Online choice architecture and compliance with the DMA: insights from behavioural economics

Zita Vasas and Abul Fazal[1]
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Europe's Digital Markets Act (DMA) regulates online platforms with the primary aim of making markets in the digital sector "fairer and more contestable".[2] Since March 2024, large platforms the European Commission (the Commission) designated as gatekeepers have been bound by the DMA's specific obligations and prohibitions.

The DMA's scope is broad, and the Commission is currently reviewing its rules.[3] A comprehensive assessment of the DMA would consider the impact of its specific provisions, as well as its wider effects on markets and consumers.[4] The objective of this article is narrower: we focus on how the enforcement and compliance process has worked so far, *specifically* with respect to the Commission's concerns about digital services' choice architecture.

First, we outline the relevance of behavioural economics to competition policy – to explain both: (a) competition authorities' concerns about the negative impact digital choice architecture may have on users; and also (b) the benefits it can provide. Then, we summarise the emergence of *ex ante* regulation as the Commission's preferred tool to address these issues.

We then review the compliance process so far, making three observations. In this initial phase:

- It has largely removed or deterred conduct that the Commission focussed on in its *ex post* investigations;
- It has been, *for a regulatory process*, relatively swift in identifying and investigating compliance concerns; but
- Compliance with the DMA's obligations does not appear to be complete yet.

We conclude with three challenges that the Commission and gatekeepers will have to navigate going forward.

- The provisions aimed at improving choice architecture may not materially change outcomes in many services.
- The Commission and gatekeepers should use empirical testing to identify where changes to the choice architecture enhance the DMA's objectives (while not imposing disproportionate costs on gatekeepers and business and end users).
- A major test for the compliance process will be whether it can adapt its assessments to new AI-enabled services, not just familiar ones – here too, effective testing will better guide the Commission's priorities and understanding.

The relevance of behavioural economics to competition policy in the digital sector

For many years, competition authorities have been concerned that providers of digital services can influence users' decisions in ways that may harm competition by altering the design of their choice architecture – the environment that determines which options are presented to users and how. Nevertheless, the way gatekeepers design their choice architecture can also benefit users. Behavioural economics helps us understand both mechanisms.

Choice architecture is inherent and can benefit users

Firstly, it is important to clarify that choice architecture is inherent in how digital platforms interact with their users, and it is not a concern in itself that it influences users' choices.

There is no neutral or bias-free choice architecture. Every interface or presentation involves design choices — the order of options, their framing, their visual emphasis — each of which could influence behaviour. A fully neutral design, that does not influence users, is not a coherent alternative; every design affects users in some way, even if unintentionally.

A fully informed choice is impractical. In theory, users could make fully informed choices – where they understand the pros and cons of each option available to them – but this is unrealistic. Consumers do not have the time, information, or cognitive capacity to process all available alternatives in a perfectly rational way.

Further, users would most likely not benefit from a choice architecture that forced them to make fully informed choices. Rather, convenient short-cuts that lower the mental cost of decision-making – such as recommendations, popularity indicators, or defaults – are in fact helpful for users, particularly for choices with low-stakes. Many design features that influence behaviour can help users make faster or better decisions by reducing cognitive effort.

Behavioural economics of choice architecture

Authorities' concerns about digital choice architecture are grounded in the behavioural economics literature, which catalogues numerous factors that influence decision-making in ways that (seemingly) depart from the rational behaviour classical economics assumes.[5]

In particular, consumers' decisions may vary depending on various features of the choice architecture.

- **The number of options presented**. The choice architect can steer users towards a particular option either by providing too few alternatives (effectively restricting choice) or too many (*choice overload*).
- **The information provided**. Familiar options can gain advantage if the information provided about alternatives is too little (*shrouding*) or too much (*cognitive overload*).
- **The contextual signals presented**. The architecture can steer users towards particular options by increasing their *salience* or prominence relative to others' — for instance, by presenting the preferred option in vivid colours and others in grey, or by using social cues and prompts such as reviews, popularity metrics or "scare screens" warning users about potential risks of third-party providers.
- **The relative effort of the selection process.** The architecture determines how laborious it is to select each option. Some options can be made easier to choose (e.g., through *defaults* or pre-installations), while others can be made more difficult — for instance, by *complexification*, which makes the administrative steps unnecessarily onerous, leading to a higher likelihood of users abandoning the process before completion.
- **The timing of the selection process.** User choice may differ depending on whether an architecture requires a decision when the user is more likely to devote attention to it (such as during initial setup of a device), or when the user is focused on something else (such as when opening a search engine to look something up). In the latter case, users are more likely to stick with the default option than consider alternatives so that

they can swiftly complete the action they were doing.[6]

Why choice architecture matters in digital services in particular

Authorities have been particularly concerned that large platforms can optimise their choice architecture to give an advantage to their own complementary services (self-preferencing) at the expense of rivals — making digital markets less contestable. The focus on digital platforms broadly stems from two main reasons.

First, the impact on users is likely to be especially significant in digital markets given the following characteristics that make users susceptible to the influence of choice architecture in digital settings.

