

# **MOBILE BROWSERS AND CLOUD GAMING MARKET INVESTIGATION**

**WP5: The role of choice architecture on  
competition in the supply of mobile  
browsers**

05 July 2024

This is one of a series of consultative working papers which will be published during the course of the investigation. This paper should be read alongside the [Issues Statement](#) published on 13 December 2022 and other working papers published.

These papers do not form the inquiry group's provisional decision report. The group is carrying forward its information-gathering and analysis and will proceed to prepare its provisional decision report, which is currently scheduled for publication in October 2024, taking into consideration responses to the consultation on the Issues Statement and responses to the working papers as well as other submissions made to us.

Parties wishing to comment on this paper should send their comments to [browsersandcloud@cma.gov.uk](mailto:browsersandcloud@cma.gov.uk) by **29<sup>th</sup> July 2024**.

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The Competition and Markets Authority has excluded from this published version of the working paper information which the inquiry group considers should be excluded having regard to the three considerations set out in section 244 of the Enterprise Act 2002 (specified information: considerations relevant to disclosure). The omissions are indicated by [✂]. Some numbers have been replaced by a range. These are shown in square brackets. Non-sensitive wording is also indicated in square brackets.

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## Appendix

A. Google's agreements with device manufacturers and their impact on android choice architecture

# 1. Introduction

- 1.1 Choice architecture describes the environment in which users act and make decisions, including the presentation and placement of choices and the design of interfaces.<sup>1</sup> This involves firms making decisions about how to present information and choices to their users on the relevant user interface.
- 1.2 Specific choice architecture practices can have either positive or negative effects on consumer behaviour. For example, firms can use different choice architecture practices to create smooth user journeys or display relevant information prominently. However, choice architecture can also be used in ways that prevent consumers from finding the best deals and switching between providers and has the potential to weaken competition.<sup>2</sup>
- 1.3 In this paper, we consider whether Apple and Google's use of choice architecture for mobile browsers on smartphones reduces user awareness, engagement and choice, which in turn may reinforce the position of their own browsers and browser engines.<sup>3</sup>
- 1.4 In particular, we focus on the following six choice architecture practices, including:
  - (a) Pre-installations of browsers in the factory settings and installations of alternative browsers;
  - (b) Placement of browsers on a mobile device home screen in the factory settings;
  - (c) Default browsers settings at the factory setup and after purchase of a mobile device;
  - (d) Friction in the user journey to change default browsers;
  - (e) Prompts and push notifications to switch or change default browser settings;
  - (f) The ability of users to uninstall a pre-installed browser.
- 1.5 These choice architecture practices mean that consumers may make less effective choices about which browser to use on their mobile device, or experience difficulty or friction in exercising choice between the use of different browsers. Overall, this means that fewer consumers are likely to switch between browsers; and therefore drive browser competition.

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<sup>1</sup> As defined in Fletcher, A. (2023) [Choice architecture for end users in the DMA](#), p. 5.

<sup>2</sup> See CMA [Evidence Review of Online Choice Architecture](#), paragraph 1.6 for a detailed review of the impact of online choice architecture on consumer choice and competition.

<sup>3</sup> As outlined in the [Issues statement](#) for this Market Investigation Reference, paragraph 45



- 1.6 The CMA's Mobile Ecosystem Market Study (MEMS) found that several aspects of the design and layout of the user interface on mobile devices may encourage the use of Chrome and Safari.<sup>4</sup> For example, Apple's iPhones and iPads come with Apple's Safari browser pre-installed, and mobile devices using the Android operating system generally come with Google's Chrome browser pre-installed alone or with another browser (eg Samsung Internet).
- 1.7 To examine this further, we developed the following hypotheses to provide a framework for our investigation:
- (a) Apple's control of choice architecture on iOS (eg the initial pre-installation placement and pre-set default setting for browsers included in the factory settings for devices on first use) may increase barriers to entry and expansion for other browser vendors and further reinforce Safari's very strong position on iOS (see paragraphs 3.1 to 3.6).
  - (b) Apple's use of certain choice architecture practices on iOS (eg friction in the user journey to change defaults, prompt for switching and ability to uninstall Safari after the point of device set up) may maintain low levels of consumer awareness and engagement in relation to choice of browsers and reinforce Safari's very strong position on iOS (see paragraphs 3.7 to 3.72).
  - (c) Google's control of choice architecture on Android via agreements with Original Equipment Manufacturers (OEMs) may increase barriers to entry and expansion (eg the initial pre-installation placement and pre-set default setting for browsers included in the factory settings for devices on first use) for other browser vendors and further reinforce Chrome's very strong position on Android (see paragraphs 4.1 to 4.10).
  - (d) Google's use of certain choice architecture practices on Android (eg friction in the user journey to change defaults, prompt for switching and ability to uninstall Chrome after the point of device set up) may maintain low levels of consumer awareness and engagement in relation to choice of browsers and reinforce Chrome's very strong position on Android (see paragraphs 4.11. to 4.75).
- 1.8 We have considered these hypotheses alongside other key issues in this investigation, including:
- (a) The overview of the nature of competition in mobile browsers (see 'WP1 – Nature of competition in the supply of mobile browsers and browser engines');

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<sup>4</sup> MEMS, [Final Report](#), paragraph 2.27

- (b) The WebKit restriction forcing mobile browsers on iOS to use Apple’s own browser engine (see ‘WP2 - The requirement for browsers operating on iOS devices to use Apple’s WebKit browser engine’);
- (c) Apple’s restrictions on the functionality other browsers can access on iOS compared to Safari (see ‘WP3 - Access to browser functionalities within the iOS and Android mobile ecosystems’); and
- (d) Implementations of in-app browsing on Android and iOS (see ‘WP4 - In-app browsing within the iOS and Android mobile ecosystems’).

1.9 This paper includes a preliminary analysis of a range of evidence including responses to requests for information from Apple and Google (including section 174 notices)<sup>5</sup> and a number of third parties (browser vendors and OEMs), consumer research (both qualitative and quantitative) commissioned from Verian by the CMA<sup>6</sup>, evidence from CMA’s MEMS report and available literature from the academic and public domain.

1.10 The remainder of this paper is structured as follows:

- (a) Section 2 provides an overview, in general terms, of six key practices relevant to choice architecture on mobile browsers and the potential impact these have on user awareness, engagement and choice.
- (b) Section 3 presents the evidence gathered so far in relation to Apple’s use of choice architecture through these six practices.
- (c) Section 4 describes the evidence gathered so far in relation to Google’s use of choice architecture through these six practices.
- (d) In Section 5 we summarise our emerging thinking on the impact of choice architecture on competition and consumers in mobile browsers.
- (e) Appendix A covers Google’s agreements with OEMs.

1.11 This paper and responses to it will form part of our assessment of whether or not there is an adverse effect on competition in the relevant market.

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<sup>5</sup> Section 174 notices are the means through which the CMA formally requests information from parties under the UK Enterprise Act 2002.

<sup>6</sup> Source: Verian Group UK (2024), Mobile Browsers Qualitative Consumer Research and Mobile Browsers Quantitative Consumer Research.

## 2. Background

### Choice architecture in mobile browsers

- 2.1 Mobile browsers are applications that enable users of mobile devices to access and search the world wide web and interact with content online. Browsers rely on browser engines to render or transform web page source code into content that users can engage with. A separate paper published in this market investigation entitled 'WP1 – Nature of competition in the supply of mobile browsers and browser engines' provides an overview of competition in mobile browsers and presents emerging thinking on the market definition.<sup>7</sup>
- 2.2 Browsers also comprise a branded user interface (UI), which is responsible for user-facing functionality. The UI is an integral element of browser choice architecture that users interact with when they open their browser app, but the choice architecture of the operating system also plays a role in how users make choices.
- 2.3 On mobile devices, users are presented with choice architecture which affects the presentation and placement of browsers and the design of choices that a user may make between different browsers. Some form of choice architecture is inevitable as users need to access and open browsers to access the web on their mobile devices, and developers and manufacturers need to make decisions about how to present apps and settings.
- 2.4 Choice architecture can be used to design environments that optimise user experience and help consumers make decisions that are in their best interest. However, it can also be used to design interfaces that steer users towards particular choices eg between different browser vendors, operating system providers, device manufactures and in some cases app developers. This, in turn, may create barriers to competition and enable firms to maintain/strengthen strong market positions without competing on the firms' merits.<sup>8</sup>
- 2.5 The CMA's MEMS report found that Apple and Google exert substantial control over the iOS and Android ecosystems respectively,<sup>9</sup> allowing them to implement choice architecture practices that potentially self-preference their own products and services.<sup>10</sup> These practices include pre-installation and default setting of apps, as well as default settings and user journeys built into the operating system.<sup>11</sup>

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<sup>7</sup> 'WP1 – Nature of competition in the supply of mobile browsers and browser engines'

<sup>8</sup> [Evidence Review of Online Choice Architecture and Consumer and Competition Harm \(publishing.service.gov.uk\)](https://publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/674442/evidence-review-online-choice-architecture-and-consumer-and-competition-harm.pdf); paragraph 1.5

<sup>9</sup> MEMS [Final report](#), p.12

<sup>10</sup> MEMS [Final report](#), p. 199, paragraph 6.65

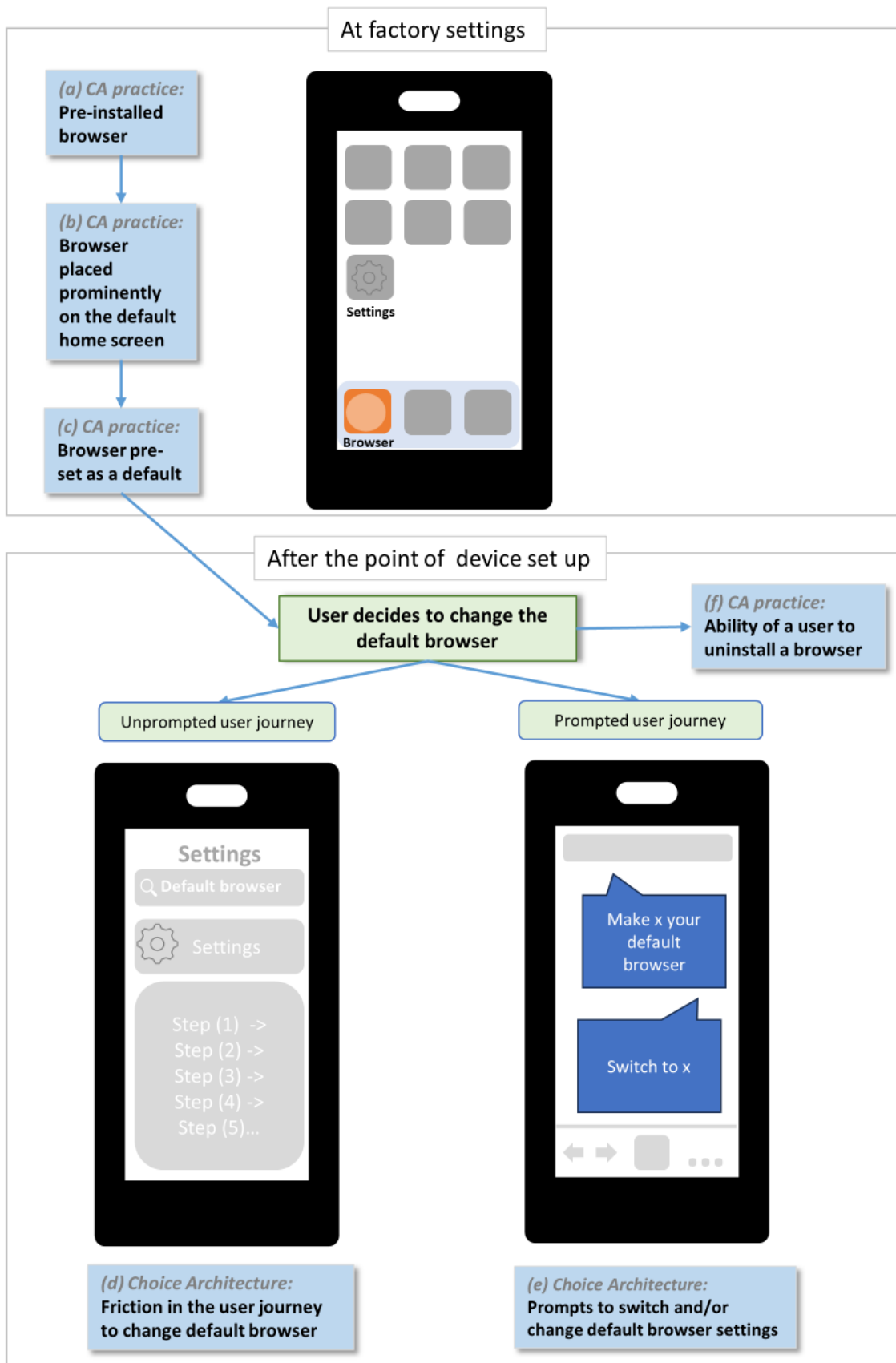
<sup>11</sup> MEMS [Final report](#), p.197-200

2.6 In the following section, we provide an overview of six key practices that are relevant in relation to choice architecture and use of browsers. We also set out the evidence on user awareness, engagement and choice. In addition, we briefly describe the relationship between choice architecture across browser and search applications. Each of these six choice architecture practices may adversely impact consumer choice and engagement, although where they exist in combination, this may further amplify their effect.<sup>12</sup> We visualise the six key practices using Figure 2.1 below, to enhance the understanding of these practices and their effects in mobile ecosystems.

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<sup>12</sup> [Online Choice Architecture - How digital design can harm competition and consumers - discussion paper \(publishing.service.gov.uk\)](https://publishing.service.gov.uk), p. 6.

Figure 2.1: Visualisation of six choice architecture practices in mobile browsers.



Source: Illustration created by the CMA.

## (a) Pre-installations of browsers in factory settings

- 2.7 In this paper, 'pre-installation' refers to browsers that have been installed on a mobile device at point of purchase, such that they are available for users 'out-of-the-box'. Pre-installations can be viewed as a type of a default linked to the device operating system set up.
- 2.8 Pre-installations carry some benefits to users, minimising effort because users do not have to make an active choice at the device set up stage and instead have the option to use their device and additional functionality out-of-the-box.<sup>13</sup> However, pre-installed applications may lead to user inertia,<sup>14</sup> where users never make an active choice about the browser they prefer and thus use the readily available browser on the device. Users may believe that browsers are pre-installed on mobile devices because they are endorsed or recommended<sup>15</sup> by the device manufacturer because they provide a better user experience, which may not be the case.
- 2.9 Pre-installed browsers may benefit from the status-quo effect,<sup>16</sup> where, once a decision is made to adopt the low-effort option of the pre-installed browser, users do not revisit that decision.<sup>17</sup> There may also be an 'endowment' effect,<sup>18</sup> where users might place more value on the browser that is pre-installed than they would if it was not pre-installed or if it was downloaded at a later stage on their mobile device.<sup>19</sup>
- 2.10 In summary, pre-installation could have an impact on competition in mobile browsers, especially on third-party browsers that are not pre-installed or placed prominently on the device screen because looking for them would require additional effort and attention from users, diminishing the out-of-the-box experience.

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<sup>13</sup> MEMS [Appendix G - Pre-installation default settings and choice architecture for mobile browsers \(publishing.service.gov.uk\)](#); p. 4, paragraph 13; [Apple response to interim report](#), p.32 paragraph 101.

<sup>14</sup> 'Inertia' refers to a behavioural tendency to do nothing or make no changes. For example, see Marzilli Ericson (2020) [When consumers do not make an active decision: Dynamic default rules and their equilibrium effects](#). *Games and Economic Behaviour*, 124, pp. 369-385.

<sup>15</sup> [Online Choice Architecture - How digital design can harm competition and consumers - discussion paper \(publishing.service.gov.uk\)](#), p. 33

<sup>16</sup> A behavioural bias whereby people have a preference for maintaining the current status, even if it is suboptimal. An early investigation by Samuelson and Zeckhauser (1988) found evidence of status quo bias in decision making ([Status quo bias in decision-making](#). *Journal of Risk and Uncertainty*.1. pp.7-59). See also Godefroid, ME., Plattfaut, R. & Niehaves, B. (2023). [How to measure the status quo bias? A review of current literature](#). *Manag Rev Q* **73**, pp. 1667–1711.

<sup>17</sup> As described in Fletcher, A. (2023) [Choice architecture for end users in the DMA](#), p.9

<sup>18</sup> A behavioural bias whereby people value things they already possess more highly than things they do not own. The term was originally coined by Thaler (1980). [Towards a positive theory of consumer choice](#). *Journal of Economic Behaviour and Organisation*. 1:1, p.39-60.

<sup>19</sup> [Online Choice Architecture - How digital design can harm competition and consumers - discussion paper \(publishing.service.gov.uk\)](#), p.33

## **(b) Placement of browsers on a mobile device home screen**

- 2.11 Placement of browsers refers to the positioning of a browser on the mobile device, typically on the 'default home screen' of the device, and in many cases in the 'hotseat' on the home screen (centrally in the row of apps placed at the bottom of the home screen). Apps located in the 'hotseat' remain visible even when the user moves away from their default home screen to another screen on their device.
- 2.12 Visual salience can be an important aspect of UI design, especially for user engagement. For example, positional bias in search results can influence how many clicks a result receives, even if the result is less relevant, with users primarily focussing their attention on the top three search results in a list.<sup>20</sup> A 2022 report on Amazon consumer behaviour indicated that more than 30% of users frequently buy the first product listed in a search.<sup>21</sup>
- 2.13 Similarly, placement on the default home screen can focus user attention and minimise user effort to access applications they use frequently, requiring less navigation and creating inertia through the UI. Therefore, browsers that are placed on the home screen are likely to be more visually salient and accessible, influencing the users' likelihood of using the browser app.
- 2.14 As with pre-installation, users may believe that the browser that is placed most prominently on their mobile device is endorsed or recommended<sup>22</sup> by the mobile device manufacturer, and additionally they may be influenced by the status-quo-effect and defer to the browser placed in the hotseat without ever taking an active decision.<sup>23</sup>

## **(c) Default browser settings**

- 2.15 Default browsers refer to browsers which are set as the default on the device, such that the browser opens automatically and renders a webpage when a user clicks on a link (eg in a messaging or email service, or from another application), without needing to select the browser manually. There are two types of defaults in mobile browsers:

- (a) System default browser: a default chosen by the OS provider or device manufacturer.

