

CMA MOBILE BROWSERS AND CLOUD GAMING MARKET INVESTIGATION

MOZILLA RESPONSE TO WORKING PAPERS 4 & 5

July 2024

This response to Working Papers 4 and 5 supplements Mozilla's response to Working Papers 1, 2 and 3.

1. Working Paper 4: in-app browsing within the iOS and Android mobile ecosystems

Mozilla welcomes the CMA's Working Paper 4. In particular, we commend the CMA for the in-depth investigation, research and analysis which it has conducted into the competitive dynamics around in-app browsers (IABs).

CMA's emerging thinking

We generally support the CMA's findings and emerging conclusions and note some of the more salient points in this response. In particular, we agree with the CMA's emerging thinking that:

- Apple's restriction of rival browsers offering remote-tab IABs on iOS limits their ability to compete against Safari on iOS.
- Apple restricts rival browser engines from providing Webview IAB (recognising Mozilla's views that the use cases for third party engine provided webviews are complex and may not be appropriate in certain circumstances).
- Google creates friction for third party engines to compete in offering an alternative to Webview on Android and this contributes to the attractiveness of supporting such an offering.
- People have limited choice and control in relation to IAB implementations for several reasons, including that:
 - on iOS, where the default is set as a third party browser, this is not applied to in-app browsing;
 - on Android, settings for third party default browsers may not be replicated in an IAB (whereas they are for Chrome);
 - both Apple and Google's design of the visual interface may make it difficult for people to distinguish between when they are using their default browser and an IAB;

- people have low awareness of IABs and the implications of this, including for their privacy and security; and
- people are not offered the same levels of control and choice over their IAB experience (compared with their default browser experience).

The importance of IABs for browser vendors

As noted by the CMA, the usage of a browser vendor's IAB is important as it drives traffic to browsers. For Mozilla, usage of our IABs allows us to provide a consistent experience with Firefox and ultimately helps us to advance our goal of a more open and accessible internet for all, while ensuring privacy and security.¹ It also supports development of Gecko - including web compatibility benefits which follow.

While this latter benefit is recognised by the CMA in Working Paper 4, it is considered to be small. We would emphasise that ensuring web compatibility remains an important challenge for Mozilla, as the provider of an independent browser engine. We have provided more detail in our response to Working Papers 1 to 3, but note here that web compatibility issues have a direct consequence on consumer browser usage. In addition, they create a resource burden on companies like Mozilla to evaluate and minimise web compatibility issues. Given that many of the highest ranking and most frequently used apps on iOS and Android are those where clicking on a link and opening an IAB is likely to be common (such as social media, instant messaging, email etc.) the importance of IABs - and respecting browser choice in the IAB people are offered - should not be underestimated.²

The importance of user choice and control

As noted above, the lack of effective browser competition on iOS and Android, and the consequent impact on consumer understanding and expectation, is also relevant for IABs. The Verian survey commissioned by the CMA found that 52% on iOS incorrectly believed that clicking on a link within an app would open in their default browser and 30% stated that they did not know. For Android, 43% provided an incorrect answer. This data from the survey underlines the need for IABs to respect the user's choice of default browser.

The Working Paper establishes that the lack of awareness and choice is not only contributed to by Apple and Google's policies, but also their deliberate user interface design choices:

“The in-app browsing visual interfaces on Android, similarly to iOS, mimic the ‘actual’ Chrome browsing experience with some visual differences between the different IAB implementations (see Figure 5.1). This, in turn, may contribute to low levels of user awareness of in-app browsing. If a user is not aware that they are in an IAB and the IAB offers different security and privacy settings to their default browser, this might mean that

¹ <https://www.mozilla.org/en-GB/about/manifesto/details/>

² [Ofcom. Online Nation Report 2023](#)

users are being tracked without awareness or consent, while navigating the web within an app. The lack of user awareness of IAB may also make users less likely to control their IAB settings.”³

One clear example of this lack of user choice, particularly in the context of iOS, is in the provision of remote-tab IABs. On iOS, the only remote tab IAB is SFSafariViewController which is limited to Safari and WebKit. It therefore does not respect the user choice default browser which, as noted in other Working Papers, is in itself limited on iOS - in terms of browser engine, functionality and choice architecture. While Android provides a better solution in principle in the form of Custom Tabs, the CMA has rightly identified frictions imposed by Google which impede effective competition in IABs.

Mozilla encourages the CMA to consider the findings of the various Working Papers together. This is necessary in order to implement solutions which take into account the harm to browser and IAB competition on mobile that has occurred over many years and the long term impact on UK consumers - including on their expectations and behaviours in respect of mobile browsers and IABs.

2. Working Paper 5: The role of choice architecture on competition in the supply of mobile browsers

Operating system providers have consistently used harmful choice architecture practices to undermine browser competition. Mozilla has highlighted these tactics in recent research, including our Five Walled Gardens report in 2022 that covered major operating systems⁴ and the Over The Edge report in 2024 that looked specifically at Windows.⁵

The CMA has previously provided valuable contributions to understanding the impact of online choice architecture, including through a taxonomy and a consideration of the potential harm to competition and consumers.⁶ Mozilla welcomes the fact that the CMA has used its expertise to assess Apple and Google’s deployment of choice architecture and the impact on browser competition.