- **Numerous decisions.** Users face many small choices, leaving them prone to choice overload and decision fatigue, which amplify the power of defaults and the influence of contextual signals.
- **Low stakes for users**. For each specific decision, the stakes for the user are relatively low — the marginal benefit of choosing the best option is limited, as is the potential for long-term regret from choosing a less optimal one.
- **High capabilities and incentives for providers**. For digital service providers, both the ability and the incentive to influence user choices are high. Small shifts in many users' behaviour can generate large aggregate rewards, and access to user data enables providers to test and optimise their choice architecture continuously.[7]

Second, many digital services combine (a) a platform that generates significant network effects — creating a degree of user lock-in or dependence — with (b) an ecosystem of interoperable products and services offered by the platform provider and by third parties. This structure, while clearly bringing various benefits to users, creates opportunities for self-preferencing, whereby platforms can leverage users' dependence on the core service in a manner that may distort competition in complementary markets.

It is these features — network effects, user dependence and ecosystem integration — that make self-preferencing and choice architecture particular concerns in digital markets. In contrast, authorities are generally less concerned about, for example, a supermarket that designs its store layout to favour its own-brand beans over (better value) third-party rivals. The influence of the choice architecture may be just as powerful as in a digital platform, but consumers' dependence on it is not: they can easily switch to another supermarket that makes it easier to find their preferred brand.

Challenges in identifying anti-competitive and pro-competitive choice architecture

Assessing choice architecture can be complicated for two reasons.

- **Many specific features involve trade-offs between harm and benefit to users.** For instance: choice screens can provide opportunities for rivals, but also impose a burden on users they would rather avoid; warnings about third parties' services may be "scare screens" that deter users from choosing competitors, but also genuinely protect users from risks;[8] and similarly, popularity metrics can help users avoid wasting time assessing bad options, but also make incumbents with a historical advantage difficult to challenge.
- **The effect of a given feature can vary in different situations.** There will rarely be a design that is pro-competitive in every circumstance. For instance, a specific number of options may be sufficient in one context, too few in another, and lead to choice overload in a third.

These features can make effective regulation of choice architecture challenging.

Nevertheless, regulators are typically able to identify specific elements of a choice architecture that they consider **anti-competitive** – i.e., that it distorts user choice or gives an unreasonable advantage to the platform provider in isolation. Examples include deceptive prompts, excessive restriction of alternatives, or asymmetric burdens imposed on users depending on whose service they aim to use.

However, it is far harder for a regulator to specify what a **pro-competitive** counterfactual design would look like – and, therefore, it is hard for digital platforms to anticipate what may satisfy a regulator where it has concerns.

Moreover, there will always be further changes one could make to channel more users to competitors, but that is not the goal of competition policy – authorities aim to protect the *competitive process*, not to arbitrarily improve *competitors' outcomes*, and certainly not at the expense of consumer welfare.

As we will explore, this asymmetry affects how authorities address their concerns about digital choice architecture – both in terms of how they specify their objectives, and how they prioritise assessment and intervention.

The emergence of *ex ante* regulation of digital markets

In the past, authorities have attempted to address their concerns about choice architecture in digital services through *ex post* investigations.

However, some authorities have now embraced *ex ante* regulation in digital markets, exemplified by the DMA. The hope is that this approach will address the limitations they experienced with the *ex post* regime. In addition, an *ex ante* regime seeks to prevent harm before it arises, by imposing ongoing obligations and compliance assessments on large platforms.

When pursuing these objectives, it must not be overlooked that *ex ante* regulation imposes significant costs, including on the gatekeepers, their users and the regulator itself.

The challenges with addressing behavioural issues through *ex post* investigations of digital services

For at least the past decade, insights from behavioural economics have featured in European competition authorities' *ex post* investigations of digital services. The importance of choice architecture has featured in the authorities' concerns regarding most of the GAFAM firms. We briefly summarise these below.[9,10]

- **Alphabet (Google).** In *Google Shopping* (2017), the European Commission found that Google abused its dominance in general search by giving its own comparison-shopping service prominent placement at the top of search results, while demoting rival services. Since users tend to engage more with the first results shown, this design diverted traffic towards Google's own service, and away from competitors.[11] In *Google Android (2018)*, the Commission found that Google abused its dominance by requiring device manufacturers to pre-install Google Search and Chrome. In 2022, the General Court largely upheld this finding, noting that status quo bias makes users reluctant to download alternatives and that pre-installation has the same practical effect as a default, based on behavioural evidence on user switching.[12]

- **Amazon.** In 2021, the Italian Competition Authority (*Autorità Garante della Concorrenza e del Mercato*, or AGCM) found that Amazon abused its dominance in online marketplace intermediation by tying its logistics service, Fulfilment by Amazon (FBA), to a set of exclusive seller benefits, most notably the Prime label. The investigation showed that offers with the Prime label were much more visible to consumers, steering buyers towards FBA sellers.[13] Likewise, in its Buy Box investigation, the Commission

preliminarily found that Amazon's rules for selecting the Buy Box winner and granting Prime eligibility favoured Amazon's own offers and FBA users, steering consumers towards those options. To address these concerns, Amazon committed to treat all sellers equally in Buy Box rankings and to display a second competing offer, making it easier for consumers to see and choose alternative deals.[14]