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<sup>20</sup> As detailed in the following study: Rock, R., Strauss, I., O'Reilly, T. and Mazzucato, M. (2023). [Behind the Clicks: Can Amazon allocate user attention as it pleases?](#) UCL Institute for Innovation and Public Purpose, Working Paper Series (IIPP WP 2023-11); This study replicates earlier findings: e.g. Joachims, Swaminathan, and Schnabel (2017). "Unbiased Learning-to-Rank with Biased Feedback." Proceedings of the Tenth ACM International Conference on Web Search and Data Mining, pp. 781–789; [Online search: Consumer and firm behaviour - A review of the existing literature \(publishing.service.gov.uk\)](#), p.38-44

<sup>21</sup> As reported by Feedvisor (2022). "The 2022 Amazon Consumer Behavior Report." Feedvisor.

<sup>22</sup> [Online Choice Architecture - How digital design can harm competition and consumers - discussion paper \(publishing.service.gov.uk\)](#), p. 33

<sup>23</sup> Fletcher, A. (2023) [Choice architecture for end users in the DMA](#), p.9

(b) Chosen default browser: a default chosen by users.

- 2.16 As with other choice architecture practices, defaults can have benefits for users, by potentially minimising effort.<sup>24</sup> Consumers do not have to make an active choice at device set up and instead have the option to keep out-of-the-box settings.<sup>25</sup>
- 2.17 Defaults are suggested to be one of the most effective practices to influence user behaviour.<sup>26</sup> For example, evidence relating to search engine defaults from the CMA's Online Platforms and Digital Advertising Market Study ('DAMS') indicates that several search engine providers acknowledge the relationship between default status and usage.<sup>27</sup> Academic research shows that the randomly assigned default exposure to a given search engine can increase the users' perceived quality of the default search engine.<sup>28</sup> A 2019 meta-analysis of 58 default studies demonstrated a considerable influence of defaults, with the preselected default option being on average 27% more likely to be chosen out of two options, than if there was no default option.<sup>29</sup>
- 2.18 As with other choice architecture practices, there are behavioural barriers that reduce consumers' choices in the face of defaults. Users may be heavily influenced by the status quo, adopting the system default browser without ever making an active decision,<sup>30</sup> or may be influenced by the endowment effect.<sup>31</sup> Users may trust that the browser that is selected as the default is endorsed or recommended<sup>32</sup> by the device manufacturer, and in many cases may not be aware that they have the option to change their default browser.

#### **(d) Friction in the user journey for changing default browsers**

- 2.19 Friction in the user journey for changing the default browser refers to the number and/or complexity of steps involved for changing the default browser app unprompted.

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<sup>24</sup> See Ortmann, Ryvkin, Wilkening and Zhang (2023). [Defaults and cognitive effort](#). Journal of Economic Behaviour and Organisation, 212, pp. 1-19, and Smith, N. C., Goldstein, D. G., & Johnson, E. J. (2013). [Choice without awareness: Ethical and policy implications of defaults](#). Journal of Public Policy & Marketing, 32(2), 159-172, for examples of how defaults can minimise cognitive effort.

<sup>25</sup> MEMS Appendix G - [Pre-installation default settings and choice architecture for mobile browsers](#) ([publishing.service.gov.uk](#)); p. 4, paragraph 13; [Apple response to interim report](#), p.32 paragraph 101

<sup>26</sup> [Online Choice Architecture - How digital design can harm competition and consumers - discussion paper](#) ([publishing.service.gov.uk](#)), p. 33

<sup>27</sup> DAMS Appendix H: [default positions in search](#) ([publishing.service.gov.uk](#)), p.H19, paragraph 80.

<sup>28</sup> As reported in Duque, V. (2022). [The Potential Anticompetitive Stickiness of Default Applications: Addressing Consumer Inertia with Randomization](#).

<sup>29</sup> See Jachimowicz, J., Duncan, S., Weber, E., & Johnson, E. (2019). [When and why defaults influence decisions: A meta-analysis of default effects](#). Behavioural Public Policy, 3(2), 159-186 for a meta-review of the research on the effects of defaults on consumers.

<sup>30</sup> Fletcher, A. (2023) [Choice architecture for end users in the DMA](#), p.9

<sup>31</sup> Ibid.

<sup>32</sup> [Online Choice Architecture - How digital design can harm competition and consumers - discussion paper](#) ([publishing.service.gov.uk](#)), p. 33



2.20 In the case of browsers, complexity or friction involved in the process for changing their default browser may deter users from doing so, increasing the usage of the browser that has been pre-installed and set as the initial default on the device.

### **(e) Prompts and push notifications to switch or change default browser settings**

2.21 Prompts and push notifications refer to pop-ups or screens encountered by users (for example, on launching a browser app) which encourage the users to either download a new browser app or set a particular browser as the default.

2.22 Push notifications are not triggered by the user's activity. They appear on the device's notification bar (ie top of the screen) and can be sent even if the app is not actively open. Push notifications do not require immediate action from the user and can be interacted with later. The users can receive system-level and/or app-level push notifications. System-level push notifications are generated by the operating system providers while app-level push notifications are generated by app developers. In contrast, prompts are usually context-specific and related to the user's current activity (eg opening a link from an email application). Prompts require immediate action from the user to proceed. Usually, prompts appear as a window that blocks other interactions until the user responds (acts upon or dismisses the prompt).

2.23 Prompts can minimise user effort because they offer an easier route for switching browsers. However, by interrupting the user and nudging them to either switch or try an alternative browser, prompts can increase the burden on users and reverse a decision a user has made previously. Prompts may require users to take immediate action (known as 'forced action').<sup>33</sup> As a result, prompts may adversely impact the users' browsing experience and may lead them to accidentally making less effective choices.<sup>34</sup>

### **(f) The ability of users to uninstall pre-installed browsers**

2.24 In some cases, uninstalling a browser app is restricted on a mobile device, so the user can only disable or remove the app from the home screen, but not uninstall it from the device. These restrictions on a user's ability to uninstall an app could be seen as a type of 'forced action' which limit users' control and ability to exercise effective choice. It also might allow OS providers to self-preference their own apps over rival browser apps.

2.25 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

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<sup>33</sup> According to research commissioned by the Swedish Consumer Agency: [Konsumentverket. \(2021\). Barriers to a well-functioning digital market Effects of visual design and information disclosures on consumer detriment.](#)

<sup>34</sup> As suggested by Busch, C., & Fletcher, A. (2024). [Harmful Online Choice Architecture.](#) Centre on Regulation in Europe, p. 10.

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. Users may also believe that there may be a functional reason as to why they cannot uninstall a browser, potentially reinforcing the impression that the pre-installed browser is the recommended browser and therefore should be used.

## **User awareness, engagement and choice in relation to mobile browsers**

- 2.26 Overall, the consumer research indicates a low level of user awareness, engagement and choice in relation to the use of mobile browsers.
- 2.27 In the following section we examine five indicators of consumer demand in the mobile browser markets. They are:
- (a) User awareness.
  - (b) User comprehension and knowledge.
  - (c) User engagement.
  - (d) User preferences and habits.
  - (e) Switching between the Android and iOS ecosystems.
- 2.28 To inform the market investigation the CMA commissioned Verian (formerly Kantar Public) to conduct primary research with smartphone users<sup>35</sup>. The Verian consumer research comprised two phases: a qualitative phase to explore consumer awareness, understanding and behaviour in relation to browsers and in-app browsers; and a quantitative phase to assess the degree of consumer awareness, understanding and behaviour related to browsers and in-app browsers, with a specific focus on choice architecture elements.
- 2.29 The qualitative research comprised 40 in-depth interviews and observations of participants undertaking a number of set tasks on their mobile, including downloading a browser and changing the default browser. The research was designed to include a range of participants with regard to operating system, age and technical confidence. Participants answered questions in relation to their technical confidence – self-assessing their confidence in downloading an app and changing the settings on an app – and quotas were set to ensure a range of technical confidence. The final sample comprised 30 participants with self-assessed high confidence, 2 with medium confidence and 8 with low confidence. Half of the participants had previously downloaded a browser. The inclusion of

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<sup>35</sup> Source: Verian Group UK (2024), Mobile Browsers Qualitative Consumer Research and Mobile Browsers Quantitative Consumer Research.

participants with lower levels of self-assessed confidence enabled exploration of how potentially more vulnerable users navigated browsers on their smartphones.<sup>36</sup>

- 2.30 The quantitative phase comprised a consumer survey with a representative sample of UK smartphone users drawn from an online panel that used a random probability-based approach to recruitment.<sup>37</sup> The survey collected respondent information that allows us to assess potential vulnerability along a number of dimensions. These were data on respondents' age, household income, education, whether they had a cognitive, physical health or mental health condition.
- 2.31 The research explored various dimensions of digital capability, including: self-assessed technical confidence; observed technical ability (qualitative research only); tested knowledge about browsers; and previous experience with managing browsers. While the latter three dimensions – observed technical ability, tested knowledge and self-assessed technical confidence – contain a strong degree of reliability, there are some limitations to self-assessed technical confidence which suggest that this measure should be interpreted with a degree of caution. In particular, the qualitative research which involved observed tasks demonstrated that confidence did not always translate into ability to do the task in practice.
- 2.32 Pre-testing on the survey revealed that some lower ability users rated themselves relatively highly as they focused their confidence on a narrow range of tasks which they were familiar with.
- 2.33 Self-assessed technical confidence in undertaking a task was not always based on experience. To illustrate, among survey respondents who had expressed high confidence in changing a default browser,<sup>38</sup> just 33% had actually done so.<sup>39</sup>
- 2.34 The findings from Verian consumer research have been included where relevant in our working paper as they inform our considerations of the theories of harm being considered. The qualitative interviews and quantitative consumer survey provide original data to inform the evaluation of the impact of choice architecture practices on competition in mobile browsers. In the remainder of this paper, we refer to the quantitative consumer survey conducted by Verian as the 'Verian survey' and refer

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<sup>36</sup> Qualitative consumer interviews sought to explore consumer understanding and language to examine behaviour and attitudes in depth, as well as to inform the design of the quantitative consumer survey. The 40 interviews lasted around 60 minutes and were conducted between 19 January and 16 February 2023.

<sup>37</sup> Quantitative consumer survey aimed to assess the degree of consumer awareness, understanding and behaviour as it related to browsers, with a specific focus on choice architecture elements. A survey of 3,060 UK adults aged 16+ who owned a smartphone for personal use was conducted in the period between 13 March and 8 April 2024.

<sup>38</sup> Respondents were asked whether they could work out how to change their default browser. (Definitely/Probably/Probably not/Definitely not).

<sup>39</sup> More widely, there can be a tendency in surveys for people to overstate their level of confidence, including the potential for respondents to be overconfident in their ability to complete tasks, without having the applied skills or competence (known as the Dunning Kruger effect. The Dunning Kruger effect is a cognitive bias in which people wrongly overestimate their knowledge or ability in a specific area).

to the qualitative interviews conducted by Verian as the ‘Verian qualitative research’.

- 2.35 In our reporting of this research, we acknowledge there are some limitations in the use of self-assessed data in relation to some of the issues relevant to choice architecture, where user awareness is low and recollection may be incomplete. Moreover, there is evidence, from anomalous responses to a small number of survey questions, that some respondents were confused about their browsers; typically, older respondents and those with lower self-assessed technical confidence. Whilst Verian cognitively tested the questionnaire with participants with lower self-assessed levels of technical confidence and amended the questionnaire to address any areas of confusion, there remains a risk of misunderstanding, and the risk is greater where the subject matter is technically complex. In addition, the majority of survey respondents did not have first-hand experience of activities such as changing default browsers. These limitations are noted where they are relevant to the data we are reporting. The data from the Verian consumer research has also been compared with the evidence we received from the main and third parties as well as published research from third parties and we have indicated where the Verian data is not aligned with other sources.
- 2.36 We also draw upon previous evidence gathered for the CMA’s MEMS report<sup>40</sup> as well as available international literature, including the Australian Competition and Consumer Commission (ACCC) study commissioned from Roy Morgan to explore consumer views of web browsers and search engines.<sup>41</sup>
- 2.37 In the analysis below, we have considered certain characteristics that may make consumers susceptible to certain choice architecture practices. While 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 on their smartphone was high among survey respondents, there were nevertheless subgroups who were notably less confident. These include older people, those with low educational attainment and those with lower household incomes. As a consequence, these groups may be more dependent on default factory settings and less able to exercise choice in relation to which mobile browser they use. Those with a physical health condition were also more likely to lack confidence with managing browser settings, however, we note that those with a physical health condition were significantly older than those without so it is likely that the relationship here is a function of age, rather than physical difficulties per se.

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<sup>40</sup> MEMS [Final Report](#).

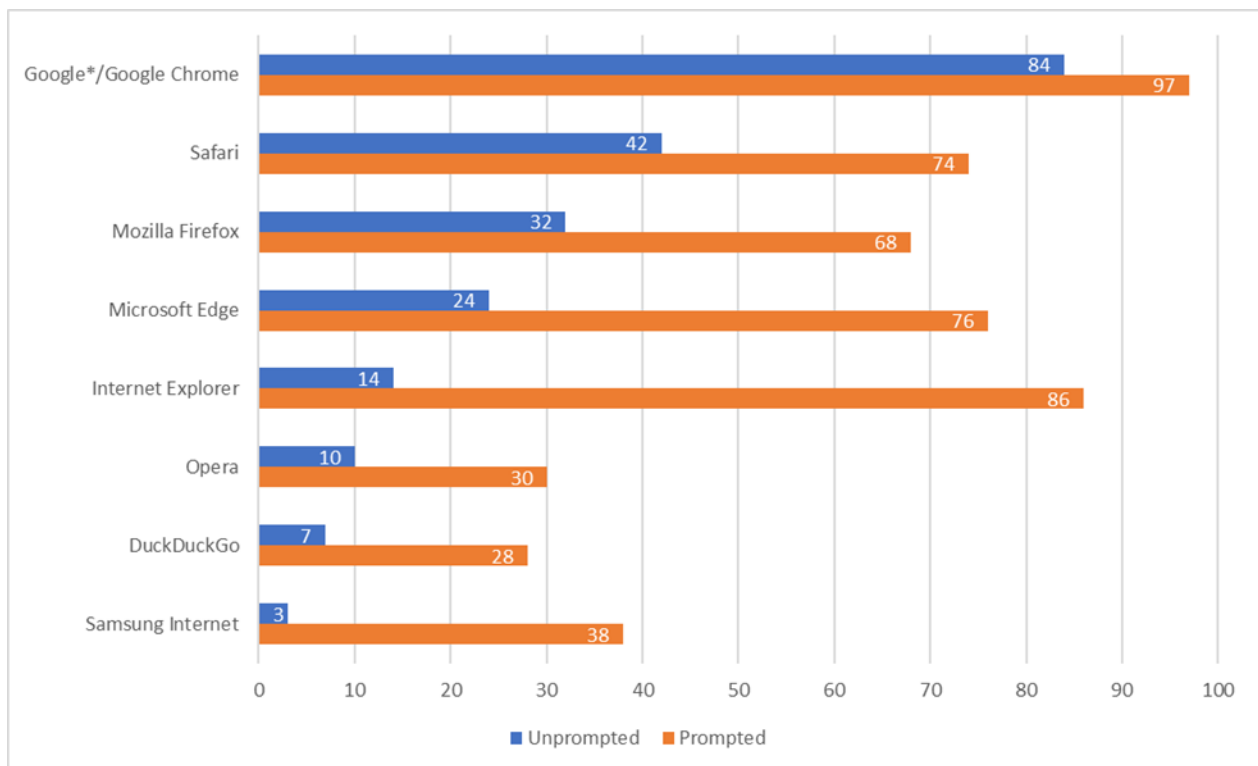
<sup>41</sup> Source: [Australian Competition and Consumer Commission \(ACCC\). Consumer views and use of web browsers and search engines. Final report](#). Published: September 2021.

## User awareness of mobile browsers

2.38 Across the Verian survey and the Verian qualitative research **we found low levels of awareness of the less used browsers, particularly outside the leading mobile browser brands.**

- (a) Respondents to the Verian survey, when asked to list smartphone browsers they had heard of without prompting ('unprompted awareness'), were able to name on average 2.5 web browsers. Around 1 in 10 respondents were unable to name any browsers (9% of iOS users and 13% of Android users). At the other end of the distribution, 10% of iOS users and 13% of Android users were able to name five or more browsers in response to this question.<sup>42</sup> Figure 2.2, displays spontaneous and prompted awareness figures for all browsers where at least 4% of respondents named spontaneously.

**Figure 2.2: Percentage of Verian survey respondents who have heard of each browser, both unprompted and prompted with a list of 15 leading browsers.**



Source: Verian Group UK (2024) Mobile Browsers Quantitative Research Data Tables.

Note: *browspont* – which web browsers have you heard of? *browprompt* – Now please look at the list below, and answer again using this list. Before today, which if any of these browsers had you heard of? (N = 3,060). To note: \*For the spontaneous awareness question 'Google' responses were coded as 'Chrome'. The tendency for some respondents to conflate search engines with browsers (see below) may have increased the spontaneous awareness figure for Chrome.

- (b) The Verian survey demonstrated that, when presented with a list of 15 of the most popular web browsers and asked which they had heard of (prompted

<sup>42</sup> Verian Group UK (2024) Mobile Browsers Quantitative Research, slide 31.

awareness), respondents recognised on average 5.2 web browsers.<sup>43</sup> As with unprompted awareness, Chrome was the most widely recognised browser (97%), with Internet Explorer and Microsoft Edge the second and third most recognised browsers (86% and 76% respectively). Safari was the fourth most recognised browser (74%) and Firefox was the fifth (68%).<sup>44</sup> Approximately 1 in 5 respondents recognised three or fewer browsers from the presented list. The pattern of responses to the prompted awareness question aligns with findings from the ACCC study (referred to at paragraph 2.36) on Australian consumers' awareness of web browsers, which found that an average of 5.3 browsers were recognised from a list of leading web browsers provided by researchers.<sup>45</sup> Both surveys found that awareness was high for certain browsers (particularly Chrome) but comparatively low for many of the alternatives.