Mozilla agrees with the CMA that the evidence presented in Working Paper 5 suggests that Apple and Google’s choice architecture for mobile browsers on iOS and Android devices reduces user awareness, engagement and choice, and encourages the use of Safari and Chrome for browsing. This in turn increases barriers to entry and expansion for third-party browsers like Firefox. Such barriers to competition for rival browsers must be addressed consistently with the technical barriers highlighted in the other Working Papers. Ensuring a level playing field for browser and browser engine vendors like Mozilla to build excellent products will

³ Working Paper 4, paragraph 5.21

⁴ [Five Walled Gardens: Why Browsers are Essential to the Internet and How Operating Systems Are Holding Them Back](#)

⁵ [Over the Edge: The Use of Design Tactics to Undermine Browser Choice](#)

⁶ https://assets.publishing.service.gov.uk/media/624c27c68fa8f527710aaf58/Online_choice_architecture_discussion_paper.pdf

only lead to greater choice and competition if people are equally able to find, set to default and continue to use those products without interference from operating systems and on the same footing as their own browsers.

Definition of Choice Architecture

Mozilla agrees that choice architecture is not “neutral” but instead can have either positive or negative effects on consumer behaviour. We would like to see the definition of choice architecture expanded to fully reflect the reality of user interface design and its potential impact on consumer behaviour.⁷ In particular, we note that choice architecture is not only the “*environment in which users act and make decisions*” but also “*specifies when, whether, and how we choose.*”⁸

Behavioural Mechanisms

Working Paper 5 builds on the CMA’s Mobile Ecosystems Market Study by highlighting six key practices relevant to choice architecture and the use of browsers and the related behavioural mechanisms that have a significant impact on consumer behaviour. Mozilla sees several points where this section could be expanded:

- In Mozilla’s research experience, many people are not clear on the difference between the mobile device manufacturer and the operating system provider. Paragraphs 2.8 and 2.14 discuss how pre-installation and placement may result in people believing a browser is endorsed by the the device manufacturer, but in cases where the device manufacturer and the operating system provider are different, people will likely also believe that browser pre-installation and placement are endorsed or recommended by the operating system provider.
- At paragraph 2.19, it is noted that, “*complexity or friction involved in the process for changing their default browser may deter users from doing so.*” Complexity or friction in changing in the default settings might also result in some users believing this is a type of endorsement or recommendation by the operating system provider. We see from our research that, while operating system barriers impact all people, factors like confidence and digital literacy can further impact people’s likelihood of engaging with settings. Our previous research suggests that friction from the number of steps or the complexity of those steps would likely convince some people that these are settings they should not change. (“*I would be intimidated by the word ‘setting’ ... That sounds like big-time stuff and I should not be messing with it.*” - 46 year-old research participant.)⁹

⁷ CMA WP5: The role of choice architecture on competition in the supply of mobile browsers, section 1.1

⁸ Sunstein, Cass R.. Choosing Not to Choose: Understanding the Value of Choice (p. 5). Oxford University Press

⁹ [Five Walled Gardens: Why Browsers are Essential to the Internet and How Operating Systems Are Holding Them Back](#), page 50

- Similar to the lack of uninstallation set out at paragraph 2.25, the “hotseat” placement would also likely result in some aspect of the “endowment effect” where some people would be likely to retain this priority placement of the browser due to aspects of divestiture aversion.
- Both Apple and Google have made relatively recent policy changes related to third-party browsers. On iOS, users have only been able to change the default browser on iOS since September 2020. And, until earlier this year, if a user switched the default browser on their Android device, this choice would not transfer to a new device¹⁰. Having the previous policies for many years is likely to have had a major compounding effect on aspects of inertia and status quo bias for people who have been using these mobile devices - in many cases for over a decade. Moreover, the various iOS bugs cited in paragraph 3.32 that reset users’ default browser settings to Safari are likely to have had additional compounding effects.

Freedom to Uninstall

The Verian survey found that 47% of respondents said that storage capacity/memory were important factors when they selected a smartphone.¹¹ It is further noted in paragraph 2.25 that:

“Not being able to uninstall an existing browser app may deter users from installing additional browsers onto their device. For example, users may not want to have multiple browser apps serving the same purpose or they may have concerns about memory restrictions due to the space taken up by a browser app they cannot uninstall.”

Mozilla believes these points should be considered in Working Paper 5 when discussing the impacts of not being able to uninstall Safari¹² and Chrome¹³ since they are relevant to choice and are examples of self-preferencing. Additionally, we consider using the term “delete” when referring to removing the visual presence of Safari from the home screen to be misleading.¹⁴

Push/Prompt Notifications

Mozilla’s research aligns with the point that “*understanding that the overuse of prompts can be perceived as intrusive*”.¹⁵ For example, we know from our research into browser choice screens that interrupting people in the middle of an unrelated workflow can significantly reduce engagement.¹⁶ This is consistent with the Verian research which found “*that respondents disliked interruptions and therefore if a prompt was perceived as an interruption, users were likely to click ‘no/’later’*”.