- **Apple.** In 2024, the Commission fined Apple more than €1.8 billion for abusing its dominance in the distribution of music streaming apps through the App Store. The Commission found that Apple's anti-steering provisions prevented developers from informing iOS users about alternative or cheaper subscription options outside the App Store. The Commission noted that these restrictions negatively affected users – who could not make informed and effective decisions on where and how to purchase subscriptions – and that many may have paid higher prices as a result. It also noted non-monetary harm in the form of a degraded user experience: users faced a cumbersome search to find external offers, or never subscribed at all.[15]

- **Microsoft.** In 2004, the Commission found that Microsoft had abused its dominance by tying Windows Media Player with the Windows operating system – a finding later largely upheld by the General Court. The Court noted that this practice altered competition by ensuring the widespread presence of Windows Media Player on personal computers, creating a disincentive for users to install third-party players and for manufacturers to pre-install competing media software.[16] Similarly, in 2009 Microsoft agreed to address the Commission's concerns about tying Internet Explorer to Windows by displaying a browser choice screen to Windows users. The choice screen was rolled out in March 2010 and was deemed successful by the Commission, with around 84 million browser downloads by November 2010.[17]

The main criticisms of seeking to address competition concerns about digital choice architecture, and potentially other related anti-competitive practices, through *ex post* assessments are the following.[18]

- **The process is too long**. The process to identify concerns, launch an investigation, assess the issue and reach a decision is long. The criticism is that by the time a conclusion is reached it is often rendered obsolete given the fast-paced nature of digital markets.

- **The scope is too narrow.** Focussed and backward-looking investigations make it difficult for authorities to either provide guidance that would help providers avoid their concerns, or create meaningful deterrence effects that would reduce the incentive to develop anti-competitive architecture in the first place.

- **The source of market power is not necessarily anti-competitive behaviour.** If a digital platform achieves significant market power stemming from intrinsic characteristics of digital markets (such as economies of scale and network effects) but without any anti-competitive actions, *ex post* competition law is not the right tool to enhance competition as (absent anti-competitive behaviour) an abuse of dominance cannot be established.

- **The *ex post* regime is ill-suited to apply the remedies considered.** The interventions required to develop, implement, and monitor the performance of adequate remedies are better suited to an ongoing regulatory regime rather than to one-off investigations.

The shift to *ex ante* regulation of digital platforms

Several jurisdictions have adopted, or are considering adopting, *ex ante* regulation of digital platforms with the aim of addressing competition concerns more quickly and effectively.

Here, we focus on the implementation of the European Union's DMA. The UK is taking a similar approach in its new digital markets regime, where the Competition and Markets Authority (CMA) recently designated Google with Strategic Market Status (SMS) in general search and search advertising services[19], and proposed designating Apple and Google with SMS in mobile ecosystems.[20]

While the European Union and the UK have moved first with dedicated regimes now in force, other jurisdictions – such as Australia, Brazil, India, Japan and South Korea – have also been considering legislative proposals, or are yet to fully implement comparable frameworks.[21]

The DMA draws on behavioural insights from earlier competition cases, but aims to overcome the limitations of *ex post* enforcement. This is evident both in the substantive **requirements** imposed on designated firms and in the **process** put in place to ensure compliance.

The requirements of the DMA

Behavioural economics underpins some of the DMA's overarching requirements and several of the operational duties imposed on designated digital gatekeepers.

- **Overarching requirements**.[22] The DMA aims to enhance fairness and contestability in digital markets. Article 8 sets out that gatekeepers must implement provisions in a way that is *effective* in achieving these overall objectives. In addition, Article 13 prohibits *circumvention*, including via the use of behavioural techniques. Thus, the gatekeepers are expected to comply not only with the word, but also the *spirit* of the rules.
- **Specific obligations.** In practice, much of the DMA includes formal rules that guide what is regulated and how – at least in the initial stages of its implementation.[23] Certainly, the articles of the DMA set out requirements and prohibitions that relate to specific conduct on particular platform services that gatekeepers must comply with. These provisions directly target practices previously scrutinised from a behavioural perspective in *ex post* investigations.

For instance, Article 6(3) specifically addresses the use of pre-installations and defaults by gatekeepers – common focal points of *ex post* assessments prior to the DMA. The article requires that end users must be able to easily uninstall apps (with narrow exceptions for essential apps), easily change defaults on a gatekeeper's operating system, web browser, and virtual assistant, and must be prompted at first use of these services to choose from the main available providers (a choice screen).

Similarly, Article 6(5) addresses gatekeepers' ability to manipulate the ranking of search results to give preferential treatment to their own services. Wherever a gatekeeper ranks results (e.g., in search results, app-store listings, or marketplace options), the DMA requires that the gatekeeper must not favour its own products/services over similar third-party offerings, and must apply transparent, fair, non-discriminatory ranking conditions.

The compliance and assessment process in the DMA

Unlike *ex post* enforcement, the DMA's compliance regime introduces ongoing and iterative assessment. It is designed to assess, monitor, and refine how gatekeepers' design actually affects users' choices and competition in practice.