- (c) The Verian qualitative research demonstrated that even among respondents that had high self-assessed technical confidence both in relation to downloading and using a new app on their smartphone and in relation to changing the settings for an app on their smartphone, web browsers and web search were often grouped together as one and the same. Interviewees often defined web browsers as “a way of searching the internet”. When identifying logos and their function, most users were not aware of any differences between browsers and search apps and so grouped them as one and the same. This was the case even among those who had reported high self-assessed technical confidence in relation to downloading and using a new app on their smartphone and in relation to changing the settings for an app on their smartphone.<sup>46</sup> This was corroborated by the unprompted awareness question regarding web browsers, where 12% of respondents cited search apps Bing and 7% Yahoo (see also footnote 75 and paragraph 2.49).<sup>47</sup>
- (d) In the Verian qualitative research, even when users were familiar with multiple browsers, the belief that they were largely interchangeable was widely held. Interviewees were unable to differentiate browsers in terms of their features.<sup>48</sup>
- (e) When asked why they use the web browser that they typically use, 58% of the Verian survey respondents selected responses that indicated only a slight preference for that browser (it is my preferred web browser – 32%; it was already on my phone and I chose to keep using it based on my experience – 26%). By contrast, 41% selected responses that indicated they had not

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<sup>43</sup> A test of recognition memory as opposed to recall memory when asked to remember unprompted.

<sup>44</sup> Verian Group UK (2024) Mobile Browsers Quantitative Research Data Tables, brownprompt.

<sup>45</sup> See [Australian Competition & Consumer Commission \(ACCC\), Consumer Views and Use of Web Browsers and Search Engines – Final Report](#), September 2021.

<sup>46</sup> Verian Group UK (2024) Mobile Browsers Qualitative Research, Slides 20 & 21.

<sup>47</sup> Verian Group UK (2024) Mobile Browsers Quantitative Research Data Tables, browspont.

<sup>48</sup> Verian Group UK (2024) Mobile Browsers Qualitative Research, Slide 26.

considered using another browser (it was already on my phone and I had no reason to use another one – 28%; no particular reason/never thought about it – 8%; it was already on my phone and I did not know there were other options – 5%).<sup>49</sup>

- (f) Among those respondents in the Verian survey who had selected a response indicating a preference for a browser, the most frequently stated reasons on follow up for their choice of browser were: familiarity (65%); ease of use (62%); trusted brand (42%); and same used as on other devices (39%). Reasons related to particular features of their preferred browser were less frequently selected: access to saved information eg bookmarks, passwords (38%); speed of loading webpages (27%); stability (24%); compatibility with websites/software (23%); design (19%); security features (18%); privacy features (18%); fewer adverts/pop-ups (14%).<sup>50</sup>

## User comprehension and knowledge of browsers

### 2.39 **The Verian qualitative research and the Verian survey both suggested there is confusion about the meaning of some key terms (eg pre-installation and default browser) and a lack of awareness of web browser functionality.**

- (a) The Verian qualitative research showed that although respondents had typically heard of the term ‘web browser’, those with lower self-assessed technical confidence in relation to downloading and using a new app on their smartphone and lower self-assessed technical confidence in relation to changing the settings for an app on their smartphone, tended to think of it just as the ‘internet’.<sup>51</sup>
- (b) Both the Verian survey and qualitative research demonstrate that a small number of individuals were unaware that alternative web browsers were available to them. When asked why they used the web browser that they typically used, only 5% of survey respondents stated the web browser was already on their phone and they did not know there were other options.<sup>52</sup>
- (c) The distinction between default browser and pre-installed browser was poorly understood by respondents in the qualitative research. With the exception of the respondents with high self-assessed technical confidence in relation to downloading and using a new app on their smartphone and high self-assessed technical confidence in relation to changing the settings for an app

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<sup>49</sup> Verian Group UK (2024) Mobile Browsers Quantitative Research, Slide 51.

<sup>50</sup> Verian Group UK (2024) Mobile Browsers Quantitative Research, Slide 52.

<sup>51</sup> Verian Group UK (2024) Mobile Browsers Qualitative Research, Slide 16.

<sup>52</sup> Verian Group UK (2024) Mobile Browsers Quantitative Research, Slide 51. Note that research on the psychology of attribution (the reasons people give for their actions) indicates that there is a tendency for individuals to find reasons for their behaviour post hoc that validate their behaviour. This may have reduced the number of respondents who selected either no particular reason/never thought about it (8%) or selected they did not know there were other options (5%).

on their smartphone, respondents conflated the term default with the browser that was already pre-installed on their smartphone.<sup>53</sup> Those with low self-assessed technical confidence in relation to downloading and using a new app on their smartphone and low self-assessed technical confidence in relation to changing the settings for an app on their smartphone, found the distinction confusing, in part because they had not engaged with the fact that they were using a browser or that there were alternative options available to them.<sup>54</sup>

- (d) The Verian survey included three true/false questions that tested comprehension of specific elements of web browsers (see Figure 2.3 below):
  - (i) 70% of respondents correctly stated that a web browser that is set as default at purchase could be changed. Of the remaining 30% of respondents 9% incorrectly believed that it could not be changed while 22% did not know the answer.<sup>55</sup>
  - (ii) Less than half of the Verian survey respondents (47%) understood that different apps could use different browsers. Of the remainder 13% wrongly believed that they could not use different browsers and 40% stated they did not know.<sup>56</sup>
  - (iii) Only 19% of respondents knew that when clicking on a weblink within an app it will not always open in their default browser. Among the remainder 47% incorrectly believed that it will always open in their default browser and 34% stated they did not know.<sup>57</sup>
- (e) Those with lower educational attainment, lower household incomes and lower levels of self-assessed technical confidence in relation to downloading and using a different browser on their smartphone and self-assessed technical confidence in relation to changing the default browser on their smartphone, were all less likely to understand that the default browser set when a smartphone is first purchased can be changed.<sup>58</sup>
- (f) Across all three true/false questions, older respondents, those with low educational attainment, those with lower household income and those with lower levels of self-assessed technical confidence in relation to downloading and using a different browser on their smartphone and self-assessed technical confidence in relation to changing the default browser on their

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<sup>53</sup> Note for any respondent with just a single web browser pre-installed on their phone will have this browser set as a default browser (ie system default). This is different from a chosen default where users make an active choice and select their default browser. However, we do acknowledge that pre-installations can be viewed as a form of a default.

<sup>54</sup> Verian Group UK (2024) Mobile Browsers Qualitative Research, Slide 34.

<sup>55</sup> Verian Group UK (2024) Mobile Browsers Quantitative Research, Slide 56.

<sup>56</sup> Verian Group UK (2024) Mobile Browsers Quantitative Research, Slide 56.

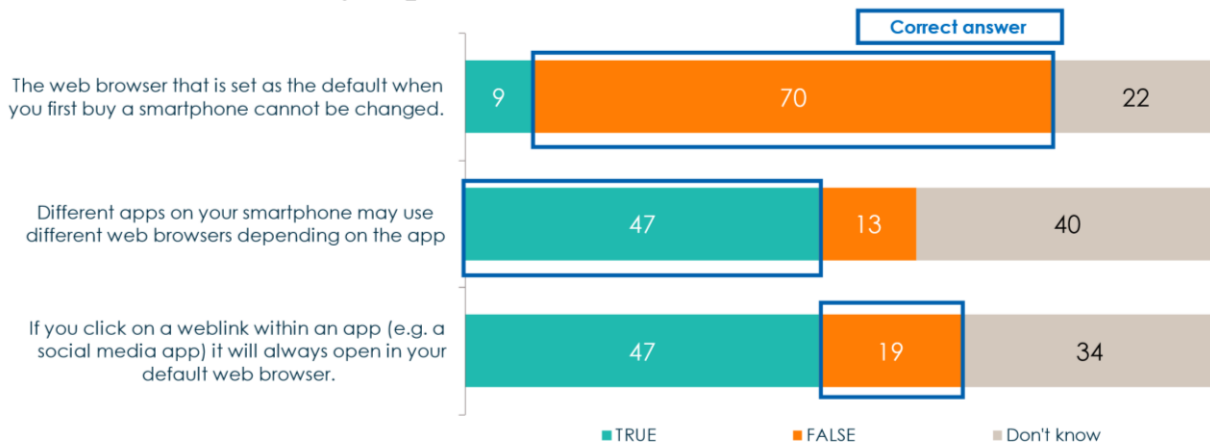
<sup>57</sup> Verian Group UK (2024) Mobile Browsers Quantitative Research, Slide 56.

<sup>58</sup> Verian Group UK (2024) Mobile Browsers Quantitative Research, Slide 57.



smartphone, were all more likely to have answered the three questions incorrectly.<sup>59</sup>

**Figure 2.3: Percentage of Verian consumer survey respondents who answered correctly each of the three true/false questions that tested comprehension of browsers.**



Source: Verian Group UK (2024) Mobile Browsers Quantitative Research, slide 56.

Note: TFGRID2 - For each of the next statements, please tell us whether you think the statement is true, false or if you are unsure either way. Total sample (3,060).

## User engagement

2.40 The Verian survey indicated that user **engagement with mobile browsers is low, as demonstrated by the number of survey respondents that had rarely or ever thought about mobile browsers.**

- (a) When asked at the end of the survey how much they had thought about the topics covered within survey before completing it, 70% stated they had rarely or never thought about it. By contrast, 7% had often thought about these topics and 23% had thought about them from time to time. Engagement with the topic of mobile browsers was slightly lower for older respondents in comparison to younger respondents and for women in comparison to men.<sup>60</sup>
- (b) Survey respondents were asked to select factors that were important to them in their choice of smartphone. Only 7% of respondents indicated that web browser availability on the device was an important factor for them. Rather, price (50%), brand (49%) and hardware features (camera (48%), battery life (48%), storage capacity/memory (47%)) were the most commonly selected reasons. Operating system was a factor for 30% of survey respondents.<sup>61</sup>
- (c) When asked why they used the browser that they typically used, 28% of survey respondents selected that it was already on their smartphone and

<sup>59</sup> Verian Group UK (2024) Mobile Browsers Quantitative Research, Slide 60.

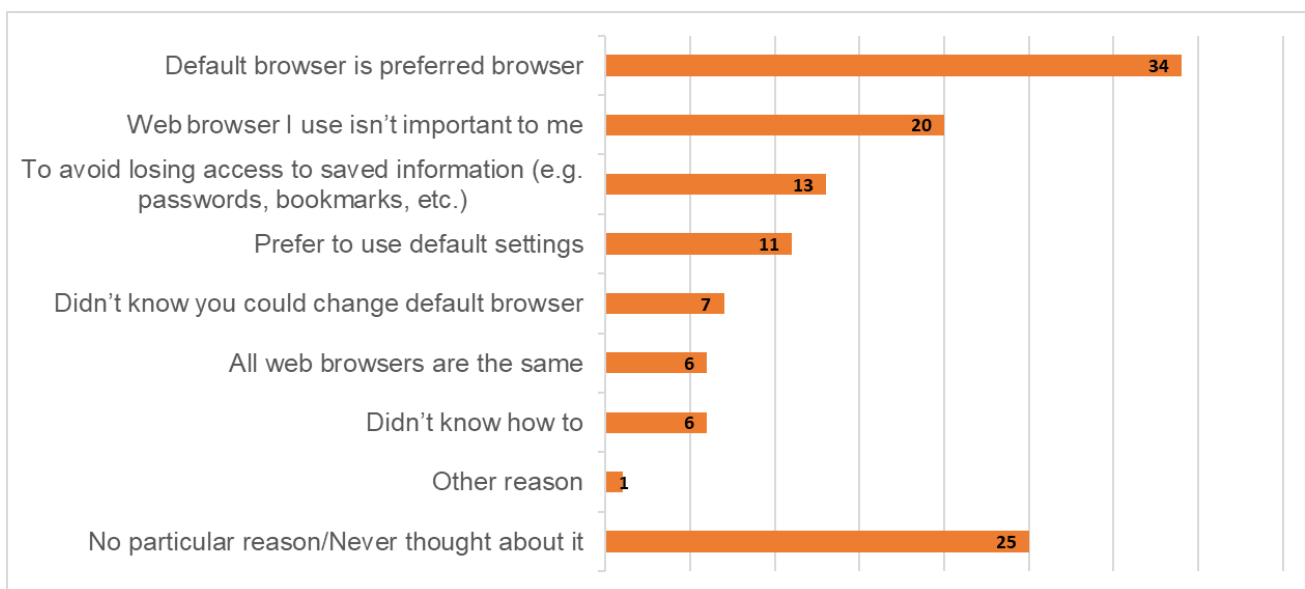
<sup>60</sup> Verian Group UK (2024) Mobile Browsers Quantitative Research, Slide 20.

<sup>61</sup> Verian Group UK (2024) Mobile Browsers Quantitative Research, Slide 36.

they had no reason to use another web browser. This figure was lower (26%) for those with high self-assessed technical confidence in relation to using a smartphone and the different apps on it than it was for those with medium or low self-assessed technical confidence (31% and 30% respectively).<sup>62</sup>

- (d) Across all survey respondents, it was found that 21% had changed the default browser on their current phone.<sup>63</sup> Of the 79% that hadn't changed default browser or couldn't remember if they had, Figure 2.4 below displays the reasons they selected on follow-up as to why they hadn't changed the default web browser. Note that 1 in 4 selected no particular reason/never thought about it,<sup>64</sup> and 6% selected 'all web browsers are the same'.<sup>65</sup>

**Figure 2.4: Among respondents who have not changed their default browser the reasons selected on follow-up as to why they had not changed default.**



Source: Verian Group UK (2024) Mobile Browser Quantitative Research, slide 68.

Note: *whynochange* – Are there any particular reasons why you have not changed default browser on your smartphone? (All who had not switched default, N = 2,390).

- (e) There was a significant difference across those with high and low 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 on their smartphone in terms of the reasons selected at follow-up as to why they hadn't changed the default browser on their current phone. Those with the highest self-assessed technical confidence were significantly more likely to select 'default web browser is my preferred browser' than those with the lowest self-assessed technical confidence (50% vs. 12% respectively). Whereas those with the lowest self-assessed technical

<sup>62</sup> Verian Group UK (2024) Mobile Browsers Quantitative Research, Slide 52.

<sup>63</sup> Verian Group UK (2024) Mobile Browsers Quantitative Research, Slide 65.

<sup>64</sup> iOS users were more likely to say the web browser I use is not important to me - 24% vs 16% of Android users.

<sup>65</sup> Verian Group UK (2024) Mobile Browsers Quantitative Research, Slide 65.

confidence were significantly more likely to select 'I didn't know you could change the default browser' (15% vs 1% of the high technical confidence group), 'I didn't know how to do this' (21% vs. 0% of the high technical confidence group), and 'no particular reason to change/Never thought about it' (40% vs. 18% of the high technical confidence group).<sup>66</sup>

## User preferences and habits

- 2.41 Both the Verian survey and the Verian qualitative research asked respondents about their preferences for browsers compared with apps, the importance of browser availability in their choice of mobile smartphone and their reasons for switching default browser, if they had done so. **Overall, users tended to stick with their pre-installed browser and only a minority of respondents switched their default browser.**
- 2.42 Although only 7% of respondents in the Verian survey indicated that availability of a particular browser was an important factor in their choice of phone, there was nevertheless a strong effect of pre-installation on the choice of browser that respondents reported typically using. Among iOS users 72% predominantly used Safari (the pre-installed browser), whereas on Android, 77% of users are predominantly using Chrome (a pre-installed browser on most Android devices sold in the UK).<sup>67</sup>
- 2.43 The ACCC study (referred to at paragraph 2.36 above) found a similar pattern of browser usage where 67% of iPhones users were mainly users of Safari; 67% of Samsung users and 79% of users of other Android devices were found to mainly use Chrome.<sup>68</sup>
- 2.44 Both the Verian survey and qualitative research showed a preference for native apps over browsers. When asked if they prefer to download and use an app or visit a website on their smartphone, 60% of survey respondents stated a preference for downloading an app. By contrast 15% would prefer to visit a website. This pattern of preference for apps over websites was more pronounced for younger respondents than older respondents (74% of 16-24 year-olds prefer an app compared to 44% of over 65s).<sup>69</sup>
- 2.45 As reported in 2.39(d), the Verian survey found that 21% of respondents had changed the default browser on their current phone. Android users were almost twice as likely to have changed default browser as iOS users (27% vs 14%).<sup>70</sup>

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<sup>66</sup> Verian Group UK (2024) Mobile Browsers Quantitative Research, Slide 70.

<sup>67</sup> Verian Group UK (2024) Mobile Browsers Quantitative Research, Slide 40.

<sup>68</sup> Source: [Australian Competition and Consumer Commission \(ACCC\). Consumer views and use of web browsers and search engines. Final report](#), p10. Published: September 2021.

<sup>69</sup> Verian Group UK (2024) Mobile Browsers Quantitative Research, Slide 39.

<sup>70</sup> Verian Group UK (2024) Mobile Browsers Quantitative Research, Slide 65.

When asked to select reasons why they switched default browsers, reasons selected by more than 10% of respondents were as follows:<sup>71</sup>

- (a) 51% said it was because of preference for a specific browser
- (b) 45% said it was because they wanted to use the same browser as they used on another device
- (c) 30% wanted to be in control of how they access the internet
- (d) 29% did not like using the default browser on their smartphone

2.46 Those respondents who had high self-assessed technical confidence in relation to using a smartphone and the different apps, were more likely to have switched default browser than those who had medium or low self-assessed technical confidence, though this effect was not as pronounced as we might expect. Just 25% of the high self-assessed technically confident users had switched compared with 17% of the medium self-assessed technically confident users and 11% of the low self-assessed technically confident users.<sup>72</sup>

### **User switching between (iOS and Android) and within the operating systems (Android)**

2.47 Evidence from the Verian survey indicated **low levels of switching between iOS and Android devices. There were slightly higher rates of switching within the same operating system (eg brands of Android devices).**

- (a) The Verian survey showed that among respondents with Android devices, 92% of respondents stated that their previous device was also an Android phone. Of the remainder, 3% had switched from an iPhone and for 3% their current phone was their first smartphone.<sup>73</sup>
- (b) Among iOS users, 90% of respondents stated that their previous model was also an iPhone, 9% had switched from an Android device and for 1% this was their first smartphone (see Figure 2.5. below).
- (c) It was much more common for Android users to have switched from another brand of Android phone (26%) than to have switched from an iPhone (3%).