¹⁰ Working Paper 5, paragraph 4.50

¹¹ Working Paper 5, paragraph 2.40(b)

¹² Working Paper 5, paragraphs 3.69, 3.71

¹³ Working Paper 5, paragraph 4.73

¹⁴ Working Paper 5, paragraph 3.71

¹⁵ Working Paper 5, paragraph 3.63

¹⁶ [Can Browser Choice Screens be Effective?](#) Page 62

However, the risk of overuse of prompts is not a justification for the situation which persists for browsers on iOS: Apple does not provide third party browsers on iOS with visibility into whether Firefox is set as default. This has significantly hindered our ability to target the right users, at the right time, with the right information. In addition to not being able to effectively target users, it is also not possible to send them to the correct menu within settings to change their default browser thereby creating an additional barrier for consumers interested in changing their default web browser.¹⁷

Apple Restrictions

Working Paper 5 lists three restrictions in place on iOS devices at the factory setup: pre-installation on Safari; placement of Safari in the “hotseat”; and default settings. This is followed by four restrictions in place on iOS for third-party apps: placement of downloaded browsers; friction changing default settings; use of prompts; and Safari cannot be uninstalled. The requirement for all browsers to be built on WebKit does not appear in these lists of restrictions, but this limits the ability of browsers to innovate and improve their browsers - including by bringing their features and innovations on other platforms to iOS users. This directly impacts user choice by shaping the product third-party browsers are able to provide to users and their ability to differentiate these products.

Verian Research

As noted in our response to Working Papers 1 to 3, Mozilla strongly supports the use of in-depth user research to inform policy interventions.

Mozilla would like to underscore that the Verian research found that, among respondents who indicated a preference for a browser, 38% said that access to saved information (like bookmarks, passwords) was important.¹⁸ However, browsing information like history, bookmarked sites, and cookies is not accessible to third-party browsers on iOS or Android, and there’s no API to allow this data to be imported.¹⁹

Working Paper 5 rightly considers the fact that certain characteristics that may make consumers susceptible to certain choice architecture practices. This included the finding (which is consistent with other research) that older people, those with low educational attainment and those with lower household incomes expressed lower self-assessed technical confidence in relation to downloading and using a different web browser on their smartphone and in relation to changing the default browser. However, we would highlight that the Verian survey also indicates there is a consistent confidence and knowledge gap for women.²⁰ In practice, this means that self-preferencing in online choice architecture is likely to exacerbate impact on such groups:

¹⁷ Working Paper 5, paragraph; Mozilla’s [Platform Tilt](#) repository

¹⁸ Working Paper 5, paragraph 2.38(f)

¹⁹ Platform Tilt, issues [1](#), and [2](#)

²⁰ [Verian Survey Report](#), pages, 21, 24, 47, 60, 63

“...these groups may be more dependent on default factory settings and less able to exercise choice in relation to which mobile browser they use.”²¹

Default Settings Friction

Mozilla agrees that friction in the user journey to change defaults on iOS and Android “*may maintain low levels of consumer awareness and engagement in relation to choice of browsers and reinforce the strong positions of Safari and Chrome.*”²² The frictions on iOS discussed in Working Paper 5 are consistent with our own recent qualitative research. We found that the experience of changing the default browser via the main operating system settings is often difficult for people. In particular, the lack of a central point in the settings menu to change the default browser, confusion with menu titles and settings navigation, hidden menu options, and search dead-ends create barriers for consumers.

Apple submitted to the CMA that it does not use “hassle factors” and that the user journey to change default settings is not complex.²³ Yet, this is evidently not the case in the context of browsers: in addition to the other practices deployed by Apple to undermine user choice, Figures 3.4 to 3.6 captured by the CMA show clear use of harmful design practices by Apple. Through hiding the Default Browser App setting within Safari when it is set to default and restoring it when Safari is not the default, Apple is deliberately blocking user switching through default settings (which are already difficult to navigate and differ from the model on other platforms, including MacOS).

This tactic is also relevant for paragraph 5.4(b) of Working Paper 5 states that, “*After the point of device set up on iOS devices, users face additional friction in the user journey for changing default settings because Safari is set as the default browser.*” However, it should be noted that this friction is not only “because Safari is set as the default browser.” It is also because Apple is deliberately hiding important menu information from people attempting to exercise this choice.

Despite the seriousness of this particular action, Mozilla would encourage the CMA to focus more broadly on choice architecture and design practices which seek to make it difficult for people to switch their default browser. There will always be an incentive for operating systems to preference their own browsers to the detriment of independent competitors like Firefox. Tackling this issue at its root will be far more effective than seeking to address each instance/type of harmful design, self-preferencing or complex default settings after the fact.

²¹ Working Paper 5, paragraph 2.37

²² Working Paper 5, paragraph 1.7(b) and (d)

²³ Working Paper 5, paragraph 3.45