Figure 1: Timeline of key events in the DMA compliance process

Source: Compass Lexecon analysis based on review of European Commission DMA compliance documents

The core features are (see **Figure 1**):

- **Designations.** Effective enforcement began with the first gatekeeper designations on 6 September 2023.
- **Initial compliance reports.** Designated gatekeepers prepare compliance reports, demonstrating how their services meet requirements. The first round of reports were published on 6-7 March and 1 November 2024.
- **Initial scrutiny and dialogue.** The Commission reviews the reports and holds workshops to discuss the gatekeepers' approach, providing the opportunity to consider evidence on the impact that the chosen design, and alternatives, would have on business users and end users. The first round of compliance workshops took place on 18-26 March and 25 November 2024.
- **Targeted scrutiny *via* specification**. Article 8 of the Act covers specification investigations, which allow the Commission to further specify how obligations apply in practice. In this context, the Commission has opened two specification proceedings: one on Apple's interoperability obligations under Article 6(7); and another on Apple's iOS connectivity features for connected devices. The Commission adopted decisions for both in March 2025.[24]
- **Specific non-compliance proceedings**. Where concerns arise, the Commission can open focused investigations into potentially non-compliant conduct. To date, it has opened seven non-compliance cases. The first five (against Apple, Meta and Google) were launched within a month of receiving the initial compliance reports. The sixth was launched in June 2024 (against Apple) and the seventh in November 2025 (against Google).

The Commission's non-compliance investigations can result in: (a) **no adverse findings**, either by providing evidence that allays the Commission's concerns, or by adjusting the architecture to address concerns; or (b) **adverse findings and fines**.

Importantly, the compliance process is an **annual cycle**, allowing the Commission to monitor compliance and performance on a continual and iterative basis, updating its understanding and assessment. The second round of compliance reports were published in March 2025.

After the first two years, the Commission launched a consultation on its first review of the DMA and issued a call for evidence on the effectiveness of the DMA.[25,26]

Most recently, the Commission launched three market investigations on cloud computing services, to assess whether to designate Amazon and Microsoft as gatekeepers for these services, and to assess whether the DMA can effectively tackle issues in the sector.[27]

The challenge of regulating dynamic markets

In principle, therefore, the DMA was designed to tackle both the specific concerns identified in the Commission's *ex post* assessment of the choice architecture in digital services, and also serve the broader principle that firms should not design their core services in ways that hinder competition, even as they evolve.

The challenge, however, is that *ex ante* regulation cannot simply target past concerns, especially given how dynamic digital markets are. Inevitably, it will encounter new circumstances and must adapt to markets as they emerge and change – without the benefit of the lessons and insights from past investigations in the same circumstances. It may also introduce new risks and burdens that other regimes avoided.

How well has the compliance process worked in practice?

In the first compliance cycle, the Commission designated seven companies as "gatekeepers" and opened six non-compliance investigations.

As shown in **Table 1**: (a) one investigation has been closed with no adverse findings, following Apple committing to changes to address concerns with its user choice obligations;[28] and (b) two investigations have resulted in infringement decisions and significant fines: Apple's App Store steering and Meta's "pay or consent" model.[29]

The remaining three cases, covering Google's search and Play Store practices, and Apple's contractual terms for alternative app distribution, as well as the most recently launched investigation against Google about demoting media publishers' content in search results, are still ongoing.

Table 1: Summary of DMA non-compliance investigations to date

Gatekeeper	Case / Focus	Date opened	Preliminary findings	Infringement finding
Apple	User choice obligations (Art. 6(3))	25 Mar 2024	—	**No** – case closed on 23 April 2025
Apple	App Store steering (Art. 5(4))	25 Mar 2024	24 Jun 2024	**Yes** – decision and €500m fine announced on 23 April 2025
Meta	"Pay or Consent" model (Art. 5(2))	25 Mar 2024	1 Jul 2024	**Yes** – decision and €200m fine announced on 23 April 2025
Alphabet (Google)	Steering in Google Play (Art. 5(4))	25 Mar 2024	19 Mar 2025	Ongoing
Alphabet (Google)	Self-preferencing in vertical search (Art. 6(5))	25 Mar 2024	19 Mar 2025	Ongoing
Apple	Alternative app distribution / contract terms (Art. 6(4))	24 Jun 2024	23 Apr 2025	Ongoing
Alphabet (Google)	Publishers' content in search results (Art. 6(12) and Art. 6(5))	13 Nov 2025	—	Ongoing

Source: Compass Lexecon analysis based on review of European Commission DMA compliance documents

Reviewing the DMA compliance process so far, we highlight three observations.

- It has been largely effective at **removing and preventing the major behavioural concerns from the Commission's past investigations**, particularly on the end user side, and with regards to choice screens;
- For a regulatory regime, **it has been relatively swift in identifying and investigating potentially anti-competitive conduct,** certainly in comparison with the *ex post* regime that preceded it; but
- **There are still concerns regarding compliance and unresolved issues remain,** particularly for business users of designated platforms.

Removing and preventing major concerns of past investigations

A clear consequence of the first round of compliance assessments is that many of the features that the Commission had concerns about in the past have been removed and have not re-emerged.

First, the *ex ante* regime appears to encourage parties to self-censor, avoiding the behavioural techniques the Commission considered to be the worst and most blatant, to a greater degree than they likely would have avoided under a purely *ex post* regime.

