement of functional equivalence where "the functional equivalence is established by the destination provider of data processing services" should be read as an attempt by the legislator to address profound concerns regarding the undue onus placed upon the cloud providers.[30] In concert with the interpretation in Recital 74 that "[a] source provider of data processing services has no access and insights into the environment of the destination provider of data processing services and should not be obliged to rebuilt customer's service, according to functional equivalence requirements, within the destination provider's infrastructure", it is clear that the legislator has sought to meaningfully refine the concept of 'functional equivalence'.[31] Critically, we also find the clarification buried deep within Recital 72 that "[d]ifferent services may only achieve functional equivalence for the shared core functionalities,

[26] Council text, Recital 71a.
[27] Commission text, Article 2 (14); Parliament text, Article 2 (14); Council text, Article 2 (14).
[28] Parliament text, Article 22a (7).
[29] Ibid., Article 29.
[30] Ibid., Article 26 (1).
[31] Ibid., Recital 74.

where both the source and destination service providers independently offer the same core functionalities" to represent a promising step forward.[32]

However, important shortcomings remain. It is inherently concerning that so much of the attempted reduction in ambiguity is situated in the increasingly dense thicket of Recitals. Indeed, despite certain improvements, we fear that a pervasive absence of clarity could give rise to legal disputes that will necessarily complicate and even forestall the switching process. Moreover, the Parliament text appears to confirm that the functional equivalence criterion should apply only to the IaaS layer in the context of both portability and interoperability.[33] In light of the earlier discussion of cloud service models, this exposes a profound disconnect between the legislator's understanding and the realities of the industry. We would underscore the reality that distinguishing between the IaaS and PaaS layers, in particular, is an increasingly challenging and artificial pursuit.[34] Ultimately, we consider that the legislation could benefit from modification to clarify the precise definition and scope of application of 'functional equivalence' as a first step towards properly evaluating its merits and demerits. Considering the earlier example of two data analytics services that employ different statistical approaches, an erroneous application of functional equivalence would risk the twofold consequence of instating a particular approach to data analytics as the baseline industry standard and disincentivising future innovation in the market for data analytics.

3. Portability and interoperability

Before critically assessing the concept of 'equivalence', it is necessary to interrogate the portability and interoperability provisions of the Data Act at a broad level. We find that these provisions are hampered by important analytical short-cuts, which may risk substantially harming competition and innovation across cloud computing services.

The Commission and Council texts both omit a definition of 'portability'. Although the Parliament text corrects this oversight, it defines 'portability' rather narrowly as "the ability of a customer to move imported or directly generated data that can be clearly assigned to the customer between their own system and cloud services, and between cloud services of different cloud service providers."[35] This stands in stark contrast to the provisions of Article 23 and 24, in particular, which explicitly cover both data and applications,[36] and are, hence, in line with the definition of the European Telecommunications Standard Institute.[37]

[32] Ibid., Recital 72. Notably, this clarification is also mirrored in the Council text, according to which "[s]ervices can only be expected to facilitate functional equivalence for the functionalities that both the originating and destination services offer." Council text, Recital 72.

[33] Parliament text, Article 26 (1) and Article 29 (1) (c); Recital 71a, Recital 72 and Recital 76. Although Article 29 (1) (c) of the Council text appears to provide for 'functional equivalence' across the PaaS and SaaS models, Recital 72 clarifies that "[t]his Regulation does not instate an obligation of facilitating functional equivalence for data processing services of the PaaS and/or SaaS service delivery model". Council text, Article 29 (1) (c), Recital 72.

[34] W. Kuan Hon, C. Millard, and J. Singh, 'Cloud Technologies and Services', in C. Millard (Ed.), *Cloud Computing Law* (OUP 2021).

[35] Parliament text, Article 2 (19a).

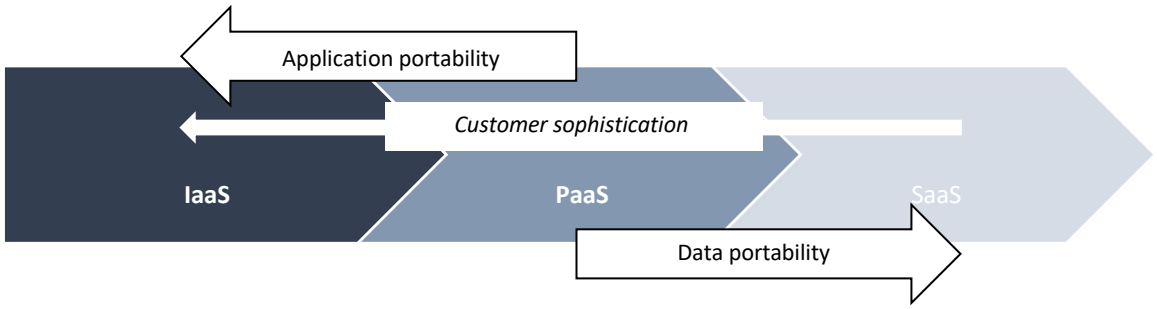
[36] Ibid., Article 23 (1) (c) and Article 24 (1) (a).

[37] Portability is defined as: "the ability of users to move applications and data between multiple cloud providers and their cloud computing services at low cost and with minimal disruption". European Telecommunications Standards Institute, 'Cloud Standards Coordination: Interoperability and Security in Cloud Computing' ETSI SR 003 391 v2.1.1 (2016-02) 26 Section 6.2 Interoperability, quoting from draft of ISO/IEC 19941 [i.9] 'Interoperability & Portability in Cloud Computing', as cited in N. Gleeson and I. Walden, 'Cloud Computing, Standards, and the Law', in C. Millard (Ed.), *Cloud Computing Law* (OUP 2021).