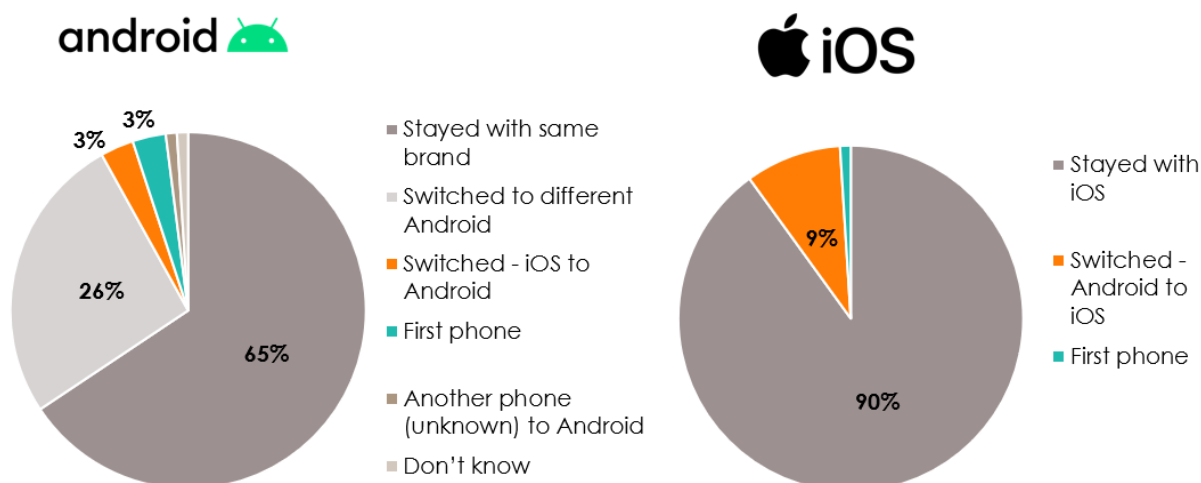
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<sup>71</sup> Verian Group UK (2024) Mobile Browsers Quantitative Research, Slide 68. Note that respondents were able to select multiple reasons.

<sup>72</sup> Verian Group UK (2024) Mobile Browsers Quantitative Research, Slide 66.

<sup>73</sup> Verian Group UK (2024) Mobile Browsers Quantitative Research, Slide 16.

**Figure 2.5: Percentage of Verian consumer survey respondents who have stayed with the same operating system provider or switched to a different operating system.**



Source: Verian Group UK (2024) Mobile Browsers Quantitative Research, slide 14.

Note: premob - Now thinking about the smartphone you used before you [bought/got] your current personal smartphone, was that the same brand you have now or a different brand? (If different brand) premobcnfirm – Which of the following smartphone brands was your previous smartphone? All (n=3,060), Android (1,455), iOS (1,536).

- (d) This pattern of results was consistent with the consumer survey evidence commissioned for and reviewed in the MEMS report.<sup>74</sup> There it was reported that 8% of iPhone users had switched from an Android device and 5% of Android users had switched from iPhone.

## Choice architecture across search and browser applications

2.48 The focus of this working paper is on the choice architecture relating to browser apps on mobile devices. However, browser choice architecture is only one part of the wider choice architecture of applications and services on a device. Therefore, user awareness of, and response to, choice architecture practices in relation to browsers may be influenced by choice architecture practices in other areas of the mobile ecosystem.

2.49 In particular, choice architecture for browsers is intrinsically linked to search engines, with the search engine being a key entry point for exploring the web through a browser. For example, browser apps usually have a search engine URL as the launch page (ie the first page upon opening the browser and when a new tab is opened), and the search bar in the browser is a key point for navigation within the browser window. Awareness and understanding of the difference between a browser and a search engine is low, with only a minority of users being

<sup>74</sup> MEMS [Appendix D – Barriers to switching between mobile operating systems \(publishing.service.gov.uk\)](#); p. 1, paragraph 1.

able to name a search engine and some users believing that browser and search engine serve the same functions.<sup>75</sup>

- 2.50 Google's search engine and related advertising business account for the majority of the company's revenue – one avenue to increase user engagement with its search engine is by providing multiple access points to search, one of those being the Chrome browser.<sup>76</sup>
- 2.51 On Android devices, Google has entered into agreements with OEMs, to enable the pre-installation, prominent placement and default setting of Google Search and Chrome. As discussed in section 5 of this working paper, these agreements have substantial impact on the choice architecture for mobile browsers on Android devices.
- 2.52 These agreements also influence the accessibility and visibility of different search engines available on mobile browsers. As noted in Appendix A (see section 7.2), various Placement Agreements (PAs) and Revenue Sharing Agreements (RSAs), OEMs can earn financial incentives (as, for example, per-device activation payments, a share of Google's search revenues, or lump sum incentive payments) by fulfilling terms relating to Google Chrome as a search access point, underscoring the link between browser and search engine.
- 2.53 Furthermore, there is also choice architecture for Google's products and services on iOS devices. [REDACTED].<sup>77</sup>
- 2.54 Consumers are very unlikely to be aware of the mechanisms that have led to the installation and placement of Google Chrome and Search apps on their devices.
- 2.55 As set out in the Issues Statement published, the focus of this market investigation is the supply of mobile browsers and mobile browser engines.<sup>78</sup> However, where relevant, we make reference to choice architecture for the use of search engines to understand how this may affect the choice architecture that is presented to users of mobile browsers.

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<sup>75</sup> Evidence from the qualitative consumer interviews conducted by Verian as a part of our market investigation showed that Google Search and Google Chrome were often confused and that there was a tendency to elide all the Google apps into a single 'Google' function. Furthermore, the quantitative consumer survey also conducted by Verian as part of our market investigation revealed that, when asked to name web browsers, a minority of respondents will name a search engine (e.g. 12% named Bing and 7% named Yahoo).

<sup>76</sup> "Chrome exists to serve Google search." Internal email from VP of Android platform partnerships. [Trial Exhibit - UPX0809: U.S. and Plaintiff States v. Google LLC \(justice.gov\)](#).

<sup>77</sup> [REDACTED] response to the CMA's information request [REDACTED]

<sup>78</sup> See [Issues Statement](#).

### 3. Apple's control and use of choice architecture in mobile browsers

- 3.1 In this section, we consider whether Apple's use of choice architecture for mobile browsers on mobile devices reduces user awareness, engagement and choice, which in turn may reinforce the position of their own browsers and browser engines.<sup>79</sup> We consider these practices within the context of Apple's vertical integration, which means that Apple has substantial control over choice architecture on iOS devices.
- 3.2 Apple is vertically integrated across different layers of the mobile browser supply chain. Apple manufactures its own mobile devices (iPhones), supplies its own operating system (iOS), browser engine (WebKit) and browser (Safari), with a large majority of Apple's revenue coming from device sales. However, Apple has also seen growth in revenue from the App Store, made through commission on in-app purchases and subscriptions.<sup>80</sup>
- 3.3 Apple has a number of restrictions in place on iOS devices at the factory setup:
- (a) **Pre-installation of Safari:** Apple only pre-installs Safari on iOS devices and no other browser can be pre-installed out-of-the-box.
  - (b) **Placement of Safari on the device home screen:** Safari is placed prominently in the 'hotseat' (application dock) on the Default Home Screen.
  - (c) **Defaults settings:** Safari is set as the default browser at factory setup.
- 3.4 Beyond the point of purchase, users who wish to use other browsers must download and install them from the App Store. Once the third-party browser app is downloaded, it is placed on the minus one or minus two screen rather than the default home screen.<sup>81</sup> If a user wants to relocate the app to the default home screen, they have to do it manually. Furthermore, Apple also controls the use of choice architecture, including:
- (a) **The level of friction in the user journey for changing default browser:** Apple has designed its operating system architecture in a way that if users wish to change their default browser settings, they need to take a number of steps to do so.

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<sup>79</sup> Where we cite evidence from the consumer research conducted by Verian, it refers to iOS users only, unless explicitly stating otherwise.

<sup>80</sup> MEMS [Final Report](#), pp.19-21.

<sup>81</sup> The 'minus one' or 'minus two' screen refers to the screens that are respectively one or two swipes from the home screen. Browser apps that are placed further away require more effort from users to access when opening the browser manually.

- (b) **Use of prompts for switching or changing default browser settings:**  
Apple chooses not to display any prompts to encourage users to set Safari as the default browser (where it is not). Other browser vendors are allowed to display prompts on iOS to encourage users to change their default browser when users open their browser app. However, several browser vendors told us that Apple did not provide visibility to browser vendors on whether a browser is set as the default (eg through an (Application Programming Interface - API) which would enable browser vendors to target users more effectively.<sup>82</sup>
- (c) **The ability of uninstall Safari:** Only Safari cannot be uninstalled from iOS devices (while other browsers can be).

3.5 These choice architecture practices mean that consumers make less active and effective choices about which browser to use on their mobile device, or experience difficulty or friction in exercising choice between the use of different browsers. Overall, this means that fewer consumers are likely to switch between browsers; and therefore contribute to competition between browsers.

3.6 In the next section, we set out submissions received from Apple, third parties, the Verian qualitative research and the Verian survey, as well as external consumer research on each of the six choice architecture practices. Where we cite evidence from the consumer research conducted by Verian it refers to iOS users only, unless explicitly stating otherwise.

### **(a) Pre-installations of Safari and installations of alternative browsers on iOS devices**

3.7 In paragraphs 2.7 to 2.10, we explained how in principle pre-installations can have significant impacts on the accessibility of browsers for consumers at device setup. On iOS devices, Apple has full control over the apps that are pre-installed. Since the launch of the iPhone in 2007, Safari has been the only browser app to be pre-installed on iOS devices.

3.8 The pre-installation of a browser app allows Apple to provide a fully functioning mobile device out-of-the-box; meaning that users can use their mobile device to access and search the web and interact with content online without having to first navigate to the App store and download a browser.

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<sup>82</sup> Responses to CMA information requests [redacted].



- 3.9 Pre-installation may contribute to high usage of Safari on iOS devices. Data collected from the Verian survey shows that Safari is the most-used browser on iOS.<sup>83</sup>
- 3.10 If consumers want to download third-party browsers, they need to access the App Store and complete the download process. This requires additional effort and attention from users, taking them away from an out-of-the-box experience.

### Evidence from Apple

- 3.11 Apple has stated that its rationale for the factory set-up of iOS devices is to provide a premium consumer experience and ease of use out of the box that differentiates Apple from its competitors. To do so, it integrates apps that it believes users would expect to have available when turning on a new smartphone or tablet.<sup>84</sup>
- 3.12 Apple provided data relevant to the assessment of pre-installation of Safari on browser usage, including:
- (a) Data per fiscal quarter on the total number of active iOS devices in the UK, from the beginning of the fiscal year 2023 through to Quarter 2 of the fiscal year 2024.<sup>85</sup> Table 3.1 shows there were [REDACTED] active iPhones in the UK as of Quarter 2, 2024.<sup>86</sup>
  - (b) Data per fiscal quarter on the number of iPhone activations for the same period. Over that total period [REDACTED] iPhones were activated in the UK.

**Table 3.1:** [REDACTED].

[REDACTED]

- (a) Monthly data from October 2022 to February 2024 on the total number of first time downloads of ten popular web browsers (see Table 3.2).

**Table 3.2:** [REDACTED].

[REDACTED]

### Evidence from third parties

- 3.13 A number of browser vendors have stated that pre-installation of browsers is strategically important, improving visibility and awareness of their browsers.<sup>87</sup> In

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<sup>83</sup> Verian Group UK (2024) Mobile Browsers Quantitative Research, Slide 40.

<sup>84</sup> Apple's response to the CMA's information request [REDACTED].

<sup>85</sup> Note Apple's fiscal year runs from 1 October of the prior calendar year through 30 September of the fiscal year indicated.

<sup>86</sup> Apple response to CMA's information request [REDACTED].

<sup>87</sup> Responses to CMA's information requests [REDACTED].

particular, Vivaldi expressed the opinion that consumer awareness is the biggest growth-limiting factor for its product, which would be mitigated by pre-installation.<sup>88</sup> Under current restrictions, third-party browser vendors are unable to be pre-installed on any iOS device and have no avenues to achieve pre-installation on iOS.

- 3.14 Beyond the point of purchase, users need to download other browsers from the App Store. For example, a browser vendor told us that it targets distribution through advertising campaigns to encourage users to download its browser, though this carries with it other barriers (such as the need to educate users on how to change its browser to the default browser once installed).<sup>89</sup>

### Evidence from consumer research

- 3.15 The Verian qualitative research indicated that respondents were typically unaware of pre-installation. The research showed that respondents who had downloaded an alternative browser (to the pre-installed browser) were motivated differently depending on whether the downloaded browser was Chrome or an alternative to Chrome/Safari. Respondents who had downloaded Chrome were motivated by familiarity and a desire to synchronise across devices or with other Google products. Those respondents who had downloaded an alternative to either Chrome or Safari tended to be motivated by a practical need (for example, they had experienced an issue on a browser, or had a particular usability requirement), or by a distrust of big technology companies and a concern for privacy.<sup>90</sup>
- 3.16 Responses to the Verian survey indicated that the majority of iOS users were using Safari as their primary web browser. Figure 3.1 below shows the percentage of iOS users by their primary browser usage alongside the percentage of iOS devices by pre-installed browser.<sup>91</sup> Safari was the only pre-installed browser on all iOS devices and used by 72% of respondents, followed by Chrome which was primarily used by 24% of respondents and other browsers used by 4% of respondents.<sup>92</sup>

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<sup>88</sup> Vivaldi's response to CMA's information request [redacted].

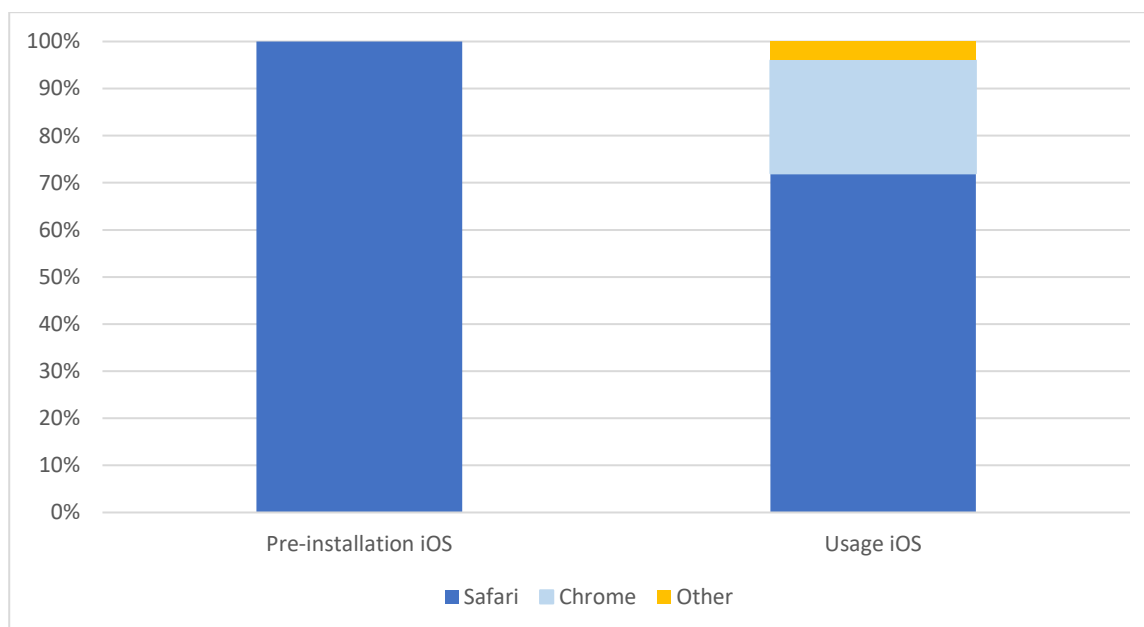
<sup>89</sup> Note from meeting with [redacted].

<sup>90</sup> Verian Group UK (2024) Mobile Browsers Qualitative Consumer Research Slide 34

<sup>91</sup> Safari is the pre-installed browser on all iOS devices. Source: MEMS [Appendix G: pre-installation, default settings and choice architecture for mobile browsers](#), page G6, figure G.1 – pre-installation and share of mobile browsers on mobile devices in the UK, 2021. Browser usage data from Verian survey – BROWMOST – You said you had the following web browsers on your smartphone, which one of these do you use most often? (all iOS users, N = 1,501).

<sup>92</sup> Verian Group UK (2024) Mobile Browsers Quantitative Research, slide 40.

**Figure 3.1: Pre-installation and usage of browsers on iOS.**



Source: MEMS Appendix G: pre-installation, default settings and choice architecture for mobile browsers, page G6, figure G.1 – pre-installation and share of mobile browsers on mobile devices in the UK, 2021. Browser usage data from Verian Group UK (2024) Mobile Browsers Quantitative Research, Slide 40.

Note: BROWMOST – You said you had the following web browsers on your smartphone, which one of these do you use most often? (all iOS users, N = 1,501).