This is particularly the case with browser and search engine choice screens as Apple's and Google's choice architecture largely avoids past techniques (applied in other contexts): their services are not more salient than competitors; nor are they presented as literal or *de facto* defaults (in the choice screens); neither does the design include any apparent complexification for rivals, such as various additional screens; and messages do not deter users from selecting third party services. Additionally, there is no indication of information overload – for instance, Google includes a short description, and Apple provides short titles. Further, social cues that could steer users towards established providers – such as displaying the number of reviews – are not included in the choice screens.

Second, gatekeepers have implemented a wide range of changes to their services in order to comply with the DMA. For instance, Apple has introduced a browser choice screen, created a centralised menu for managing default apps, and now allows users to delete pre-installed apps that were previously not possible to remove – including the App Store, Messages, Camera, Photos, and Safari.[30] Google has introduced choice screens for both browsers and search engines, and has also implemented significant changes to the design of its search results to avoid preferential treatment of its own services.[31] Similarly, Microsoft has also introduced new ways for users to manage default applications[32] and it no longer promotes other Microsoft products in Windows.[33]

A relatively swift process

The second observation is that the assessment process is relatively efficient compared with *ex post* investigations.

First, it is fair to say that the Commission has been relatively fast in enforcing the DMA. The annual compliance process is up and running. The Commission issued preliminary findings in two non-compliance investigations within a few months of opening them, and issued decisions in roughly a year (see **Table 1** above). Compare that with the timelines of *ex post* investigations – both by the Commission and others – and the relative speed of the DMA regime is clear. Consider, for instance, the Google Shopping case, in which the Commission issued the infringement decision six and half years after it opened the investigation in November 2010.[34]

Second, the iterative nature of the process allows the Commission and the gatekeepers to find solutions in a relatively efficient way compared with the *ex post* investigation that preceded it. In particular, gatekeepers have the opportunity to discuss implementation with the Commission and update their design where required. For instance, following the Commission's findings that its earlier measures still favoured Google services such as Shopping, Hotels and Flights, Google proposed further changes in June 2025.[35] Similarly, the Commission closed its investigation assessing whether Apple had provided end users with sufficient ability to uninstall any software applications and to easily set the default web browser, and other settings on iOS, after Apple had announced it would implement new measures to comply with the DMA.[36] These updates included design changes, such as easier browser selection through the choice screen and changes to the positioning of the browser

icons on the device's home screen and dock.[37]

While the process has been relatively swift, we note that the impact of the changes on the market and users has not yet been established. As mentioned above, the DMA imposes costs not only on the gatekeepers and the regulator, but also on end users (e.g., by forcing them to incur the cost of making a change or making it more difficult for them to identify their preferred (gatekeeper) service). It will therefore be essential that the DMA's review covers both the achieved benefits and costs to establish the net impact of the regulation.

Unresolved compliance issues

The third observation is that there remain concerns around the use of behavioural techniques in gatekeepers' compliance.

First, this is reflected in the non-compliance decisions against Apple and Meta.

- **In relation to Apple's App Store**, the Commission found that (i) Apple restricted third-party developers' ability to provide end users with links to external websites when promoting their offers within an app,[38] which made it unduly difficult for end users to locate the offer,[39] (ii) Apple's disclosure sheet contained a warning for unsubstantiated risks to user's privacy and security,[40] which could deter end users from following through, and (iii) Apple did not allow third parties to include additional data on the URL, forcing end users to re-enter information,[41] which increases frictions.[42]

- **In relation to Meta's "pay or consent" model**, the Commission found Meta's model was non-compliant, as it forces end users to choose between either sharing their personal data for use in targeted advertising, or paying a monthly subscription fee to access Meta's social media services.[43] In its decision, the Commission notes that one of the reasons why users of Meta's social networking services may be hesitant to switch to the fee-based model is that they have grown accustomed over the years to using these services for free.[44] Here, the Commission may be concerned about the impact of status quo bias, that is, our tendency to stick with what we are used to. The Commission also notes that an equivalent alternative to its current free-to-use service should (among other things) be presented in a neutral manner with choice flows that allow end users to freely choose that alternative.[45]

Second, **some of the ongoing non-compliance investigations are clearly concerned about behavioural issues**. For instance, the Commission's preliminary investigation found that Apple made it overly burdensome and confusing for end users to install apps when using such alternative app distribution channels.[46]

Third, **business users remain concerned about their ability to compete**. For instance, DuckDuckGo claimed in November 2024 that switching search engines and browsers on Android devices did not become easy (complexification)[47] and we are unaware of further changes since then by Google in this respect.

Finally, **there are some clear gaps in the application of the DMA's principles**. No choice screens have been introduced for virtual assistants as no gatekeeper has been designated with respect to these services. This, in particular, indicates one of the structural challenges in the DMA compliance process. Its major achievements so far relate to mature products and services, where users' preferences have already been shaped by years of use. But once formed, those habits and preferences can be hard to change, even if the constraints of the original choice architecture that moulded them are loosened. In contrast, users' preferences for relatively new products and services, such as virtual assistants, are less likely to have ossified, and so the principles that underpin the DMA's *ex ante* regulation could have greatest impact here. But the rules that determine its application do not (yet) apply.

We note that while there are still remaining issues with compliance, it is important that the Commission prioritises well on what to pursue further. There may always be potential for objections from third parties but gatekeepers must be given clarity in terms of what is sufficient for compliance. Further refining choice architecture designs that are broadly pro-competitive could become counterproductive and/or impose disproportionate costs for all stakeholders involved.