The first analytical short-cut is to assume that data and applications comprise a homogenous set of digital assets for the purposes of portability.[38] It should be regarded that data and application portability are entirely distinct concepts which manifest differently across the spectrum of cloud computing service models.[39] Inherent to the IaaS model is a heightened level of customer control. Indeed, Kuan Hon et al. note that at this layer customers are "free to store, copy, and download their data however they wish" and are likely to test whether their data can readily be ported either in-house or to another cloud provider.[40] Whilst not necessarily operating precisely on a sliding scale, progressing from the PaaS to the SaaS layer, data portability is more likely to represent a significant issue.[41] And at the SaaS level, in particular, this may be an issue for which the customer, typically individuals or small to medium sized enterprises (SMEs), is less likely to have accounted when choosing a cloud provider.[42]

Application portability is an issue of greater significance at the IaaS and PaaS layers, since customer applications running thereon tend to be highly customised, generally utilising and integrating with the provider's proprietary application programming interfaces (APIs).[43] However, it is important to regard that, in the same way as with data portability, customers of these service models are far more likely to account for potential portability issues during the decision making process by, for example, testing *ex ante* whether applications can be ported as required.[44] Figure 1 captures the above graphically.

Figure 1. Portability across cloud computing service models.



The second analytical short-cut is to assume that interoperability is unidimensional. The Parliament text defines interoperability as "the ability of two or more data-based serviced [sic], including data spaces or communication networks, systems, products, applications or components to process, exchange and use data in order to perform their functions in an accurate, effective and consistent manner."[45] Although slightly more detailed, this definition follows the same formula as the Commission and Council texts, from which it is apparent that the scope of interoperability is limited

[38] Commission text, Article 23 (1) (c), Article 24 (1) (a) and Recital 72; Parliament text, Article 23 (1) (c), Article 24 (1) (a) and Recital 72; Council text, Article 23 (1) (c), Article 24 (1) (a) and Recital 72.
[39] W. Kuan Hon, C. Millard, and J. Singh, 'Control, Security, and Risk in the Cloud', in C. Millard (Ed.), *Cloud Computing Law* (OUP 2021).
[40] N. Gleeson and I. Walden, 'Cloud Computing, Standards, and the Law', in C. Millard (Ed.), *Cloud Computing Law* (OUP 2021).
[41] Ibid.
[42] Ibid.
[43] W. Kuan Hon, C. Millard, and J. Singh, 'Control, Security, and Risk in the Cloud', in C. Millard (Ed.), *Cloud Computing Law* (OUP 2021).
[44] Ibid.
[45] Parliament text, Article 2 (19). The Commission and Council texts define 'interoperability' as "the ability of two or more data spaces or communication networks, systems, products, applications or components to exchange and use data in order to perform their functions". Commission text, Article 2 (19); Council text, Article 2 (19).

to ensuring the compatibility of ported data.[46] By focussing exclusively on data, the Data Act ignores the technical breadth of interoperability, which is an entirely distinct concept to portability and means the "capability of public clouds, private clouds, and any other systems in the enterprise to understand each other's application and service interfaces, configuration, forms of authentication and authorization, data formats etc. in order to cooperate and interoperate with each other".[47] Gleeson and Walden note that across the spectrum of cloud computing service models, interoperability takes on different meanings and emphasise how, at the IaaS and PaaS layers, the concept "refers to the interfaces or APIs needed so that the virtualization platforms management interfaces operate between different providers." [48] Interoperability encompasses not just the ability for different cloud providers to work together, but also the ability for customers to migrate workloads between them.[49] At the SaaS layer, the question of interoperability essentially concerns the compatibility of data formats and files, and of protocols.[50]

We would concur with others that the legislator should clarify and refine the scope of the interoperability provisions and reconsider the merits of 'open interfaces', which seems unjustifiable if the objective is limited to data portability.[51] Moreover, it has been pointed out that, where a lack of interoperability is perceived by a sufficient number of cloud customers as a substantial disadvantage, innovative providers may respond by voluntarily joining an open standardisation initiative in order to compete with incumbents operating closed systems.[52] Overall, we are optimistic about the emergence of market-driven solutions to interoperability issues and would underscore that in the absence of clear market failures there can be no justification for such intervention. We also concur with the concerns raised by others that the imposition of mandatory interoperability standards would inherently favour incumbents, impede existing competition by differentiation and limit the parameters for future innovation.[53]

4. Equivalence and product variety

Within the context of cloud computing services, what matters for the implementation of functional equivalence between products is:

a. the number of variables needed to define the product (or features); and
b. the variance within each variable (or feature).

To explain further the difference between features, we consider the example below that relates to the cloud offerings. The general distinction between features and variance within a feature is quite common to complex products, such as cars.

- A variable (feature) might be the availability of a backup on demand. The variance in this feature might relate to the maximum memory covered by it and the speed with which a backup will be resurrected.
- A different variable (feature) might relate to adding in a security product that customises security to the needs of the customer and instantly alerts the customers to a likely intrusion.