- 3.17 The Verian survey further found that when respondents were asked which browser app they have currently installed on their devices, 89% of respondents indicated Safari and 54% indicated Chrome.<sup>93</sup> The third most commonly installed web browser on iOS devices, as reported by survey respondents, was Microsoft Edge at 7% with few other browsers mentioned (eg Internet Explorer, Firefox and DuckDuckGo).<sup>94</sup>
- 3.18 A study carried out by the ACCC (referred to at paragraph 2.36) attests to these affects, finding that iPhone (and Samsung) owners were more likely than others to use the Safari (and Samsung Internet) browsers which are pre-installed on these respective devices. In particular, 83% of iPhone users said they used Safari citing pre-installation as the primary reason for using a given browser on their device.<sup>95</sup>
- 3.19 The Verian survey found that among iOS users there was an approximate even split between those that had just one browser installed (45%) and those that had more than one browser installed (53%). The majority of those that had more than one browser installed had two browsers installed (41% of iOS respondents).<sup>96</sup>

<sup>93</sup> Note, as Safari is pre-installed on all iOS and cannot currently be uninstalled from iOS, in fact 100% of iOS devices have Safari installed. From the users perspective, however, the Safari app can be deleted such that it does not appear on either the home screen or secondary screens.

<sup>94</sup> Verian Group UK (2024) Mobile Browsers Quantitative Research, slide 40.

<sup>95</sup> [Consumer Views and Use of Web Browsers and Search Engines - Final Report](#) p. 34-35.

<sup>96</sup> Verian Group UK (2024) Mobile Browsers Quantitative Research, slide 41.

3.20 The Verian survey offers some evidence of the links between browser choice on mobile devices and computers. For example, for respondents who mostly used Safari on their computer, approximately 86% also used Safari as the primary browser on their mobile device. For users who mostly used Safari on their mobile device, only 35% primarily used Safari on their computers (where users are less likely to rely on the pre-installed browser).<sup>97</sup>

### **(b) Placement of Safari and alternative browsers on iOS devices home screen**

3.21 In paragraphs 2.11 to 2.14, we explained how placement can have an impact on the visibility of browsers. On iOS, Safari is placed in the 'hotseat' on the home screen of all mobile devices, as part of the out-of-the-box app configuration. By 'hotseat' we mean the bottom four apps on the home screen on an iOS device (see Figure 3.2).

3.22 Data supplied by Apple (see table 3.1) indicates that there were [REDACTED] iOS device activations in the UK from the start of the fiscal year 2023 through to Quarter 2 of 2024. For each of these, Safari is pre-installed on the device.<sup>98</sup> If a user downloads an alternative browser to Safari and sets that browser as their default browser, the newly downloaded browser would not automatically appear on the Default Home Screen, while Safari will still be positioned in the hotseat. A user must take active steps to customise the hotseat to have an alternative browser placed there, or otherwise, navigate manually through one or more additional screens to open the other browser.

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<sup>97</sup> Verian Group UK (2024) Mobile Browsers Quantitative Research, slides 78 & 79.

<sup>98</sup> Apple response to CMA's information request [REDACTED].

**Figure 3.2: Placement of Safari on iOS devices.**



Source: CMA.

Note: Screenshot taken on iPhone 10 running iOS 17.4 in April 2024.

## Evidence from Apple

- 3.23 Apple has submitted that its rationale for iOS device configuration is to deliver a premium consumer experience and ease of use.<sup>99</sup> In addition to this, Apple stated that it chooses apps that will differentiate Apple products from its competitors. Apple submitted that it takes into account factors such as usefulness of the app, ease-of-use of the device, and prior layouts when considering the initial placement of apps out-of-the-box on iPad and iPhone.<sup>100</sup>
- 3.24 Apple allows users to control the position of all apps, including those in the hotseat, on the iPhone. Apple has also submitted that it expects that users will tailor and customise their home screens in line with their own preferences and expected usage of apps.<sup>101</sup>

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<sup>99</sup> Apple's response to the CMA's information request [REDACTED].

<sup>100</sup> Apple's response to the CMA's information request [REDACTED].

<sup>101</sup> Apple's response to the CMA's information request [REDACTED].

## Evidence from third parties

- 3.25 Some browser vendors highlighted the importance of placement in the visibility and adoption of browsers,<sup>102</sup> given that a substantial proportion of browser usage may happen through users manually opening the browser. In particular, one browser vendor told us that Apple had clear control over the hotseat on iOS and stated that every instance of additional user friction affects retention.<sup>103</sup>
- 3.26 A browser vendor submitted that it conducted an online survey, which revealed that for iPhone users who have downloaded an alternative browser app (to Safari) and are not using it, the main reason is the location of the app.<sup>104</sup> When iPhone users were asked why they downloaded the alternative browser app but are not using it, they responded "Another browsing app is on my home screen" and "not located in a convenient place on my phone" and "I forgot I downloaded it".<sup>105</sup>

## Evidence from consumer research

- 3.27 With regard to the mobile browser that iOS users most commonly used, the Verian survey found that 36% of respondents chose the location of the browser app, while 48% had not changed the position of the app from when it was first installed on their phone. The remaining 16% were either not sure or could not remember.<sup>106</sup>
- 3.28 The Verian survey further found that for the majority of iOS users the browser app they most frequently used was located on their home screen (60%), with only 6% indicating that it was in a location other than their home screen. The survey also found that for 36% of iOS users their most used browser was placed in the 'hotseat' such that it stayed in the same location even if they swiped to a new page.<sup>107</sup>
- 3.29 This is broadly aligned with the qualitative consumer research conducted by Verian,<sup>108</sup> which identified three types of smartphone users in terms of how they position apps on their devices (both iOS and Android).
- (a) One group preferred tidy screens and like to categorise their apps into folders.

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<sup>102</sup> [redacted] response to the CMA's information request [redacted]. Note from meeting with [redacted].

<sup>103</sup> Note from meeting with [redacted].

<sup>104</sup> Online 20 minute survey. Sample size = 880 UK Android and iPhone users.

<sup>105</sup> [redacted] response to the CMA's information request [redacted].

<sup>106</sup> Verian Group UK (2024) Mobile Browsers Quantitative Research, slide 45.

<sup>107</sup> Verian Group UK (2024) Mobile Browsers Quantitative Research, slide 47. This was a multi-response question and so at least some of the 36% of respondents who indicated their app was pinned have also indicated that their preferred browser app is located on their home page. In addition, respondents may also have chosen either the 'pinned' or 'home screen' option when their browser was both pinned and on the home screen – therefore, we expect that this figure is an underestimation of how often iOS users have their browser app available on the home screen.

<sup>108</sup> Verian Group UK (2024) Mobile Browsers Qualitative Consumer Research, Slide 22.

- (b) A second group had made minimal changes to the placement of apps on their device, maybe a little when first purchasing their smartphone but otherwise were not motivated to curate the placements of their apps.
- (c) The third group included users with lower self-assessed technical confidence in relation to downloading and using a new app on their smartphone and lower self-assessed technical confidence in relation to changing the settings for an app on their smartphone and these users preferred not to move anything. As a consequence, these users tended to have some commonly used apps in an inconvenient place such as on the minus two or minus three screen.

### **(c) Default settings on iOS devices**

3.30 In paragraphs 2.15 to 2.18, we explained how setting a default browser allows users to easily open web links from other applications without having to select which app opens the link each time. Safari is set as the system default browser on iOS devices.

#### **Evidence from Apple**

3.31 [REDACTED].<sup>109</sup>

3.32 While Apple stated that its design intention is “to preserve the default browser setting regardless of any changes made to the user’s device, including but not limited to device reboots, iOS updates, updates to Safari or other apps and device transfers”, Apple has acknowledged a number of operating system bugs that had led to the users’ default browser setting being reset to Safari, which were fixed in 2020 to 2021.<sup>110</sup> Apple submitted that a bug identified in 2023 that reset users’ default browser setting upon migration of data to a new device was also subsequently fixed. Apple told us that it was not aware of any other instances where the default browser can be inadvertently reset.<sup>111</sup>

#### **Evidence from third parties**

3.33 Several browser vendors have acknowledged the importance of defaults in engaging and retaining users.<sup>112</sup>

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<sup>109</sup> Apple’s response to the CMA’s information request [REDACTED].

<sup>110</sup> Apple’s response to the CMA’s information request [REDACTED].

<sup>111</sup> Apple’s response to the CMA’s information request [REDACTED].

<sup>112</sup> Responses to the CMA’s information requests [REDACTED].

- 3.34 However, several browser vendors have told us that they have no visibility on data relating to default browsers on iOS, which has implications for their ability to effectively target prompts encouraging users to switch default browser.<sup>113</sup>
- 3.35 Mozilla has stated that it saw an increase in usage of its browser after Apple allowed non-Safari browsers to be chosen as default from September 2020.<sup>114</sup> Since the introduction of the browser choice screen by the European Commission (EC) in response to requirements in the Digital Market Act (DMA) article 6.3, early reporting has shown that several browser vendors have seen an increase in user engagement.<sup>115</sup> In particular, a browser vendor told us that the increase in both downloads and retention on iOS as a result of this choice screen indicates that being set as default can help user retention.<sup>116</sup>
- 3.36 In addition to the operating system bugs referred to in paragraph 3.33, a browser vendor outlined another instance when the user's chosen default browser has been overridden if they have selected an alternative browser to Safari. The browser vendor submitted that "If a user sets a non-Safari browser as default, the user's preference is reset to Safari when they upgrade to a new phone".<sup>117</sup>
- 3.37 A browser vendor submitted that, to the best of its knowledge, Apple has recently changed the features of links shared on iMessage for devices running on iOS17 or later. Whilst previously Safari was the only browser that could receive and show all links shared in iMessage, browsers other than Safari can now access the relevant data to do so.<sup>118</sup>
- 3.38 A browser vendor on iOS suggested that while [redacted] its browser is set as a default because of its features such as [redacted].<sup>119</sup>
- 3.39 A browser vendor submitted research that identified 'laziness and unawareness' as reasons for iOS users not changing their default browser away from Safari. This research recognises that users may not make active choices with regard to the default browser selected on their mobile device and that the system default plays an important role in future browser usage.<sup>120</sup> We consider this insight to be equally applicable to Android users.
- 3.40 A browser vendor submitted that it carried out qualitative research interviews,<sup>121</sup> which revealed that their users on iOS would use their browser app more if more

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<sup>113</sup> Responses to the CMA's information requests [redacted].

<sup>114</sup> Mozilla's response to the CMA's information requests [redacted].

<sup>115</sup> Reported for several browser vendors: [Brave](#), [Mozilla](#), [Vivaldi see browser installs rise on iOS • The Register](#); [Firefox saw an increase in users following Apple's default browser changes in the EU. - The Verge](#). Accessed by the CMA 3 July 2024.

<sup>116</sup> Note from meeting with [redacted].

<sup>117</sup> [redacted] response to the CMA's information request [redacted].

<sup>118</sup> [redacted] response to the CMA's information request [redacted].

<sup>119</sup> [redacted] internal document [redacted].

<sup>120</sup> [redacted] internal documents [redacted].

<sup>121</sup> The interview study duration was 45 minutes. Sample size was 12 (9 women) of a browser vendor's users.



users understood how to switch default browsers on iOS. Interviews also showed that “Safari is typically chosen for quick, one-off searches that are dependent upon user’s muscle memory of using an iPhone”. Moreover, some respondents revealed that they downloaded the browser app on the mobile due to using the same app on desktop.<sup>122</sup>

## Evidence from consumer research

- 3.41 The Verian survey found that Safari was set as the default browser for 81% of iOS users. Chrome was set as the default browser for 16% of iOS users and no other web browser was set as the default browser for more than 1% of users.<sup>123</sup> Furthermore, the survey findings indicated that 76% of iOS users had not changed their default browser, 14% had changed their default browser, while 10% were unsure.<sup>124</sup> Of the small number of iOS users that had changed their default browser, about 89% said they found it very easy or fairly easy to change, with just 4% finding it very difficult or fairly difficult.<sup>125</sup> We note that there are a number of psychological phenomena that may bias survey respondents to report a task they completed as being easier for them in hindsight than it was in the moment, such as social desirability and the discounting of past experiences.<sup>126</sup>
- 3.42 Among iOS users in the Verian survey that had not changed their default browser, a variety of reasons<sup>127</sup> were given (see Figure 2.4 for reasons selected across all respondents), most commonly that their current default browser was their preferred browser.<sup>128</sup> The only reasons that varied in the likelihood of selection across iOS and Android users were ‘the web browser I use isn’t important to me’ (selected by 24% of iOS users in comparison with 16% of Android users) and ‘I prefer to use default settings (selected by 13% of iOS users compared with 10% of Android users).<sup>129</sup> The reasons selected by survey respondents corroborated the Verian qualitative research which found that the key barriers to using an alternative browser were inertia, loss of stored passwords and the absence of any perceived benefits.

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<sup>122</sup> [🔗] response to the CMA’s information request [🔗].

<sup>123</sup> Verian Group UK (2024) Mobile Browsers Quantitative Research, slide 50.

<sup>124</sup> Verian Group UK (2024) Mobile Browsers Quantitative Research, slide 65.

<sup>125</sup> Verian Group UK (2024) Mobile Browsers Quantitative Research Data Tables, switchease.

<sup>126</sup> D. Dodou, J.C.F. de Winter (2014) [Social desirability is the same in offline, online, and paper surveys: A meta-analysis](#), *Computers in Human Behavior*, 36, 487-495. Yi, R., Gatchalian, K. M., & Bickel, W. K. (2006). [Discounting of past outcomes](#). *Experimental and Clinical Psychopharmacology*, 14, 311–317.

<sup>127</sup> Respondents were able to select multiple responses.

<sup>128</sup> Source: Verian survey. WHYNOCHANGE - Are there any particular reasons why you have not changed the default web browser on your smartphone? (iOS users that have not changed default browser, N = 1298).

<sup>129</sup> Verian Group UK (2024) Mobile Browsers Quantitative Research, slide 68.

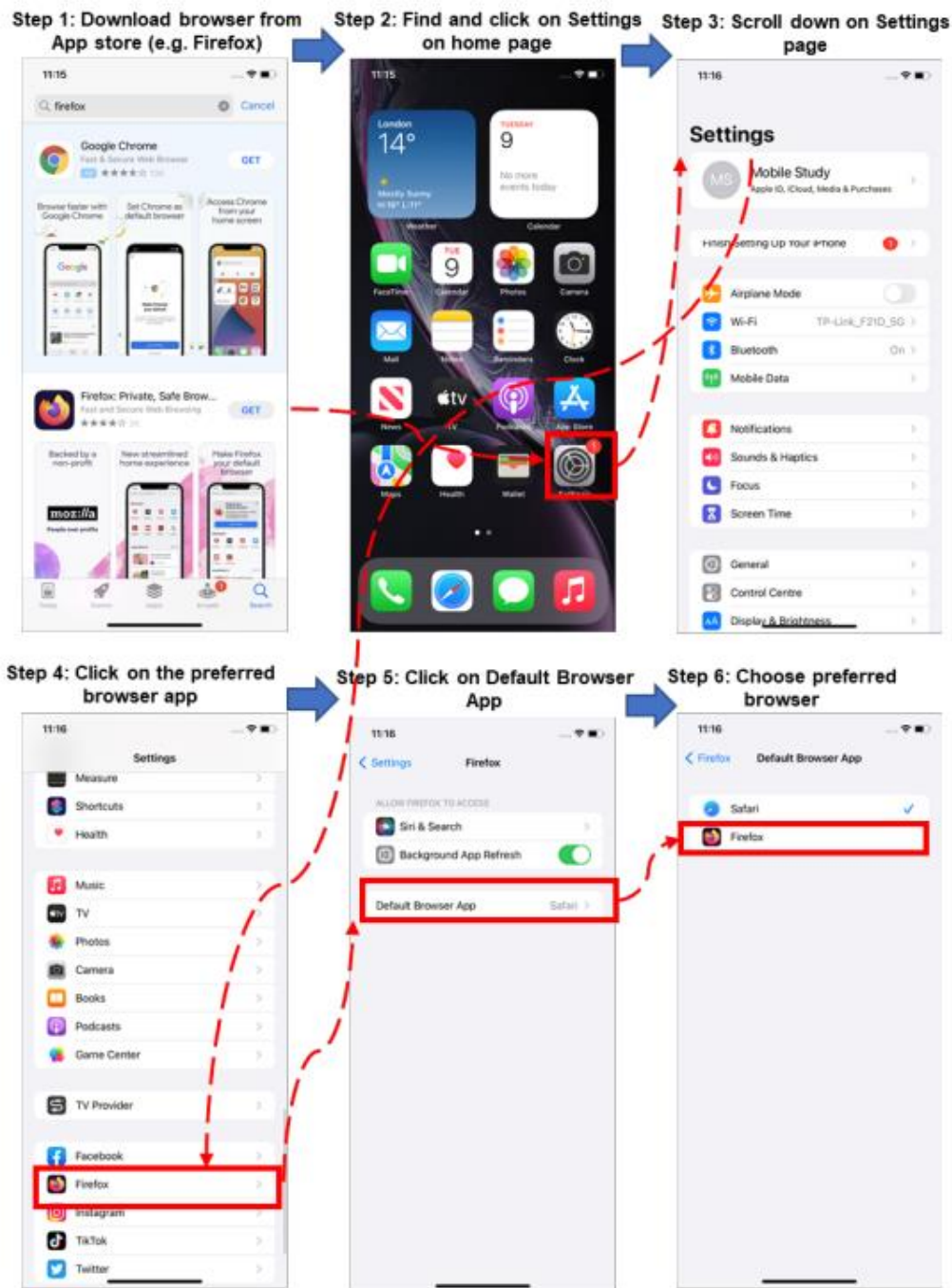
## **(d) Friction in the user journey for changing default browser on iOS devices**

- 3.43 In paragraphs 2.19 to 2.20, we explained how users need to take active steps to change their default status in device settings. Since September 2020, users have been able to change the default browser on iOS in their device settings menu. This user journey is illustrated in Figure 3.3.
- 3.44 There is no central point in the device settings menu where users can change the default browser, regardless of which browser they want to switch from and to. There is also no way of searching on iOS to find which page they should navigate to change the default browser. Instead, users must navigate to each browser's own settings page to change their default browser.<sup>130</sup>

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<sup>130</sup> A fact highlighted by industry commentators: [Apple's one weird trick to stop you changing your default browser - Open Web Advocacy \(open-web-advocacy.org\)](#). Accessed by the CMA 3 July 2024.