Considerations for the compliance process going forward

The DMA's compliance process will need to evolve; its success will depend on how effectively it adapts. We highlight three relevant considerations:

- improved choice architecture may not materially change outcomes in many services;
- the need for empirical testing; and
- the need to adapt processes to new (AI-enabled) services.

First, users' behaviour in mature markets may be resilient to changes in choice architecture design. The DMA cannot be expected to reverse the impact of past practices.[48] Where users' preferences have formed under the choice architecture authorities have been concerned about, it is unlikely the DMA can now undo those habits and preferences. For instance, Pape-Rossi (2025) finds that removing Google's "one-click advantage" did not shift traffic towards alternative map providers but instead increased user friction.[49]

While there are meaningful relative gains for smaller rivals – with Mozilla reporting that Firefox daily active users doubled in Germany and France on iOS devices over the first year after the launch of browser choice screens,[50] and Opera and Vivaldi also reporting substantial growth in their user traffic[51] – these are unlikely to materially erode the leading providers' overall market shares (at least in the short run and without any disruptive innovation).

The interventions that could shift deeply embedded preferences likely go well beyond what DMA compliance would contemplate. For instance, Allcott et al. (2025) found that a significant share of users paid to try Bing rated it more positively and continued using it afterwards (albeit some due to inertia and not because they realised they preferred Bing). Users who were simply prompted to make an active choice between search engines – without any financial incentives – largely stayed with Google.[52]

The key point here is that choice architecture should *enable* contestability, but not necessarily *improve* outcomes for specific competitors. If consumer preferences are strong, changing the architecture may not have much effect.[53]

Second, empirical testing must inform and help prioritise compliance assessments. For the reasons set out above, it will be difficult for the Commission to categorically say which particular design is most effective in enhancing contestability in practice. For instance, the choice screens Apple and Google introduced show up to 12 alternatives.[54] That, in principle, should make the markets more contestable than they were without choice screens. However, in practice, will users engage with assessing 12 alternatives? Even if they do, could user engagement be further improved by showing fewer alternatives? If so, is that a priority, or even necessary, to comply with the DMA?

These are empirical questions that can only be answered via testing. We note that Google first introduced stratified randomisation showing the top five alternatives in random order before the others but subsequently changed the design.[55] The role that empirical testing played in the assessment of that specific change is important – as, from first principles, we expect stratified randomisation to better engage users, as it reduces the risk of choice overload.[56]

Empirical testing has played a role in the compliance process already, and the Commission has criticised parties for not providing results of A/B testing or other empirical evidence.[57] However – for understandable reasons – there is very little available in the public domain on the scope of any such testing, the alternatives considered, or their results.

Given the inherently empirical nature of establishing the impact of behavioural biases, these issues will increasingly matter in practice, as proper compliance assessments and prioritisation can only be carried out once design choices have been tested and evaluated.

Particularly where compliance with the DMA's formal rules has little effect, it will be important for gatekeepers themselves to be on the front foot. Gatekeepers should demonstrate that users' preferences drive outcomes, and that under a reasonable range of alternative choice architectures, the difference in outcomes for competitors may be limited – or that the (negative) impact on users could be considerable.

Third, a key question is how the DMA will adapt to new services and disruption, and in particular AI functions. The DMA's initial designation and compliance process is informed by lessons from the past.[58] However, the formalism that has been developed to assist the regulation of familiar services provided by familiar firms will become less important, as new services emerge, with new choice architecture, in new contexts. How the DMA identifies, assesses and addresses these new challenges will be the true litmus test of *ex ante* regulation.

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2 See "About the Digital Markets Act" (available at: https://digital-markets-act.ec.europa.eu/about-dma_en) which summarises Article 1(1) of the DMA: The purpose of this Regulation is to contribute to the proper functioning of the internal market by laying down harmonised rules ensuring for all businesses, contestable and fair markets in the digital sector across the Union where gatekeepers are present, to the benefit of business users and end users.

3 https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/14831-Review-of-the-Digital-Markets-Act_en and https://digital-markets-act.ec.europa.eu/consultation-first-review-digital-markets-act_en.

4 A comprehensive assessment of the DMA should cover both the direct impact of the required changes and broader considerations. These include, but are not limited to, how the regulation affects the incentives to invest and innovate and its broader impact on consumer welfare. Issues such as the impact of FRAND pricing or the mandatory access requirements may warrant special attention.

5 For a detailed overview of the economics literature on this issue and for references to previous research on behavioural biases, see Fletcher, A. and Vasas, Z. (2024). "Implementing the DMA: the role of behavioural insights." *Journal of European Competition Law & Practice*, 15(7), 456–462.

6 For instance, see research from Mozilla (2023), *Can browser choice screens be effective? Experimental analysis of the impact of their design, content and placement (*https://research.mozilla.org/files/2023/09/Mozilla-Research-Report-Can-Browser-Choice-Screens-Be-Effective_-21-September.pdf?ref=element.io*),* which finds that "*people who receive a choice screen after clicking on the pre-installed browser choose it as their default much more often than those who receive a choice screen during set-up".*

7 For instance, see an earlier article from The Analysis (2021), *Testing, testing…* (https://www.compasslexecon.com/insights/publications/testing-testing), which describes how digital platforms routinely run A/B tests and iteratively optimise features, because even small shifts in behaviour across many users can yield large aggregate gains.