[46] D. Schnurr, Centre on Regulation in Europe: Switching and Interoperability Between Data Processing Services in the Proposed Data Act Report (2022), pp. 12-13.
[47] N. Gleeson and I. Walden, 'Cloud Computing, Standards, and the Law', in C. Millard (Ed.), *Cloud Computing Law* (OUP 2021).
[48] Ibid.
[49] Ibid.
[50] Ibid.
[51] D. Schnurr, Centre on Regulation in Europe: Switching and Interoperability Between Data Processing Services in the Proposed Data Act Report (2022), p. 18.
[52] Ibid., pp. 19-20.
[53] Ibid.

The variance of the feature might arise from the fact that not all services offer it, or offer it in the same way, of use of IP that makes the feature more effective.

- Another different variable (feature) might relate to the way that a customer's clients can sign in, e.g., can they sign in automatically if on Google, Facebook or Apple. The variance might relate to the number of automatic sign-in services offered, from 0 to many more.
- Another variable might be the speed of response of the server to customer clients (e.g., time to first response and volume of data that can be transferred per second thereafter.) The variance might arise from different times to first response (latency) and different (and consistency) of transfer speeds per second.

Functional equivalence would require that a provider of cloud computing services ensure that a customer of its services could replicate the same customer experience on equivalent services or service type. Implementing functional equivalence with 5 variables without too much variance in each one, for example, is a different matter from implementing it for 20 with substantial variance within each one.

To illustrate the difference between these situations, we consider a comparison between companies that are required to achieve equivalence in a sector with a low complexity product with low potential innovation, and a sector in which companies are required to achieve equivalence a high-complexity product with substantial variance with many variables (features) and within each variable, high variance (for example, being indicated by the non-availability of a feature for many sellers) with high potential innovation. The latter situation is one in which we would expect, simply from the inconsistency of features, that demand is heterogeneous. In the former situation, demand is likely more homogeneous, to explain the similarity of features (or potentially demand could be heterogeneous but with homogeneous technical possibilities for innovation that constrain differentiation).

We may find that equivalence in the simple sector will lead to more effective choice and lower switching costs without substantially impacting core product offerings, because even without the equivalence, they are relatively similar. In contrast, with the complex sector, the requirement to enable equivalence and switching without loss of capability, could have complex effects. In particular, the requirement to achieve 'functional equivalence' would mean that, for any 'feature', firms would prefer not to offer better capabilities than are available from other firms, because the rule would not be satisfied in that case. Instead, they would be incentivised to 'dumb down' their product to ensure that there is no difference between the exact capacity in their feature and that of other companies.

This would have two implications. First, for the variation found within a feature that would reduce (and in the limit go to 0) so that customers would not be worse off from a switch. This would lead to a lowest common denominator approach within each feature. Secondly, for features that are not available on other services, companies would be extremely hesitant (and in the limit would prefer not) to introduce a feature not currently available in the market, because then customers would not be able to move to other providers. If developing a new feature requires costly investment, the gains from such investment would be rapidly dissipated due to the need to ensure that other operators could have such features, which may risk undermining any intellectual property rights subsisting in the feature, as a new feature could not be made available unless many others could also have access to it.

We may think of demand, almost as a result of the variety in offering features, as spread out over features and the "level" of each feature. In particular, there is demand that (would) exist for some features that are not offered by all (and, from the perspective of innovation, that have not yet been offered at all). There is also demand for greater and less quality within a feature, with some customers comfortable with the idea that they would have a quality for a feature of 0, i.e., the feature would have no value to them, while for other customers that same feature would have positive value.

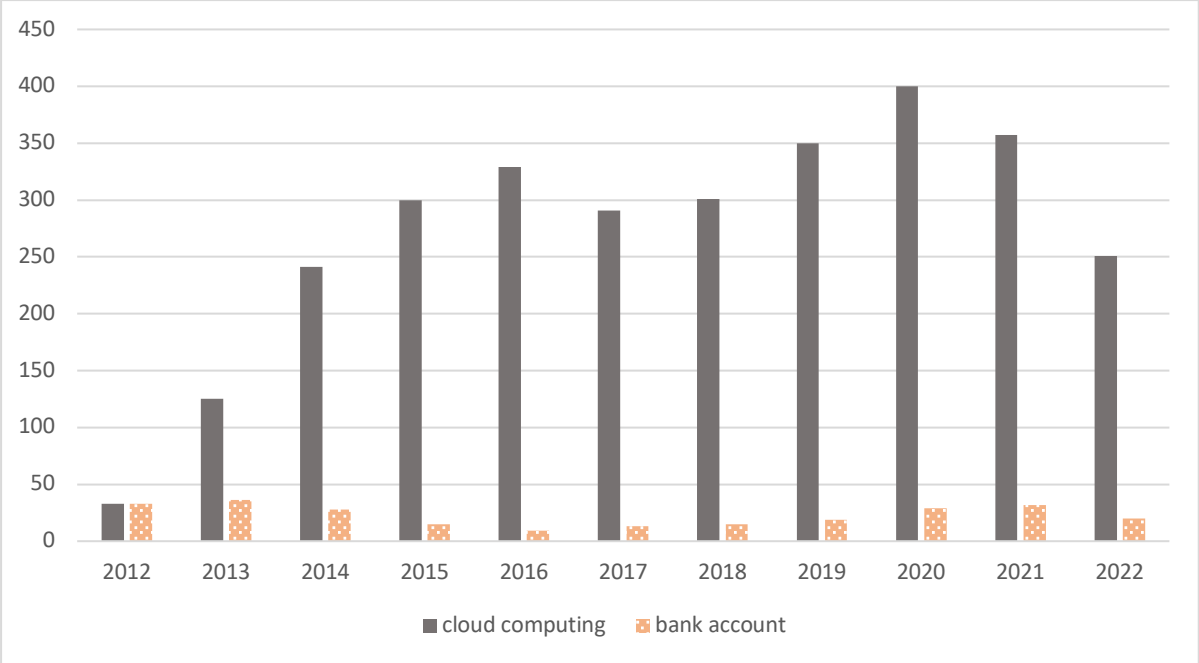
Thus, both for variance within a feature and for introduction of different features, an equivalence rule could, in principle, have a chilling effect on innovation and product offerings. Indeed, with built-in variety seemingly being the natural result of competition, and with companies frequently seeking to distinguish themselves from others with particular aspects of their offers, we can expect that their incentive to create purpose built, new solutions would be difficult to justify if, under functional equivalence provisions, they needed to ensure that their competitor can provide the same level of service. Instead, the 'Brussels effect' would plausibly be a lowering of standards to a common denominator, reducing the variety of solutions available within the EU. Such a reduction and simplification of offerings could potentially have the unintended consequence of hurt EU companies in their software choice compared to companies in other jurisdictions.