Figure 3.3: User journey to change the default browser on iOS devices.



Source: MEMS, Appendix G, p17.

Note: Screenshots taken on iPhone XR running iOS 15.1 in November 2021.

## Evidence from Apple

3.45 With regard to the switching of default browsers on iOS, Apple submitted that it does not introduce “hassle factors” and that it does not have a complex user journey when it comes to changing default settings on iOS.<sup>131</sup> [REDACTED].<sup>132</sup>

## Evidence from third parties

3.46 Several browser vendors have expressed concerns relating to the complexity of switching the default browser on iOS and have particularly highlighted that when users choose to switch after being prompted, they cannot do so directly, but instead have to navigate through the device settings menu.<sup>133</sup>

3.47 Google has indicated that it has created educational content to show users how to change the default browser on iOS.<sup>134</sup>

3.48 OWA has published a report setting out its concerns that Apple is using a ‘dark pattern’<sup>135</sup> to prevent iOS users from changing the default browser away from Safari.<sup>136</sup> It outlines that when Safari is set as the default browser, the option to change the default browser is hidden on the Safari settings page. However, if another browser is set as the default, the option to change the default browser is prominently displayed on the Safari settings page. See Figures 3.4 to 3.6 below.

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<sup>131</sup> Apple’s internal document [REDACTED].

<sup>132</sup> [REDACTED] response to CMA’s information request [REDACTED].

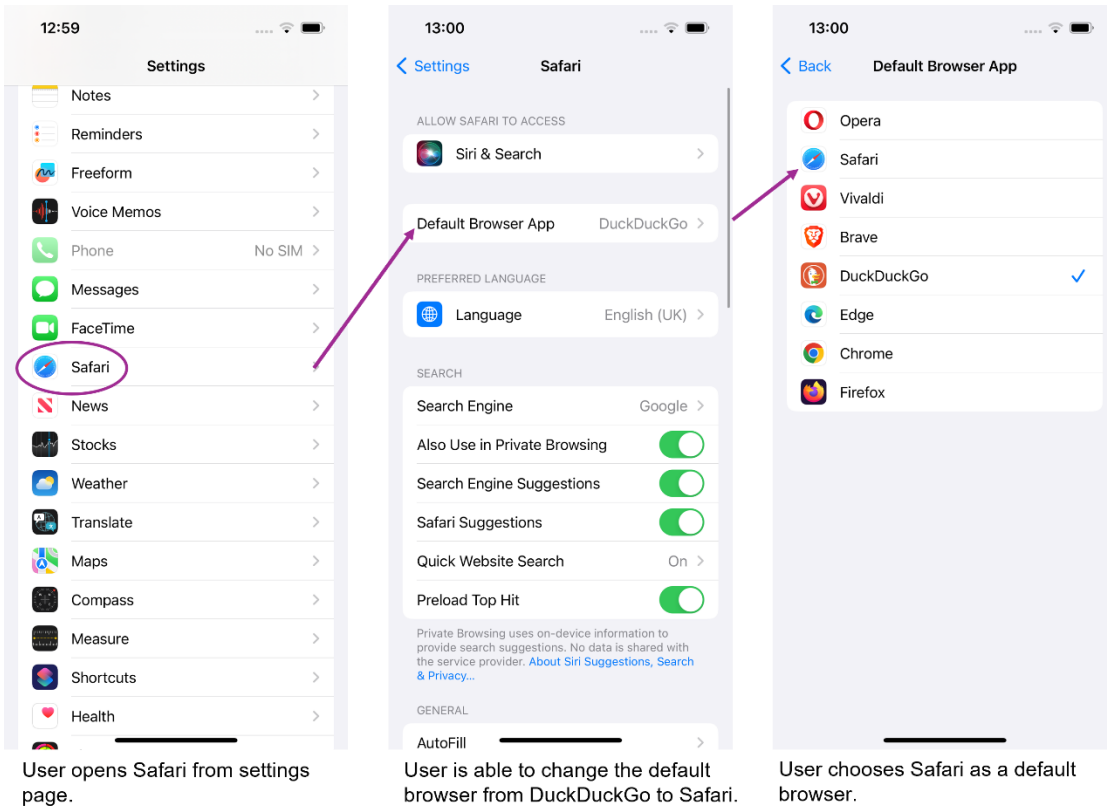
<sup>133</sup> Responses to the CMA’s information requests [REDACTED].

<sup>134</sup> Google’s response to CMA’s information request [REDACTED] see also, [Make Chrome your default browser - iPhone & iPad - Google Chrome Help](#)

<sup>135</sup> Dark patterns refer to the set of (deliberately) manipulative practices identified by user experience (UX) designers. For examples see [What are dark patterns?](#)

<sup>136</sup> Open Web Advocacy: [Apple’s one weird trick to stop you changing your default browser - Open Web Advocacy \(open-web-advocacy.org\)](#), accessed by the CMA 27 June 2024.

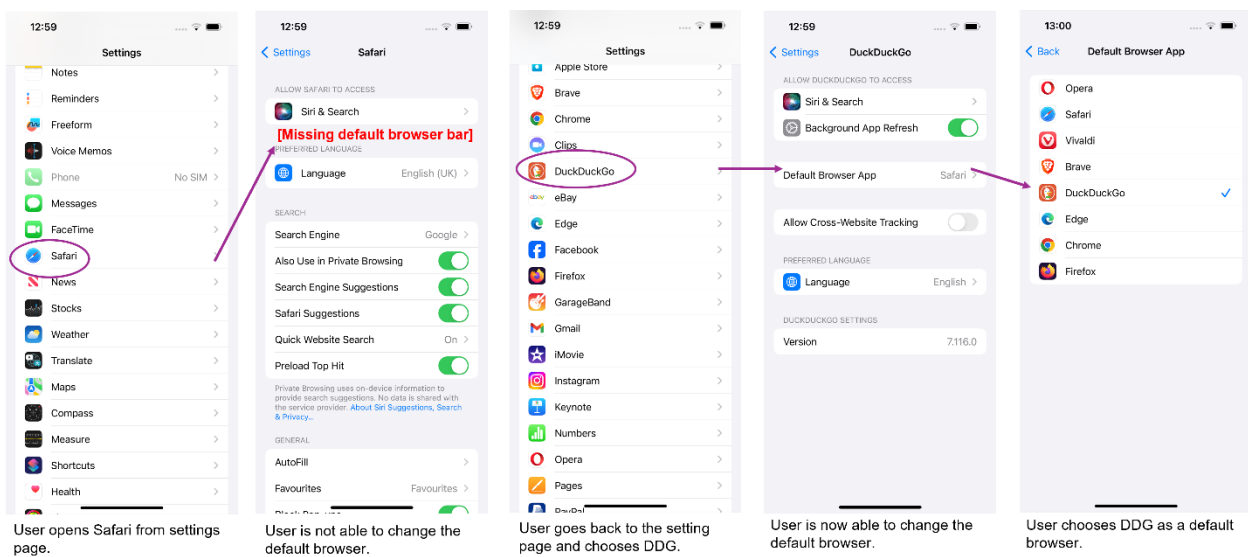
**Figure 3.4: Changing the default browser from DuckDuckGo to Safari, on iOS.**



Source: CMA.

Note: Screenshots taken on iPhone 14 running iOS 17.5.1 in June 2024.

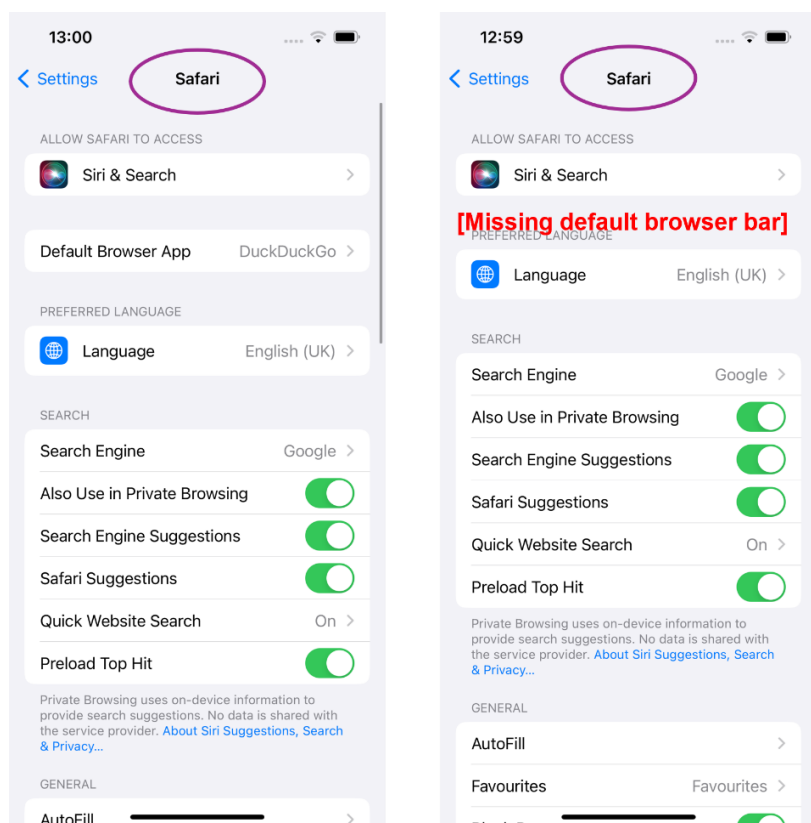
**Figure 3.5: Changing the default browser from Safari to DuckDuckGo (DDG), on iOS.**



Source: CMA.

Note: Screenshots taken on iPhone 14 running iOS 17.5.1 in June 2024.

**Figure 3.6: Comparison of the Safari settings page when Safari (a) is not set as the default browser or (b) is set as a default browser on iOS.**



(a) DuckDuckGo is a default browser

(b) Safari is a default browser

Source: CMA.

Note: Screenshots taken on iPhone 14 running iOS 17.5.1 in June 2024.

## Evidence from consumer research

- 3.49 The Verian survey asked users how confident they were that they could change the default browser setting on their iOS device without assistance. In response, 78% of iOS users reported they could definitely or probably do this, whereas 22% said they could probably not or definitely not do so.<sup>137</sup> Across both iOS and Android users, older respondents were much less likely than younger respondents to indicate that they could definitely or probably do this; as were respondents with a physical condition, compared with those without.<sup>138</sup>
- 3.50 Note, however, that although 78% of respondents with iOS devices felt they could definitely or probably change their default browser, the Verian survey found that

<sup>137</sup> Verian Group UK (2024) Mobile Browsers Quantitative Research, slide 64.

<sup>138</sup> Verian Group UK (2024) Mobile Browsers Quantitative Research Data Tables, defaultconf. Note, physical condition refers to any health condition or illness which might affect respondents' ability captured in the quantitative consumer survey (eg mobility and dexterity). Physical condition is highly correlated with age.

only 14% had actually done so.<sup>139</sup> Therefore for the majority of respondents, these self-assessed levels of technical confidence are untested and may not reflect how easy they would find it in practice. A similar pattern was found in ACCC study (referred to at paragraph 2.36) on the use of web browsers and search engines, where 64% of Australian consumers reported knowing how to change the default search engine on their smartphone but only 31% had actually done so. Taken altogether consumer self-assessed confidence in their ability to change default browser may not necessarily reflect their experience or ability.<sup>140</sup>

- 3.51 Within the Verian qualitative research, self-assessed technical confidence in relation to downloading and using a new app and self-assessed technical confidence in relation to changing the settings for an app, was not a good predictor of respondents' observed technical ability to change their default browser. During the interviews connected to the Verian consumer research, when asked to download an alternative browser and then change their default browser, it was not unusual for respondents, including those with high self-assessed technical confidence, to struggle with completing the task.<sup>141</sup>
- 3.52 The areas in which respondents faced difficulty included the settings page, due to a lack of familiarity, not knowing where to look, or wording and text in settings not being clear. Some respondents who encountered friction, or did not know where to start on their own, said they would have given up sooner if they had been doing the task on their own. Within the settings page, some respondents were unable to find the correct setting. Searching 'default' within the settings page did not yield results. Other respondents simply could not find the default settings option, even when they were on the correct page, suggesting that it is easily missed. Furthermore, respondents who searched for instructions online sometimes found that the instructions did not align with the settings categories on their mobile device.<sup>142</sup>
- 3.53 As detailed in paragraph 2.31, there can be a tendency in surveys for people to overstate their level of confidence, including the potential for respondents to be overconfident in their ability to complete tasks, without having the applied skills or competence (known as the Dunning Kruger effect). This may explain the gap between self-assessed technical confidence and observed technical ability in Verian's research.

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<sup>139</sup> Verian Group UK (2024) Mobile Browsers Quantitative Research, slide 64.

<sup>140</sup> Source: [Australian Competition & Consumer Commission. Consumer Views and Use of Web Browsers and Search Engines – Final Report \(2021\)](#). pp. 70-71.

<sup>141</sup> Verian Group UK (2024) Mobile Browsers Qualitative Consumer Research, Slides 35-37.

<sup>142</sup> Verian Group UK (2024) Mobile Browsers Qualitative Consumer Research, Slides 35-37.

## **(e) Prompts and push notifications for switching to or trying an alternative browser on iOS devices**

- 3.54 As described in paragraphs 2.21 to 2.23, users may see prompts and push notifications displayed on their device encouraging them to change their default browser.
- 3.55 Our key concern in relation to prompts and push notifications on iOS is that Apple does not provide third-party browser vendors with an API that would enable them to target users more effectively when using prompts to switch to alternative browsers (eg target users at the right time to avoid intrusiveness of repeated prompts).

### **Evidence from Apple**

- 3.56 Apple submitted that it does not display prompts or push notifications asking users to switch to Safari when Safari is not set as the users' default browser, or when users use alternative browsers on iOS.<sup>143</sup>

### **Evidence from third parties**

- 3.57 Third-party browsers can use prompts when a user downloads and opens their app on iOS devices (see Figures 3.7 to 3.9). Third-party browsers mainly display prompts when the user first downloads and opens their browser app, asking the user if they want to set the browser as their default browser.
- 3.58 On iOS, Google runs marketing campaigns to promote Chrome on Google's owned and operated native apps and websites.<sup>144</sup> Google submitted that as Chrome is not set as the default on non-Android platforms, it engages in 'standard marketing practices' aimed at encouraging users to switch to Chrome.<sup>145</sup>
- 3.59 A browser vendor also highlighted that it wanted to 'educate' iOS users about the option to switch default browsers, considering that it was not possible for users to switch their default browsers from Safari prior to 2020.<sup>146</sup> [REDACTED].<sup>147</sup>
- 3.60 The prompts Google shows on iOS include:<sup>148</sup>
- (a) **Prompts on Chrome.** Google shows prompts to users of Chrome on iOS and Android to encourage them to switch to Chrome as their default browser if it is not already set as default. As there is no equivalent API on iOS,

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<sup>143</sup> Apple's response to the CMA's information request [REDACTED].

<sup>144</sup> Google's response to the CMA's information request [REDACTED].

<sup>145</sup> Google's response to the CMA's information request [REDACTED].

<sup>146</sup> [REDACTED] response to the CMA's information request [REDACTED].

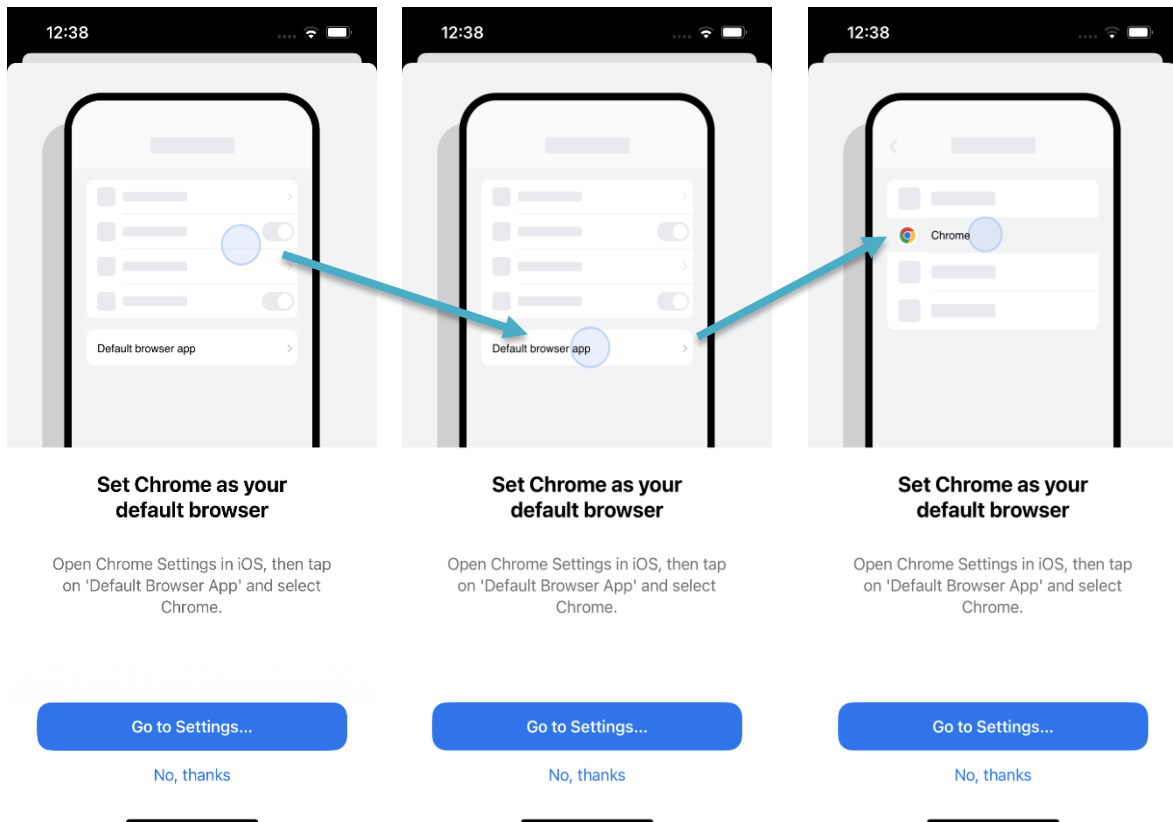
<sup>147</sup> [REDACTED] response to the CMA's information request [REDACTED].