8 This issue also interacts with the DMA's steering rules. We do not address that debate here, as the issues relevant to that debate go beyond those related to choice architecture.

9 Here we describe the concerns investigated by the Commission and courts. We do not comment on the validity of those concerns. The point here is merely to consider *how* authorities investigate the concerns that they have.

10 The cases against Meta have not focused on issues of choice architecture. For instance, the 2019 decision of the German Federal Cartel Office (*Bundeskartellamt*) concerned Facebook's data collection and combination practices across services and third-party websites, assessed primarily as an exploitative abuse of dominance, rather than a design-related or behavioural issue. See: https://www.bundeskartellamt.de/SharedDocs/Meldung/EN/Pressemitteilungen/2019/07_02_2019_Facebook.html. Similarly, the European Commission's 2024 decision on Facebook Marketplace addressed tying between social networking and online classified services, without reference to user interface design or default effects. See: https://ec.europa.eu/commission/presscorner/detail/en/ip_24_5801.

11 https://ec.europa.eu/commission/presscorner/detail/it/memo_17_1785

12 https://curia.europa.eu/jcms/upload/docs/application/pdf/2022-09/cp220147en.pdf

13 https://en.agcm.it/en/media/press-releases/2021/12/A528#:~:text=Amazon%20holds%20a%20dominant%20position,strengthen%20its%20own%20dominant%20position

14 https://ec.europa.eu/commission/presscorner/detail/en/ip_22_7777

15 https://ec.europa.eu/commission/presscorner/detail/it/ip_24_1161

16 https://ec.europa.eu/commission/presscorner/detail/en/cje_07_63

17 However, Microsoft failed to display the screen following a service pack update between May 2011 and July 2012, affecting c.15 million users and thus leading to a fine from the Commission in 2013. See: https://ec.europa.eu/commission/presscorner/api/files/document/print/en/ip_13_196/IP_13_196_EN.pdf

18 Fletcher, A. and Vasas, Z. (2024). "Implications of behavioural economics for the pro-competitive regulation of digital platforms." *Oxford Review of Economic Policy,* 40(4), 808–817.

19 https://www.gov.uk/government/news/cma-confirms-google-has-strategic-market-status-in-search-services

20 https://competitionandmarkets.blog.gov.uk/2025/07/23/cma-proposes-next-steps-for-improving-mobile-platforms-in-the-uk/

21 For Australia see: https://www.accc.gov.au/media-release/regulatory-reform-in-digital-platform-markets-is-needed-to-improve-competition-and-consumer-outcomes, For Brazil see: https://legalblogs.wolterskluwer.com/competition-blog/brazils-path-towards-digital-ex-ante-competition-regulation-remarks-on-the-brazilian-ministry-of-finance-2024-proposal, For India see: https://globalcompetitionreview.com/article/indian-digital-competition-bill-faces-further-delays-ahead-of-potential-market-study, For Japan see: https://legalblogs.wolterskluwer.com/competition-blog/japans-mobile-software-competition-act-grows-its-guidelines/, For South Korea see: https://www.techpolicy.press/digital-regulation-is-no-longer-just-domestic-policy-as-korea-and-us-clash-over-new-law

22 Fletcher, A. and Vasas, Z. (2024). "Implications of behavioural economics for the pro-competitive regulation of digital platforms." *Oxford Review of Economic Policy,* 40(4), 808–817.

23 See discussion of formalism in earlier article from The Analysis (2025), *Implementation of EU digital regulations: What is the role for economics?* https://www.compasslexecon.com/insights/publications/implementation-of-eu-digital-regulations-what-is-the-role-for-economics.

24 https://digital-markets-act.ec.europa.eu/commission-starts-first-proceedings-specify-apples-interoperability-obligations-under-digital-2024-09-19_en

25 https://digital-markets-act.ec.europa.eu/consultation-first-review-digital-markets-act_en

26 https://digital-markets-act.ec.europa.eu/commission-gathers-views-how-dma-can-support-fair-and-contestable-digital-markets-and-ai-sector-2025-08-27_en

27 https://digital-markets-act.ec.europa.eu/commission-launches-market-investigations-cloud-computing-services-under-digital-markets-act-2025-11-18_en

28 https://digital-markets-act.ec.europa.eu/commission-closes-investigation-apples-user-choice-obligations-and-issues-preliminary-findings-rules-2025-04-23_en

29 https://ec.europa.eu/commission/presscorner/detail/en/ip_25_1085

30 Apple (2025). Non-Confidential Summary of Compliance Report under the Digital Markets Act – March 2025. Available at: https://www.apple.com/legal/dma/NCS-March-2025.pdf (Annex 11 to S2, paras. 4-5, 18-19).