5. Equivalence in innovation patterns

One of the points to keep in mind is that functional equivalence for portability and interoperability between providers is completely different when considered across products that are simple and with low numbers of parameters, which themselves have low variation compared to products that are experiencing rapid innovation and with many different parameters (or features). This point is particularly relevant to the extent that open banking is used as an example of a product to demonstrate the viability of cloud interoperability, as the two have very little in common not only in their number of parameters but also in the technological innovation underway in each. As an informal characterisation, one could assert that banking accounts are relatively static in terms of innovation, while cloud computing is experiencing rapid innovation.

One indicator of these different levels of innovation can be provided by patents awarded that mention each type of product. While patent awards on an individual basis are highly imperfect measures, especially as trade secrets are highly important for the cloud, they may nonetheless, in aggregate, provide valuable indications of the relative extent of innovative activity in each area. The data in Figure 2 shows patents issued in one jurisdiction with high patent filings that is commonly studied and suggest that innovation in cloud computing service features has been high. All patents awarded in this jurisdiction have been searched for the phrase 'cloud computing' and the phrase 'bank account'.

Figure 2. US patents by year for cloud and banking, 2012-2022.



Source: US PTO.

Undue intervention could harm market for two reasons. First, if cloud providers know their products must allow full migration from one to another, they will be less likely to undertake innovations for their own platform that would somehow have to be shared across cloud providers. Second, adoption of distinguishing innovations will be discouraged by a full capability of moving across platforms unless there are clear constraints on the extent to which services must be functionally equivalent or identical.

6. Rights in cloud-based assets

We are concerned by the potential adverse impact of the provisions of the Data Act relating to the protection of intellectual property rights in cloud-based assets, which we find to be inconsistent with the realities of the cloud services industry. Common across the Commission and Parliament texts is the implication that the intellectual property rights of cloud providers are variously undermined by the obligation in Article 26 to "make open interfaces publicly available and free of charge"[54], a standard that is narrowed slightly in the Council text from 'publicly available' to "available to an equal extent to all their customers and the concerned destination service providers."[55] Whereas the Parliament text appears not to distinguish between cloud service models, both the Commission and Council texts would impose a graduated intervention by differentiating, without clear justification, between the IaaS and the PaaS and SaaS layers. We are also concerned that, unless clearly delimited, a strict implementation of functional equivalence mandating the provision of "capabilities, adequate information, documentation, technical support and, where appropriate, the necessary tools", as advanced in the Parliament text, would represent a deep incursion in the intellectual property rights and, more broadly, trade secrets and know-how of cloud service providers that is difficult to justify.[56] We would contend that, taken together, these provisions represent a disproportionate intervention that risks jeopardising the innovation advantages developed in particular by new challenger firms. Ultimately, we would underscore the importance of taking a nuanced approach to the regulation of cloud services, which must not be treated as a single organism but rather as a rich variety of highly complex products that cannot be artificially bound by service models.

Furthermore, we draw attention to another potential unintended consequence of the Data Act that deserves scrutiny. Geiregat suggests that the portability provisions would establish a specific statute-based right in data, which would be privately enforceable against cloud computing service providers.[57] Although distinct from an exclusive intellectual property right that is enforceable against any party, it is argued that the establishment of such a right represents a significant shift in the regulatory trajectory following the abandonment of the legislator's proposal to create a new 'data producer's right' in 'raw' data.[58] We would observe that the Data Act, hence, advances an extreme rebalancing of rights in cloud-based assets. The provisions amount on the one hand to a significant undermining of existing intellectual property rights held by cloud service providers across the majority of cloud services, and on the other hand to the creation of an entirely new right in data, a subject matter hitherto argued to be ineligible for protection, that would be 'held' by cloud service customers and enforceable against providers. In this case, the financial position of a cloud service provider may be expected to suffer given uncertainty over the health of its intellectual property portfolio, and the financial position of a cloud service customer may be expected to benefit given the accordance of a

[54] Commission text, Article 26 (2); Parliament text, Article 26 (2).
[55] Council text, Article 26 (2).
[56] Parliament text, Article 26 (1); Recital 74. In a similar vein, we find that greater clarity should be provided in order to properly interpret the requirement to include "sufficient information about the concerned service to enable the development of software to communicate with the service, for the purposes of portability and interoperability." Council text, Article 26 (2).
[57] S. Geiregat, 'The Data Act: Start of a New Era for Data Ownership?' (2022), pp. 41-48. Available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4214704 (accessed 28 March 2023).
[58] European Commission Staff Working Document on the Free Flow of Data and Emerging Issues of the European Data Economy (2017). Available at: https://digital-strategy.ec.europa.eu/en/library/staff-working-document-free-flow-data-and-emerging-issues-european-data-economy (accessed 28 March 2023).

new right to control data of commercial value, to the extent that such right may be profitably exploited.[59] While allocation of rights in the digital economy clearly has an important role to play in ensuring a full set of contracting incentives, we do not see a clear legislative discussion relating to the establishment of this particular right in data.