<sup>148</sup> Google's response to the CMA's information request [REDACTED].



Chrome shows prompts for users early in their user journey (eg when they first open Chrome) to navigate to Settings and manually set Chrome as default. In contrast to prompts on Android devices, it is not possible for the user to set a certain browser as a default directly from the displayed prompt – instead, the user is taken out of the browser into a general settings area. See Figure 3.7 as an example.

**Figure 3.7: ‘Full Screen Default’ interactive prompt in Chrome on iOS.**

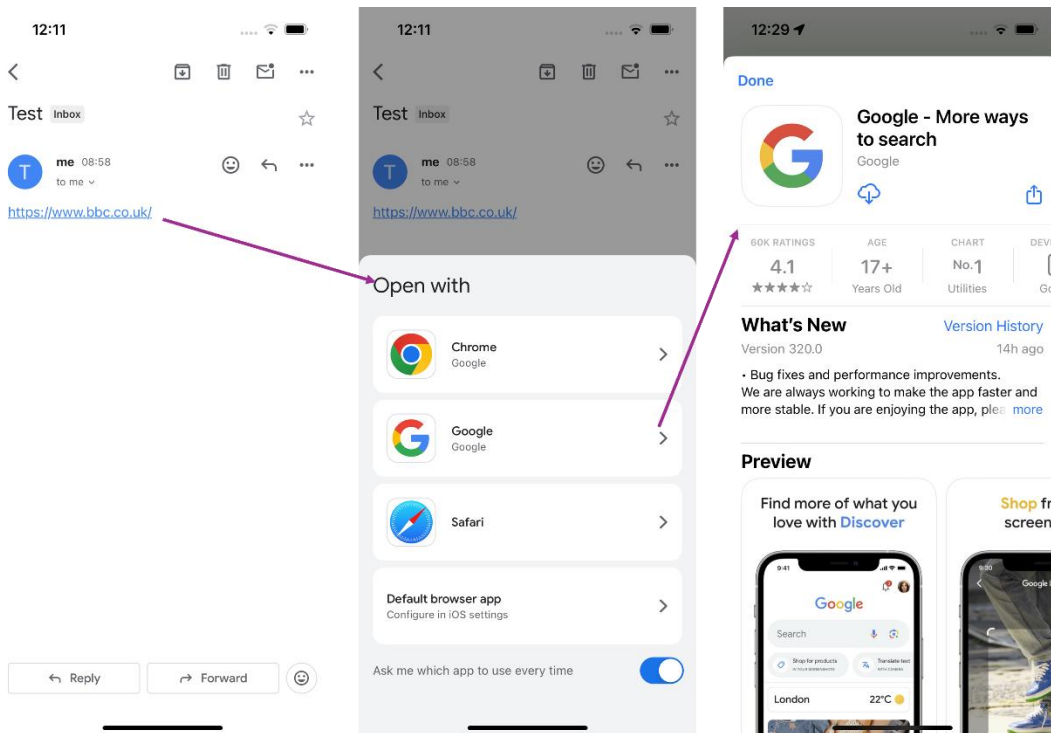


Source: CMA.

Note: Screenshots taken on iPhone 14 running iOS 17.5.1 in June 2024.

- (b) **Prompts on other Google apps.** Google shows users of its non-Chrome apps prompts for them to use Chrome as their browser on iOS.
- (i) One such prompt would be an “**app switcher**” prompt whereby Google includes an interim screen in its first-party apps on iOS that appears when users open web links. An app switcher prompt offers the user the choice of opening the link in Chrome, the Google Search App, Safari, or their default browser, as illustrated by Figure 3.8 below. Google submitted that this prompt [✂].

Figure 3.8: 'App Switcher' prompt on iOS.

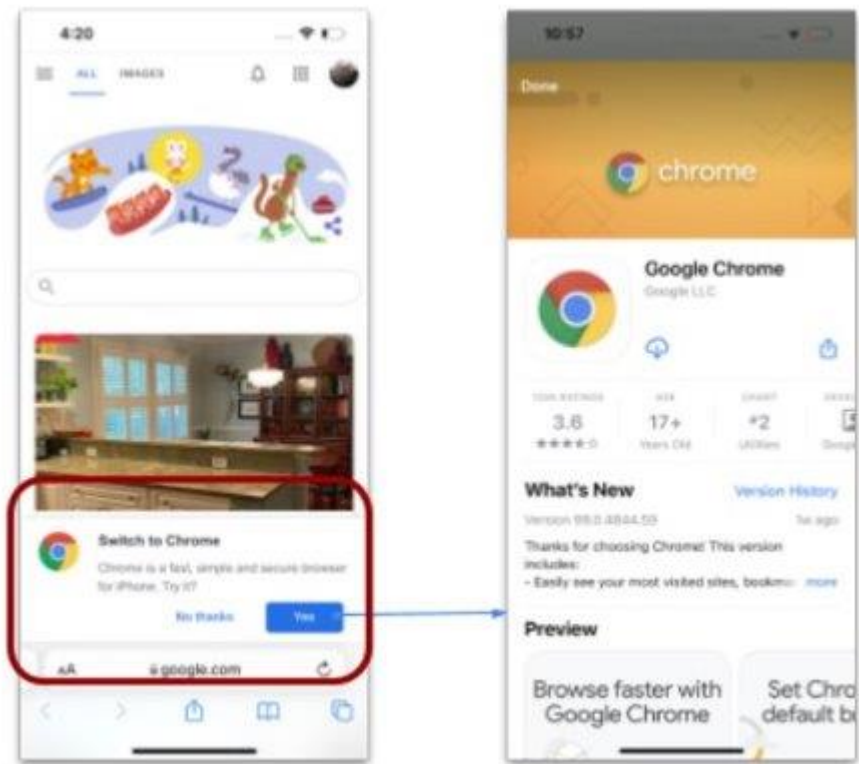


Source: CMA.

Note: Screenshots taken on iPhone 14 running iOS 17.5.1 in June 2024.

- (c) **Prompts on third-party browsers.** Google submitted that it was also possible for Google to show prompts or notifications asking users that access a Google website via a non-Chrome browser on their mobile device to use Chrome instead. On iOS, this includes suggesting that Safari users who access a Google-owned and operated website try out Chrome instead via 'Switch to Chrome' prompt (see Figure 3.9 below).

Figure 3.9: 'Switch to Chrome' prompt on Google.com accessed via Safari on iOS.



Source: Google.

(d) **Prompts on third-party apps.** When a user opens links in a third-party app, Google does not show active prompts/notifications asking the user whether they want to open the link instead in a separate browser, or to switch default browsers on iOS. Instead, Google generally gives users the option to open the relevant content in their default browser by opening a settings menu.<sup>149</sup> (See also 'WP4 - In-app browsing within the iOS and Android mobile ecosystems'.

- 3.61 Google did not share the frequency of prompts. [REDACTED].<sup>150</sup> However, Google submitted that it designed its prompts so that they were non-intrusive.<sup>151</sup>
- 3.62 Google submitted that Chrome did not currently show system-level push notifications on either Android or iOS mobile devices encouraging users to switch to Chrome or set it as default. [REDACTED].<sup>152</sup>
- 3.63 Some browser vendors have highlighted the necessity of prompts for getting users to set their browser as default and increase engagement.<sup>153</sup> An understanding that

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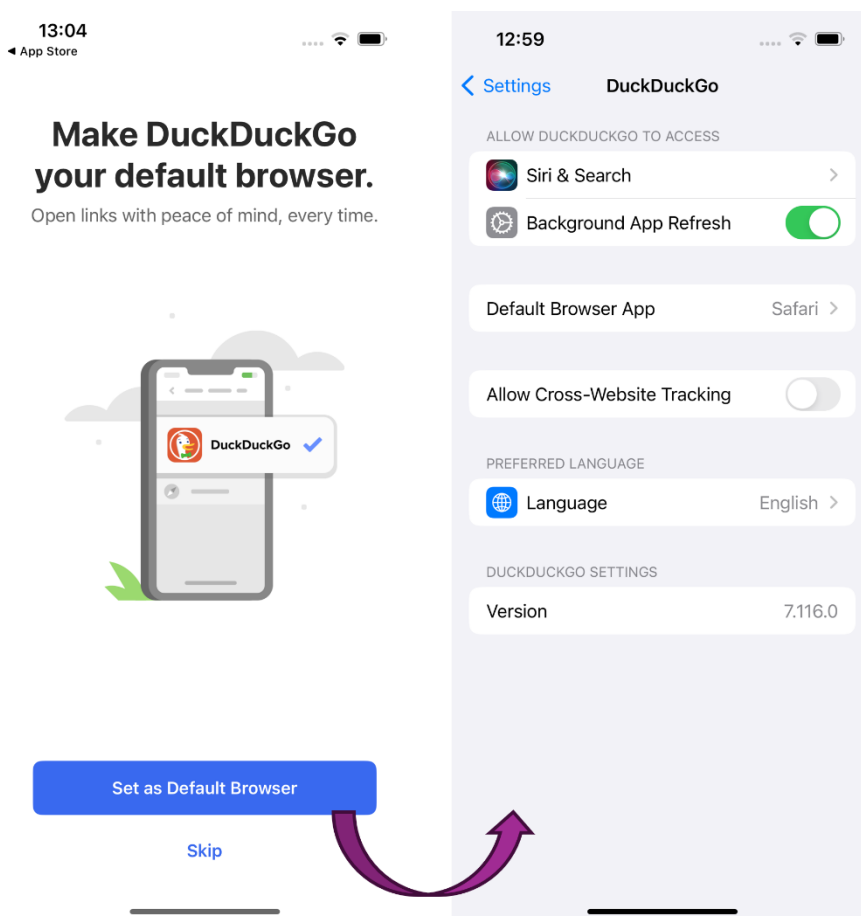
<sup>149</sup> Google's response to the CMA's information request [REDACTED].  
<sup>150</sup> Google's response to the CMA's information request [REDACTED].  
<sup>151</sup> Google's internal document [REDACTED].  
<sup>152</sup> Google's response to the CMA's information request [REDACTED].  
<sup>153</sup> Responses to the CMA's information requests [REDACTED].

the overuse of prompts can be perceived as intrusive<sup>154</sup> means that most browser vendors aim to target users who have not yet set their browser as default, therefore avoiding unnecessary prompting.

3.64 However, several browser vendors have reported that they do not have visibility on iOS as to whether their browser is set as default and that this had significantly hindered their ability to effectively target prompts to the right users at the right time and makes it difficult for browser vendors to measure whether their prompts are effective.<sup>155</sup>

3.65 In addition, some browser vendors have expressed concerns that they cannot send users directly to change their default browser on iOS, but can only direct users to the main settings on iOS.<sup>156</sup> Users would then need to navigate to the relevant browser settings to set it as default. Figures 3.10 to 3.12 show examples of third-party browser prompts on iOS.

**Figure 3.10: DuckDuckGo's prompt to change default browser on iOS.**



Source: CMA.

Note: Screenshots taken on iPhone 14 running iOS 17.5.1 in June 2024.

<sup>154</sup> From a report into choice architecture commissioned by the Mozilla Foundation: [Over the edge: How Microsoft's design tactics compromise free browser choice \(mozilla.org\)](https://www.mozilla.org/en-US/over-the-edge/), p.62, accessed by the CMA 3 July 2024.

<sup>155</sup> Responses to the CMA's information requests [redacted].

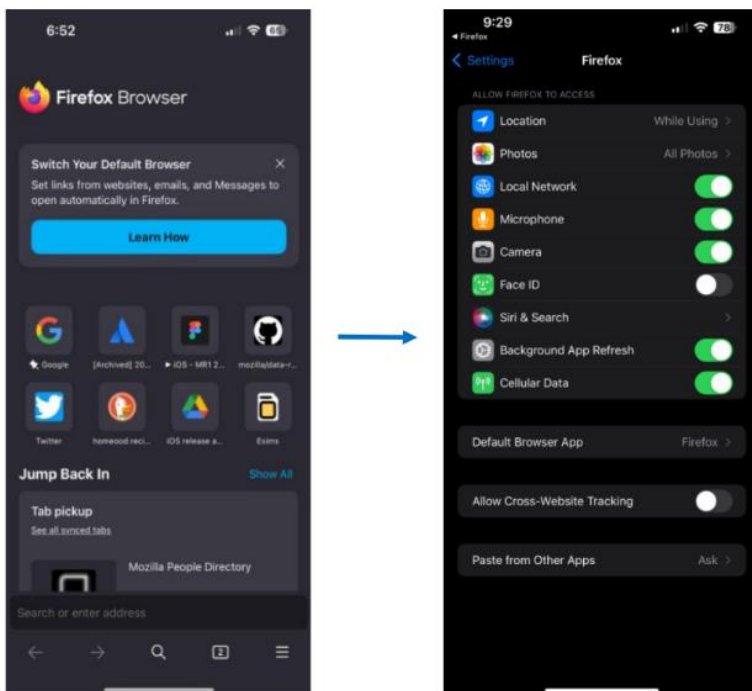
<sup>156</sup> Responses to the CMA's information requests [redacted].

Figure 3.11: Microsoft Edge's prompt to change default browser on iOS.



Source: Microsoft

Figure 3.12: Firefox's prompt to change default browser on iOS.



Source: Mozilla

## Evidence from consumer research

- 3.66 As reported in section 3.51 above, the Verian survey found that 14% of iOS users had changed their default browser. Among those users that changed their default browser, 65% indicated that they had seen a prompt asking them to change their default browser back to a previous default browser, 23% had not seen such a prompt and 12% could not remember.<sup>157</sup>
- 3.67 Among iOS users who had switched default browser and who remembered seeing a prompt suggesting they switch their default browser, 67% said they found it usually helpful or occasionally helpful.<sup>158</sup>
- 3.68 Across both iOS and Android users who had switched their default browsers, the awareness of prompts was higher for males, those in younger age groups, and those who spend more than three hours daily on their device. It may be that the more time users spent on their smartphones, the more likely they were to have received such a prompt.<sup>159</sup>

### (f) The ability of users to ‘uninstall’ Safari on iOS devices

- 3.69 As described in paragraphs 2.24 to 2.25, iOS users are unable to uninstall Safari on their mobile devices (see Figure 3.13), but they are able to remove it from their device home screen. Not allowing iOS users to uninstall Safari may restrict users from exercising effective choice within the Apple ecosystem as it forces them to keep Safari on their devices, even if they never intend to use it. The inability to uninstall Safari may lead to the ‘endowment’ effect (ie the finding that users are more likely to retain an object they own than acquire that same object when they do not own it).
- 3.70 Users may also believe that there may be a functional reason as to why they cannot uninstall Safari, that might give the impression that the pre-installed browser is the endorsed browser by Apple and therefore should be used. However, all other browsers that are downloaded by the user can subsequently be uninstalled (see Figure 3.14). Finally, this may allow Apple to self-preference Safari over other third-party browsers on iOS potentially limiting competitive pressure.

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<sup>157</sup> Verian Group UK (2024) Mobile Browsers Quantitative Research, slide 72.

<sup>158</sup> Verian Group UK (2024) Mobile Browsers Quantitative Research Data Tables, promptpurp.

<sup>159</sup> Verian Group UK (2024) Mobile Browsers Quantitative Research, slide 73.

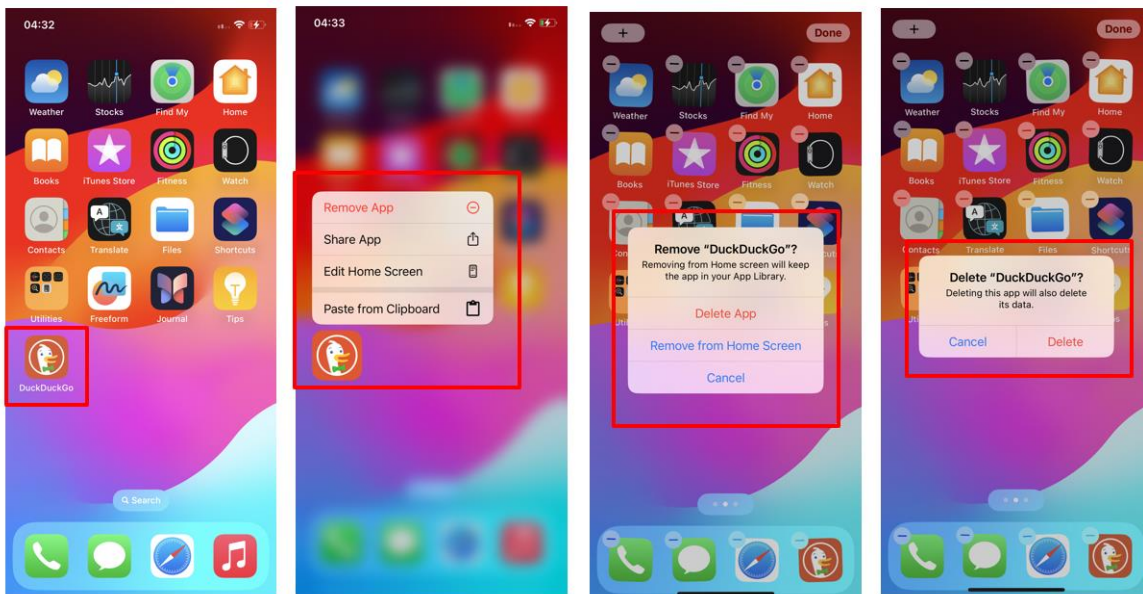
**Figure 3.13: Illustration of inability to uninstall Safari on iOS.**



Source: CMA.

Note: Screenshot taken on iPhone 10 running iOS v17.4 in April 2024.

**Figure 3.14: Demonstration of ability to uninstall a third-party browser from an iOS device.**



Source: CMA.

Note: Screenshot taken on iPhone 10 running iOS v17.4 in April 2024.