31 These include removing reserved placements for Google services – search results no longer reserve links pointing directly to Google vertical search services and these only appear if equivalent links to third-party providers are also offered. The Google Flights unit and the entry points to Google services (such as Maps and Shopping) that used to sit in the menu below the Search bar have been removed. Google has also introduced features to increase visibility for its rivals and business users. Dedicated units now group results from vertical search services – such as travel sites or comparison shopping services – with direct links to their sites. For comparison shopping services specifically, Google created a new ad format that lets them place product ads linking directly to their own sites, competing on the same basis as merchant-partner ads. Google notes its rankings are based on a non-discriminatory "utility score" – calculated by machine-learning systems using factors such as query relevance, content quality (expertise, authority, trustworthiness), usability, and user context. Google (2025). Non-Confidential Summary of Compliance Report under the Digital Markets Act – March 2025. Available at: https://storage.googleapis.com/transparencyreport/report-downloads/pdf-report-bb_2024-3-7_2025-3-6_en_v1.pdf (Non-confidential summary of the Google Search Chapter)

32 Users can now manage defaults in two ways: in settings, defaults can be changed; and when a new application is installed, Windows prompts the user the first time they open a supported file or link via an "Open With" dialog. Microsoft (2025). DMA Compliance Report: 2025. Available at: https://www.microsoft.com/en-us/legal/compliance/dmacompliance (Windows Section 2 Annex, paras. 271-272).

33 Previously, Windows 10 and 11 encouraged users to stay with Edge when switching browsers and, similarly, the "Open With" dialog included a "Featured app" section that highlighted Edge. Both of these have been eliminated. Microsoft (2025). DMA Compliance Report: 2025. Available at: https://www.microsoft.com/en-us/legal/compliance/dmacompliance (Windows Section 2 Annex , para. 309).

34 https://ec.europa.eu/commission/presscorner/detail/it/memo_17_1785

35 Under the new proposal, a rival vertical search service chosen on objective, non-discriminatory criteria would be given a dedicated box at the top of the results page, with the same format and features as Google's own units. Each vertical search service could select three direct links (for example, to hotels, airlines, restaurants or transport). Other vertical search services would continue to appear lower down in results, but without a dedicated box unless users actively expand them. https://www.reuters.com/legal/litigation/google-offers-tweak-search-results-promote-rivals-stave-off-eu-antitrust-fine-2025-06-20

36 EC Closure Decision in Case DMA.100185 – Apple - Operating systems - iOS - Art. 6(3), paragraph 5.

37 EC Closure Decision in Case DMA.100185 – Apple - Operating systems - iOS - Art. 6(3), paragraph 6.

38 EC Non-compliance Decision in Case DMA.100109 – Apple – Online Intermediation Services – app stores – AppStore – Art. 5(4), paragraphs 90-93.

39 EC Non-compliance Decision in Case DMA.100109 – Apple – Online Intermediation Services – app stores – AppStore – Art. 5(4), paragraphs 94-95.

40 EC Non-compliance Decision in Case DMA.100109 – Apple – Online Intermediation Services – app stores – AppStore – Art. 5(4), paragraph 109. When accessing links the end-user was displayed the following message "*You're about to go to an external website. Apple is not responsible for the privacy or security of purchases made on the web*".

41 EC Non-compliance Decision in Case DMA.100109 – Apple – Online Intermediation Services – app stores – AppStore – Art. 5(4), paragraph 105.

42 EC Non-compliance Decision in Case DMA.100109 – Apple – Online Intermediation Services – app stores – AppStore – Art. 5(4), paragraph 125.

43 EC Non-compliance Decision in Case DMA.100055 – Meta – Article 5(2), paragraph 3.

44 EC Non-compliance Decision in Case DMA.100055 – Meta – Article 5(2), paragraph 93.

45 EC Non-compliance Decision in Case DMA.100055 – Meta – Article 5(2), paragraph 367.

46 https://digital-markets-act.ec.europa.eu/commission-closes-investigation-apples-user-choice-obligations-and-issues-preliminary-findings-rules-2025-04-23_en

47 https://spreadprivacy.com/investigate-google-dma/

48 Fletcher, A. and Vasas, Z. (2024). "Implementing the DMA: the role of behavioural insights." *Journal of European Competition Law & Practice*, 15(7), 456–462.

49 https://www.cresse.info/wp-content/uploads/2025/09/2025_ps6_pa2_ROSSI-1.pdf

50 https://www.android.com/choicescreen/dma/

51 https://techcrunch.com/2024/04/10/eu-dma-browser-choice-screen-early-impact/

52 https://www.nber.org/papers/w33410

53 As noted in the introduction, even if user behaviour does change, the next question is how that change in behaviour affects competition and welfare.

54 https://www.android.com/choicescreen/dma/browser/, and Apple (2025). Non-Confidential Summary of Compliance Report under the Digital Markets Act – March 2025. Available at: https://www.apple.com/legal/dma/NCS-March-2025.pdf (Annex 11 to S2, para. 10).

55 https://www.android.com/choicescreen/dma/browser/

56 Fletcher, A. and Vasas, Z. (2024). "Implementing the DMA: the role of behavioural insights." *Journal of European Competition Law & Practice*, 15(7), 456–462.

[57] EC Non-compliance Decision in Case DMA.100109 – Apple – Online Intermediation Services – app stores – AppStore – Art. 5(4), paragraph 125

[58] See discussion of formalism in earlier article from The Analysis (2025), *Implementation of EU digital regulations: What is the role for economics?* https://www.compasslexecon.com/insights/publications/implementation-of-eu-digital-regulations-what-is-the-role-for-economics.