7. Operationalisation

Operationalising equivalence in the cloud may be very difficult. We suggest this both because of the challenge that did exist in creating a form of equivalence between bank accounts, which we show is an enormously simpler product compared to cloud computing services, and because of the less uniform nature of cloud products. To put it simply, many cloud computing service providers compete by offering features that others do not have, or combinations of features that may attract different types of customers. In one admittedly simple evaluation table below, the typical cloud computing service provider only offers 45 percent of the total available features. The firms offering extra features may, in presence of some forms of equivalence, be required to reduce quality in order to ensure its customers can get the same offerings somewhere else. This would make an implication of equivalence being a massive reduction in service options available to companies.

The open banking functionality pioneered in the UK is commonly taken as an example of successfully implementing an access regime that provides a technique of accessing information held by different providers. It is worth emphasising that operationalising open banking took the UK years and relied upon repeated meetings among the banks involved for years to iron out the details as the API was being agreed and put in place. That activity, though, was for a fundamentally quite simple product that was not evolving, the core bank account. The number of main variables to keep in mind for a bank account (from the perspective of a customer comparing offers) is constrained. These would include, as consumer evaluator *CompareTheMarket.com* emphasises, account fees, interest rates on deposits, refused payment fees, and interest rates for arranged and unarranged borrowing.[60] While banks will have many other features that matter to customers, such as relative availability of cash machines, the cost of a bank card, the availability of mechanisms for multi-factor authentication, these five features are those that are used by the main commercial product comparison site in the UK to help customers choose between accounts.

Cloud computing services are much more complex than a standard bank account and are experiencing relatively rapid innovation, as indicated by patent awards. This innovative activity naturally leads to variation in product offerings. In one recent cloud product comparison by a commonly read source, *PC Magazine* compares 9 providers of cloud computing services for business.[61] The review notes that the services have a variety of features and that it is important to consider the customised features, as changing later after selecting a provider can be complicated. Thus, it recommends taking care of considerations about switching at the point of entering to sign up to the product. Moreover, buyers are entering the cloud choice already with knowledge that subsequent switching from one provider to another may be complex.

The *PC Magazine* article lists 22 product features that are important and specific to backup services (i.e., storage for a specific purpose), and shows which companies have those features included within

[59] Geiregat posits that "[b]y absence of indications to the contrary, it is arguable that the Data Act Proposal would allow securities and limited proprietary rights to be vested in the data control rights, independently of the undertaking to which the data control rights may pertain." S. Geiregat, 'The Data Act: Start of a New Era for Data Ownership?' (2022), p. 46. Available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4214704 (accessed 28 March 2023).

[60] See: https://www.comparethemarket.com/ (accessed 28 March 2023).

[61] O. Rist, 'The Best Business Cloud Storage and File Sharing Providers for 2023' *PC Magazine* 8th June 2023, https://uk.pcmag.com/cloud-services/86614/the-best-business-cloud-storage-and-file-sharing-providers-for-2020 (accessed 28 March 2023).

their offer. As a suggestion of the variation in the market (and in demand) the largest number of these features held by any company was 15 and the highest rated companies (in which *PC Magazine* also took into account access to network information) had only 10 or 11 of the more than 20 features. Thus, even among these features, specific aspects of their operation or other features can be judged as sufficient to reduce overall desirability of even a service that seems to have the most complete offering. This data is shown in Table 4 (with company names anonymised in case the data was incorrectly coded at the time or has since changed). A typical feature in the list is only available from 50% of providers, suggesting high levels of product differentiation in cloud computing.

Table 4. Features by cloud provider.

Features by cloud provider company	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**J**	Freq
Overall rating	4.5	4.5	4.0	4.0	4.0	3.5	3.5	3.5	3.0	
White Label Branding	d			d		d			1	11%
Team Folders	1	1	0	1	1	1	1	1	1	89%
System Image Backup			1			1			d	22%
SOX Compliance Support (Audit Trail)			1			1			d	22%
Remote Wipe	1	1	d	1	1	d	1	1	d	67%
Public Sharing	1	1	d	1	1	d	1	1	1	78%
Partial / Differential Sync	1	1	d	1	1	1	1	1	1	89%
OSX (Mac) Client			1							11%
Mobile Apps	1	1	1	1	1	d	1	1	1	89%
Local File System Sync	1	1	d	1	1	1	1	1	1	89%
ISO 27001 Compliance			1			1			d	22%
HIPAA Compliance			1			1			d	22%
Group Permissions	1	1	d	1	1	1	1	1	d	78%
File Conflict Management	1	1	d	1	1	1	1	1	1	89%
Encryption At Rest (User Managed Private Key)			1			1			d	22%
Encryption At Rest (Provider Managed Private Key)			1			1			1	33%
Digital Rights Management	1	1	d	d	d	d	1	d	d	33%
Cloud Storage Without Local File System Sync	1	1	d	1	1	1	1	1	1	89%
Business Continuity Features			d			1			1	22%
Authenticated External Sharing	1	1	d	1	1	d	1	1	1	78%
Audit Logs			1			1			d	22%
Apple macOS Client						1			1	22%
Total	11	11	9	10	10	15	11	10	12	50%

Source: Author calculations of *PC Magazine* cloud computing review summary table.

We also note that *Which?* emphasises various features as useful but not available from all storage providers e.g., real time syncing and rollback.[62]

Furthermore, a number of providers emphasise their strengths in certain features in order to attract customers. A short list of examples would include: Semperis emphasising its quality as a intrusion, detection and prevention system provider, with patented technology to protect identities from cyber-attacks and calling itself the "industry's most comprehensive hybrid Active Directory security and recovery"; Fidelis CloudPassage Halo, a cloud security provider, offers an automated tool that can detect when a client's IT configuration strays outside of the client's defined security policies; Spectral

[62] C. Woodger, 'How to choose the best cloud storage service' *Which?*, 17th March 2023 https://www.which.co.uk/reviews/antivirus-software-packages/article/how-to-choose-the-best-cloud-storage-service-axxCf2X0KTc3#which-cloud-storage-service-features-should-i-look-out-for (accessed 28 March 2023).

Ops emphasises its ability to find configuration issues resulting from coding errors and its level of integration into the CD/CI pipeline without slowing down the development pipeline; and MinIO advertises itself as the world's "fastest object store".[63] It also emphasises on its website that it is the only vendor globally to offer Active-Active, Multi-site replication (a data replication method that allows data to be stored in two different sites at the same time) for object storage.[64]

Overall, despite the advancements in the Parliament text, we suggest that the proposed regulation may benefit from a reconsideration of the surprising and somewhat contorted use of word 'equivalent' in stating that "equivalent services may have different and competing characteristics such as performance, security, resilience, and quality of service."[65] We have here argued that it may either not be possible or may override legitimate intellectual property rights if cloud service providers are required to make it possible that "a specific service, where there are no major obstacles, can be unbundled from the contract and made available for switching in an interoperable manner".[66] Despite the prevalence of a 'building-blocks' metaphor across many different kinds of technical products and services, practical implementation of a 'building-blocks' approach could be very challenging to achieve for highly complex and interconnected cloud services in the envisaged technical separation between services with the "same primary objective" under the same data processing service model. Indeed, it is by no means clear that such a concept of modularity can be applicable to what we show are highly heterogenous cloud computing services.

8. Compliance and enforcement

Even if the equivalence, portability and interoperability questions were resolved in principle, the practical demands of compliance and enforcement would remain particularly challenging in this domain.

The provision for contract termination within a maximum notice period of 60 calendar days[67] or two months[68], increased in the Parliament and Council texts respectively from the original 30 days proposed in the Commission text, [69] represents a significant intervention in the commercial liberty of cloud computing service providers, both in terms of freedom of contract and freedom to conduct a business, and demonstrates an incomprehension of the realities of cloud contracting on the part of the legislator. We are aware that the economic model of cloud computing service providers is to a great extent based upon long-term contracts which generate recurring annual revenue.[70] While the Parliament text advances over the Commission and Council text by introducing the qualification that such notice period does not apply if "an alternative notice period is mutually and explicitly agreed between the customer and the provider where both parties are able equally to influence the content of the contractual agreement", we remain concerned by the baseline position that is established by this provision.[71] Moreover, the concept of 'equal ability to influence' risks significant legal uncertainty and demands greater clarification by the legislator.[72] Ultimately, although a notice period of this nature may be appropriate in certain markets for which products and services exhibit a low level of

[63] See: https://www.semperis.com/; https://fidelissecurity.com/platforms/cloud-secure/; https://spectralops.io/features/; https://min.io/product/active-data-replication-for-object-storage (accessed 28 March 2023).
[64] See: https://min.io/product/active-data-replication-for-object-storage (accessed 28 March 2023).
[65] Parliament text, Recital 71a.
[66] Ibid., Article 26 (2).
[67] Ibid., Article 23 (1) (a).
[68] Council text, Article 24 (1) (aa).
[69] Commission text, Article 23 (1) (a).
[70] See, for example: Kemp IT Law, 'EU Data Act: Questions For Cloud Vendors?', 5th January 2023 https://kempitlaw.com/insights/eu-data-act-questions-for-cloud-vendors/ (accessed 28 March 2023).
[71] Parliament text, Article 23 (1) (a.).
[72] Ibid., Recital 52.

user customisation, its implementation across cloud computing service models is unjustifiable and runs counter to the objective of the regulation. We are particularly concerned that only cloud computing service providers of a certain size and maturity would be capable of amortising termination and associated portability costs. Indeed, it seems likely that smaller and new challenger firms would struggle to manage capacity investments and sustain high innovation levels due to the resultant uncertainty of demand, [73] which may limit their ability to raise financing. The gradual withdrawal of switching charges over a three-year period is likely only to exacerbate this.[74]

We find that the further provision for a mandatory maximum transition period represents an equally concerning intervention. Although again the Parliament text represents an advancement, increasing the period from of 30 calendar days to 90 calendar days, as a general principle, it may be assumed that the enforcement of mandatory contract law should be a last resort that requires a high threshold of justification, since it inherently risks chilling investment incentives and, hence, reducing innovation and competition. This risk is only likely to increase given the horizontal and symmetric nature of the Data Act. We therefore disagree with the position of Schnurr that, based upon experience of number portability in the telecommunications sector, a mandatory maximum transition period represents "a suitable safeguard to facilitate switching between data processing services", which should be amended by a qualification that such period only applies where the customer and destination service provider have completed any necessary actions to enable switching.[75] Given the differences in complexity between products already discussed, we find this analogy unconvincing and would also be concerned that such solution is necessarily inhibited by uncertainty over the precise technical obligations incumbent on the respective parties. Whereas for certain less complex cloud computing services such transition period may be feasible, it is arguably far beyond the command of the legislator to assume and enforce this provision against a cloud service provider that has contracted on a long-term basis with a sophisticated customer with complex needs that have demanded a high level of customisation. We would underscore that even the provisions of the recently enacted Digital Markets Act, which exclusively targets gatekeeper firms, do not enforce mandatory contract law.[76]

Thus, we find the requirement for 'technical feasibility' of portability and interoperability between cloud computing services welcome and necessary.[77] Although no clear legal standard is provided for, and this is a shortcoming, such a requirement would provide cloud computing service providers with the opportunity to put forward reasonable technical arguments in opposition to the demands of customers under the Data Act. Taking into consideration the nature of cloud industry, we would argue that the requirement for a provider to "notify the customer within 14 working days after the switching request has been made", increased in the Parliament text from 7 working days in the Commission and Council texts, and to "duly motivate the technical unfeasibility and indicate an alternative transition period, which may not exceed 9 months", increased in the Parliament text from 7 working days in the Commission and Council texts, should be reconsidered.[78] Notwithstanding the clear steps forward made in the Parliament text, we are concerned that, although may be possible for mature firms to meet such a timetable, for smaller firms 7 or 14 working days is likely to be insufficient and that in many instances the cost of compliance within a maximum transition period of 6 or 9 months may cause considerable harm.

[73] This echoes the view of others. See: D. Schnurr, Centre on Regulation in Europe: Switching and Interoperability Between Data Processing Services in the Proposed Data Act Report (2022), p. 14.
[74] Parliament text, Article 25.
[75] D. Schnurr, Centre on Regulation in Europe: Switching and Interoperability Between Data Processing Services in the Proposed Data Act Report (2022), p. 14.
[76] Regulation (EU) 2022/1925 of the European Parliament and of the Council of 14 September 2022 on contestable and fair markets in the digital sector and amending Directives (EU) 2019/1937 and (EU) 2020/1828 (Digital Markets Act) OJ L 265.
[77] Parliament text, Article 24, Article 26, Article 28 and Article 29.
[78] Ibid., Article 24 (2).

Despite the inclusion of a requirement for 'technical feasibility' in a number of provisions across the Commission, Parliament and Council texts, and in particular in Parliament text which features a number of additional inclusions, we are concerned that this text stands out for its removal of such requirement from Article 24 (1) (a) (i).[79] Contrary to the argument of others that the 'technical feasibility' requirement has inhibited data portability under the General Data Protection Regulation (GDPR), we view this requirement as an important safeguard, not least given the significant technical incongruity of the regulatory provisions already outlined.[80] Indeed, we would emphasise that in the context of the GDPR there may be numerous more persuasive reasons why portability has not (yet) fulfilled its promise.[81]

Unique among the texts, the Council text proposes to extend the provisions relating to portability and interoperability to instances where a customer simultaneously uses two services from two different providers.[82] We find that such an extension would only exacerbate the problems that are inherent in the current language of the provisions and may be largely unworkable, not least because cloud providers do not necessarily have visibility on whether a customer is using multiple services from different providers in parallel. Indeed, such provisions would require access to customer content in a way that may adversely impact the trust between customer and provider, or a reliance upon customer attestations on how they are using cloud services that would be challenging for providers to verify. In either case, we are concerned that providers would gain new insights into their customers' use of other providers and how services offered by providers technically work, creating unduly onerous new administrative and technical burdens both for providers and customers. The extension also stands to undermine the ability of cloud providers to account for their network costs by charging ordinary transfer fees, since it would not necessarily be possible to determine whether a given transfer request is being made by a customer for the purpose of switching.

In addition, the Parliament text contains an exemption from the obligations set out in Article 23(1) (d), Article 25 and Article 26 for "data processing services which have been custom-built to [sic]".[83] Moreover, no clear legal standard is provided for. Although we infer from Recital 75b that 'custom-built refers to services that are "substantially altered to facilitate a specific customer's need", the interpretation of 'substantiality' will necessary be highly subjective and almost entirely context specific.[84] We would underscore the reality that, in the context of cloud computing services, 'custom-built' is categorically not a binary concept; rather should be appreciated on a sliding scale. Taken together, we find that the concept of 'custom-built' creates considerable legal uncertainty and this should be addressed by the legislator as a matter of urgency.

This paper has not focused on price and cost of features for cloud computing services because we prefer to focus purely on the complexity of operationalizing equivalence and the likely harm to innovation and product variety within Europe. Yet, one of the variables that is taken into account by customers of cloud computing services is evidently the price of the service. This will typically, in a commercial system, be based on costs of different elements of a service. It is evident to note that introducing a requirement to switch customers at a 0 cost, if there is actually a positive cost of moving data and coordinating a move, is a substantial intervention in the market process and moves away from the general principle that costs should be coverable through charges. In particular, a rule to make

[79] Ibid., Article 24 (1) (a) (i.).

[80] 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), p. 66.

[81] See, for example: W. Lam and X. Liu, 'Does Data Portability Facilitate Entry?' (2020) International Journal of Industrial Organization, 69.

[82] Council text, Article 28a.

[83] Remarkably, for such a critical new addition the legislator has either failed to complete the sentence or erroneously added the word 'to'. Parliament text, Article 26a (1).

[84] Ibid., Recital 75b.

customer switching away from a provider costless would be expected to result in higher prices for other parts of the process.

Finally, to buttress our contention of the unintended risk to innovation, a recent study of the impact of another recent regulatory initiative on innovation, that on GDPR by Kummer et al., uses data on 4.1 million Google Play Store apps between 2016-2019 and documents how the GDPR regulation "induced the exit of about a third of available apps; and in the quarters following implementation, entry of new apps fell by half."[85] Despite the apparently clear benefits of the GDPR to consumers, the finding that "GDPR reduces consumer surplus and aggregate app usage by about a third" offers a stark warning to the legislator concerning the potential unintended consequences of complex regulation bearing high compliance costs.[86] We do not here opine on the relative success of the GDPR based upon this finding. Ultimately, what this example illustrates is that a trade-off exists between benefits to privacy and foregone innovation and the powerful force that may be exerted by EU regulation concerning data. In the case of cloud computing services, we would observe that a significant number of customers already have a contractual possibility and incentive to account for the trade-off between complexity and customisation in service functionality and ease of portability and interoperability. We would be concerned that the anticipated cost of compliance and threat of strict enforcement of the Data Act could result in tangible harm to competition and innovation in cloud computing services. This could ultimately favour more mature cloud service providers that already benefit from a strong foothold and are likely to offer a broader portfolio of digital products and services and, perhaps more worryingly, lead all cloud providers to reduce technical capacities of their services in Europe to a basic and standardized level.

9. Conclusion

We have shown that the provisions of the Data Act relating to portability and interoperability, which rely upon the establishment of a certain level of 'equivalence' between cloud computing services, require urgent attention from the legislator. This needs arises from the economic incentives that will be installed by the new legislation, with its imposition of standardisation and consequent reduced ability to appropriate gains of innovative activity. The standardisation and reduced incentives to innovate are a particular concern for cloud computing because of the substantial variety of features offered by different providers and the fact that cloud computing is a major innovation battlefield,[87] at least compared to other products which have experienced standardisation for portability and interoperability. We find that 'service type' and 'equivalent service' are legal concepts divorced from the technical realities of the cloud industry and emphasise that distinguishing between the IaaS and PaaS layers, in particular, is an increasingly challenging and artificial pursuit. Focusing first on portability, we underscore the reality that data and application portability are entirely distinct concepts which manifest differently across the spectrum of cloud computing service models. Turning to interoperability, we identify shortcomings of the proposed provisions and emphasise optimism over the emergence of market-driven solutions. We also find that a number of key concepts, in particular 'custom-built', 'technical feasibility' and 'equal ability to influence' contractual terms, are inadequately defined and would, hence, engender considerable legal uncertainty. Crucially, we highlight concerns that many of the proposed provisions, including those that would impose mandatory contract law, run counter to the objective of the regulation and stand to put smaller and new challenger firms at a significant competitive disadvantage.

[85] M. Kummer, J. Waldfogel, R. Janßen and R. Keisler, 'GDPR and the Lost Generation of Innovative Apps' (2022) NBER Working Paper No. w30028. Available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4104014 (accessed 28 March 2023).
[86] Ibid.
[87] Measured by patents, see section 5.

In general terms, we would suggest that Parliament text represents an advancement over both the Commission and Council texts, although it is inherently concerning that so much of the attempted reduction in ambiguity is situated in the text's increasingly dense thicket of Recitals. Indeed, despite certain improvements, we fear that a pervasive absence of clarity could give rise to legal disputes that will necessarily complicate and even forestall the switching process.

A solution that is hinted at to some extent in the Parliament text, and which makes much more sense than a broad equivalence requirement, would be that providers of cloud services are required solely to ensure portability and interoperability between 'plain vanilla' services.[88] These services could be considered as those that are offered by all relevant providers, which rely less heavily upon novel intellectual property rights and which could, for example, be established by a standard embodied within one or more APIs. At the same time, though, if the customer has complicated needs that require customisation, the requirement to move in a way that maintains equivalent functionality and capabilities would be an unjustifiably excessive intervention in private operations and innovations that could disadvantage European businesses. Companies that use cloud services are, and have long been, well aware of the risks of lock-in when they choose a service provider. If a company wishes to bring a cloud service in-house or to move the provision to another cloud provider, its incentives are well aligned to ensure that such changes are feasible at the time of contract and through its future behaviour in terms of not customising its services in a way that is dependent on the cloud provider. The reality that many companies choose to customise their services potentially making switching to another cloud provider less simple, or technically impossible without substantial re-customisation, already provides substantial information about the values and needs of such companies.

We conclude that the legislator would need to clearly demonstrate broad-base market failures in order to adequately justify the profound, horizontal and symmetric intervention that it proposes to impose. Ultimately, should the Data Act be enacted without substantial redrafting, we fear that it could restrict competitive differentiation by law across markets for cloud computing services and reduce customer-desired options available in current and future product offerings.

[88] Parliament text, Recital 72.