## Evidence from Apple

- 3.71 Apple submitted that it is not possible to delete Safari from an iOS device in the UK. Safari is one of a handful of iOS apps that Apple designates as ‘operating system apps’. They are integrated into the core of the operating system and deleting any of them from iOS would impact the performance of the remaining operating system apps as well as the overall functioning of iOS and degrade the user experience. Consequently, users are not permitted to completely delete Safari from iOS devices. Apple noted that to support compliance with the Digital Markets Act, Apple is exploring how to make Safari “deletable” in the EU. As Safari was from the outset designed to be a key part of iOS, however, Apple considers that deletion of Safari will invariably result in a degraded and confusing experience for users. Apple notes that this work is ongoing and is expected to be completed by the end of the year.<sup>160</sup> Apple submitted that users are able to delete Safari from the home screen. Once deleted, and provided another browser has been set as the default browser, Safari would then be only accessible by doing a specific search for it such as through Spotlight.<sup>161</sup>
- 3.72 In this context, we note that, on 25 March 2024, the EC opened a non-compliance investigation under the DMA against Apple. This includes an investigation into Apple’s measures to comply with user choice obligations, including enabling users to easily uninstall any software applications on iOS.<sup>162</sup>

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<sup>160</sup> Apple’s response to the CMA’s information request [redacted].

<sup>161</sup> Apple’s response to the CMA’s information request [redacted].

<sup>162</sup> The European Commission suspects that the measures put in place by Apple fall short of effective compliance of its obligations under the DMA. [Commission opens non-compliance investigations against Alphabet, Apple and Meta under the Digital Markets Act](#), Accessed by the CMA 3 July 2024.



## 4. Google's control and use of choice architecture in mobile browsers

- 4.1 In this section, we consider whether Google's use of choice architecture for mobile browsers on mobile devices reduces user awareness, engagement and choice, which in turn may reinforce the position of their own browsers and browser engines.<sup>163</sup> We consider these practices within the context of Google's agreements with OEMs, which are summarised below and set out in more detail in the Appendix A. As set out in this paper, these agreements provide Google with substantial control over choice architecture on Android devices.
- 4.2 Google's business model is vertically integrated throughout the mobile browser supply chain for the devices it manufactures. It manufactures Android devices (Google Pixel) and provides both an operating system (Android) and browser engine (Chromium – both OS and browser engine are open-source). It also offers users the Chrome browser and a range of other applications, including the Google Search App, Play Store, Google Mail, Google Maps and YouTube.
- 4.3 Google derives revenue from several sources, with the largest proportion of its revenue coming from Google Search and its related advertising business<sup>164</sup> while a smaller proportion comes from sales of devices and its app store.<sup>165</sup> Google's market position across these different markets allows overarching control over Android choice architecture, through the agreements it has entered into with OEMs and browser vendors.
- 4.4 Most Android devices sold in the UK are subject to the terms of agreements between Google and OEMs that result in several other Google services (named Google Mobile Services, or GMS) being pre-installed and set as default on Android devices. For example, Google Mail, YouTube, Google Maps and the Google Play Store are pre-installed on most Android devices subject to the European Mobile Application Distribution Agreement (EMADA).<sup>166</sup> Under this agreement, OEMs cannot select individual applications from GMS but must pre-install the full suite included in GMS. However, these agreements do not preclude OEMs from installing their own or other third-party applications.
- 4.5 In addition to the EMADA, Google has entered into PA and/or RSA with OEMs that include terms governing the pre-installation, placement and default status of

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<sup>163</sup> Where we cite evidence from the consumer research conducted by Verian, it refers to Android users only, unless explicitly stating otherwise.

<sup>164</sup> MEMS [Final Report](#), p.19

<sup>165</sup> From internal documents obtained from Google by the US Department of Justice [Trial Exhibit - UPX0342: U.S. and Plaintiff States v. Google LLC \(justice.gov\)](#)

<sup>166</sup> MEMS [Appendix E: Google's agreements with device manufacturers and app developers \(publishing.service.gov.uk\)](#), p. E12-E13, para. 31-36

applications that serve as access points to Google Search, including its own Chrome browser app.

- 4.6 Google has stated that it takes a choice-centric approach and does not intend to restrict browser choice or steer users towards Chrome and away from other browsers through any of its agreements or strategies. However, Google also states that user choice must be balanced with OEMs' freedom to customise and user safety.<sup>167</sup>
- 4.7 Google has PAs with certain Android device manufacturers.<sup>168</sup> Under the PAs, Google provides financial incentives to manufacturers in the form of activation payments and shares of search revenue enabled by Google's position in the search market and high search revenues.<sup>169</sup> Other browser vendors have stated that the payments Google makes through these agreements would be difficult for them to match, meaning that such agreements are not economically viable for them (see Appendix A for more details).<sup>170</sup> For the purpose of this paper, we focus on the PAs and RSAs Google has with OEMs, under which OEMs can obtain payments from Google (in most cases, advertising revenue shares or fixed-sum activation payments) in return for complying with certain requirements which apply to the factory set up of a device:
- (a) **Pre-installing Chrome** (amongst other applications) on their devices.
  - (b) **Placement of Chrome on default home screen:** Placing Chrome prominently on the home screen (if not more prominently). [REDACTED].<sup>171</sup>
  - (c) **Setting Chrome as the default browser** on the device to receive higher tier payments.
- 4.8 Beyond these agreements, Google is able to influence users' browser choices after they have purchased and started using their devices. In particular:
- (a) **The level of friction in the user journey for changing default browser:** Google's ownership of the Android operating system gives it control over the user journey for browser switching. If a user decides to change their default browser unprompted, they need to go through several steps in their device settings to complete this action.
  - (b) **Use of prompts for switching or changing default browser settings:** If a user successfully changes their default to an alternative browser other than

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<sup>167</sup> Google's response to the CMA's information request [REDACTED].

<sup>168</sup> [Appendix E: Google's agreements with device manufacturers and app developers \(publishing.service.gov.uk\)](#), p.E18, paragraph 52

<sup>169</sup> MEMS [Appendix E: Google's agreements with device manufacturers and app developers \(publishing.service.gov.uk\)](#), p.E2, paragraph 8

<sup>170</sup> Notes from meetings with [REDACTED].

<sup>171</sup> [REDACTED].

Chrome, they might receive a prompt to switch or change their default setting back to Chrome at different stages in their user journey – for example if they open the Chrome app, or if they open any link via Google native apps like Gmail.

- (c) **The ability of users to uninstall Chrome:** Finally, if a user decides to delete their Chrome app, Google does not allow users (via OEMs) from uninstalling Chrome on their devices and only allows from removing from the device home screen.

4.9 These choice architecture practices mean that consumers make less effective choices about which browser to use on their mobile device, or experience difficulty or friction in exercising choices between the use of different browsers. Overall, this means that fewer consumers are likely to switch between browsers; and therefore contribute to competition on the merits between browsers.

4.10 In the following sections, we set out how the terms included in the PAs and RSAs give Google a degree of control over choice architecture on Android through the key practices. We set out how these practices could potentially contribute to user inertia and raise barriers to competition as a result of fewer consumers switching between the use of different browsers.

### **(a) Pre-installations of Chrome and installations of alternative browsers on Android devices**

4.11 In paragraphs 2.7 to 2.10, we explained how pre-installations can impact users.

4.12 As identified in the CMA's MEMS report<sup>172</sup> and confirmed by the evidence gathered in the course of this investigation, there is a large overlap between Chrome pre-installation and its usage on Android devices. From January 2022 to February 2024 Chrome was pre-installed on approximately [90-100%] of Android devices<sup>173</sup> in the UK and Chrome is estimated to account for 76% of usage minutes on browser apps on Android mobile devices in the UK in this period.<sup>174</sup>

**Figure 4.1:** [REDACTED]

[REDACTED]

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<sup>172</sup> MEMS [Final Report](#), p. 168

<sup>173</sup> Google's response to the CMA's information request [REDACTED]. Google's response to the CMA's information request [REDACTED].

<sup>174</sup> Google's response to the CMA's information request [REDACTED]. The share of Chrome usage is calculated based on estimates of usage minutes data from Data.ai (formerly App Annie).

## Evidence from Google

- 4.13 Google submitted that there were no restrictions on OEMs pre-installing alternative browsers under their PAs.<sup>175</sup>
- 4.14 The evidence Google submitted above (Figure 4.1) shows there is a strong correlation between Chrome being pre-installed on mobile devices and its usage. Google also submitted that, between 4 March 2024 - 15 April 2024, [0-5%] of Android active devices in the UK downloaded at least one non-Chrome browser<sup>176</sup>
- 4.15 [REDACTED].<sup>177</sup> [REDACTED].<sup>178</sup>

## Evidence from third parties

- 4.16 Browser vendors have submitted that they view pre-installation as strategically important, to increase awareness of their browser and user engagement.<sup>179</sup> However, browser vendors have told us that pre-installation agreements are difficult to develop with OEMs in the face of Google's existing agreements.<sup>180</sup> In particular, some browser vendors stated that these agreements are out of reach because they cannot compete with Google financially when trying to enter into such agreements with OEMs.<sup>181</sup>
- 4.17 Furthermore, OEMs tend to avoid overloading devices with unnecessary applications at factory setup (ie 'bloatware'). For example, most OEMs pre-install either Chrome only, or Chrome and their own first-party browser (eg in the case of Samsung).<sup>182</sup> Therefore, Google's ability to use its market position to set up pre-installation agreements means that OEMs are unlikely to install additional browsers.

## Evidence from consumer research

- 4.18 The Verian qualitative research<sup>183</sup> showed that respondents typically were not aware of pre-installed browsers on their device. However, they also showed that motivations for downloading a new browser were affected by whether the

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<sup>175</sup> Google's response to the CMA's information request [REDACTED].

<sup>176</sup> Google's response to the CMA's information request [REDACTED]. This figure includes devices which downloaded a non-Chrome browser in a 45-day period only, and therefore will understate the share of all Android devices which have downloaded non-Chrome browsers.

<sup>177</sup> [REDACTED] response to the CMA's information request [REDACTED].

<sup>178</sup> [REDACTED] response to the CMA's information request [REDACTED].

<sup>179</sup> Responses to CMA's information requests. [REDACTED]

<sup>180</sup> Notes from meetings with [REDACTED]. [REDACTED] response to CMA's information requests [REDACTED]

<sup>181</sup> Notes from meetings with [REDACTED]; [REDACTED] response to CMA's information requests [REDACTED]

<sup>182</sup> Data from Google shows that Android devices come pre-installed with 1-2 browsers on average. Google's response to the CMA's information request [REDACTED].

<sup>183</sup> Verian Group UK (2024) Mobile Browsers Qualitative Consumer Research, slide 27.

'alternative' downloaded was Chrome. Those that downloaded Chrome tended to be motivated by:

- (a) Familiarity (eg having used Chrome previously or for a long time).
- (b) Chrome being synced across devices.
- (c) A better user experience with Chrome than alternative browsers.

- 4.19 In Verian qualitative research among respondents who had not changed their default browser there was no concern about the practice of having a pre-installed browser as they reasoned that if they cared about the browser they used they could open a website in whichever browser they preferred.<sup>184</sup>
- 4.20 The Verian survey found that that 77% of Android users predominantly used Chrome for web browsing, 12% used Samsung Internet and 4% used Mozilla Firefox. No other browser was predominantly used by more than 2% of respondents (see Figure 4.1 for a comparison of pre-installation breakdown on Android with browser usage data).<sup>185</sup>
- 4.21 The survey also found that significantly more Android users (where Chrome is almost always pre-installed) had Chrome installed on their device than was the case for iOS users (90% vs 54%). While 45% of Android users had Samsung Internet installed on their smartphone, only 12% said it was their most-used browser.<sup>186</sup>
- 4.22 Among Android users in the survey, 39% had a single browser installed and a further 41% had two browsers installed.<sup>187</sup> For non-Chrome and non-Samsung browsers the overall rate of installation was low suggesting that the pre-installation of Chrome and Samsung Internet may reduce users need/willingness to search and download alternative browser apps.
- 4.23 Study carried out by the ACCC found (referred to at paragraph 2.36) that owners of Samsung (81%) and other Android devices (86%) were more likely than iOS users (47%) to use Chrome suggesting that pre-installation of Chrome has material effects on Android devices.<sup>188</sup>
- 4.24 Finally, the Verian survey found a link between browser use on mobile devices and computers. Of respondents who used Chrome as their primary browser on

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<sup>184</sup> Verian Group UK (2024) Mobile Browsers Qualitative Consumer Research, slide 27.

<sup>185</sup> Verian Group UK (2024) Mobile Browsers Quantitative Research, slide 40.

<sup>186</sup> Verian Group UK (2024) Mobile Browsers Quantitative Research, slide 40.

<sup>187</sup> Verian Group UK (2024) Mobile Browsers Quantitative Research, slide 41.

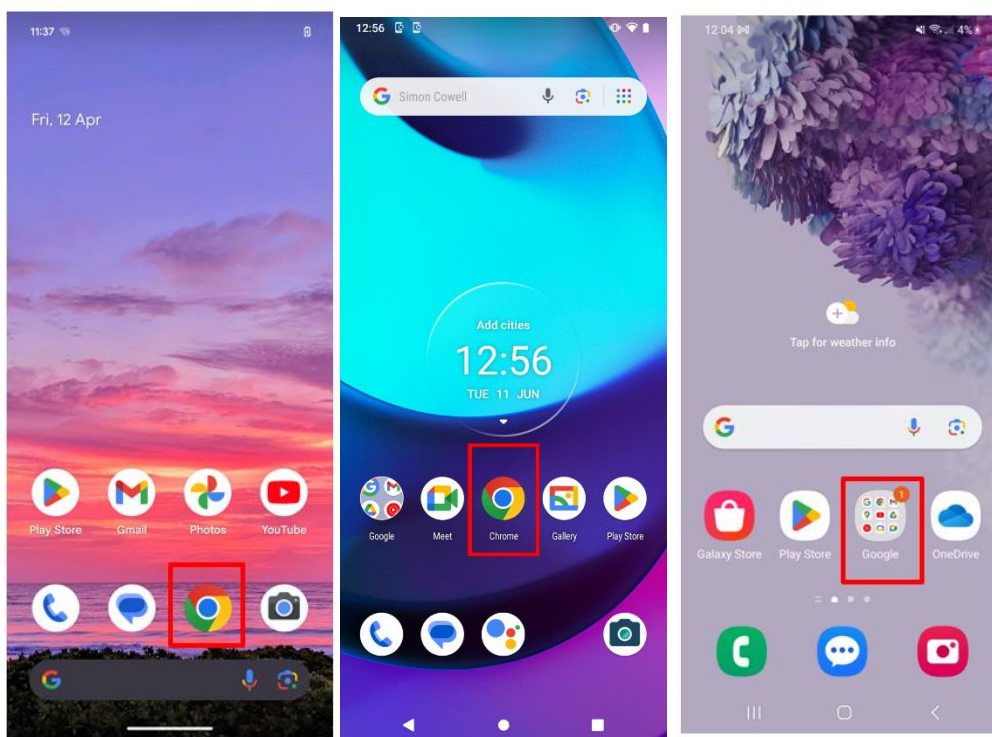
<sup>188</sup> [Consumer Views and Use of Web Browsers and Search Engines - Final Report](#) pp. 34-35.

their computer, 67% mostly used Chrome on their mobile device, with a further 26% primarily using Safari.<sup>189</sup>

## (b) Placement of Chrome and alternative browsers on Android devices home screen

- 4.25 On Android devices where Chrome is pre-installed, Chrome is always placed on the home screen – in some cases, Chrome will be placed in the Google folder on the home screen with other apps, but in many cases Chrome will be placed prominently in the application dock (see Figure 4.2).
- 4.26 Similarly to Safari on iOS devices, if a user downloads an alternative browser to Chrome when Chrome is in the hotseat, and sets that browser as their default browser, Chrome will still be positioned in the hotseat. However, users can customise the hotseat manually to have an alternative browser placed there.

**Figure 4.2: Chrome placement on Android devices [Google Pixel and Motorola – Chrome placed in the hotseat, Samsung S20 – Chrome placed in folder on the home screen].**



Source: CMA.

Note: Screenshot 1 taken on Google Pixel 6a running Android 14 in May 2024. Screenshot 2 taken on Motorola Moto E20 running Android 11 in June 2024. Screenshot 3 taken on Samsung S20 running Android 13 in April 2024.

<sup>189</sup> Verian Group UK (2024) Mobile Browsers Quantitative Research, slide 78.

## Evidence from Google

- 4.27 Google submitted that applications pre-installed on the default home screen for Google Pixel devices are important element of users' experience. [REDACTED].<sup>190</sup>
- 4.28 Google stated that the precise out-of-the-box placement configuration on Android devices varies between OEMs, their device models and even within specific models. It depends on the agreements the OEM has entered into with Google, third-party app developers, or carriers, and otherwise on how the OEMs choose to configure their devices and/or promote and bundle their own services and apps.<sup>191</sup> Google submitted that there are no restrictions on OEMs placing alternative browsers in the hotseat or on the home screen under their PAs.<sup>192</sup> However, some RSA contain clauses which restrict the placement on the home screen (unless in a folder) or the minus one screen of third-party browsers that do not use Google Search as the default search engine. These clauses are specific to certain devices in higher tiers that OEMs may choose to configure on a device-by-device basis and do not apply to OEMs' entire portfolio of devices (unless OEMs voluntarily choose to configure their entire portfolios).<sup>193</sup>

## Evidence from third parties

- 4.29 DuckDuckGo stated that prominent placement, alongside pre-installation and default status is critical for browser usage.<sup>194</sup> As with pre-installations, some browser vendors have stated that they are limited in their ability to achieve prominent placement on Android devices through agreements similar to those Google has with OEMs.<sup>195</sup>

## Evidence from consumer research

- 4.30 The Verian survey found that for 65% of Android users, the browser they used most often was placed on their home screen. Furthermore, 23% of those surveyed indicated that their most-used browser was pinned to their screen, such that it stayed in the 'hotseat' even when they swiped to a new location. By contrast, 11% of Android users indicated their most used browser was to be found on a page other than their home screen.<sup>196</sup>
- 4.31 The Verian survey found that 46% of Android users had chosen the position of the browser they most commonly used on their device, while 37% of users had not changed the position of their most used browser app. The remaining 17% of users

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<sup>190</sup> [REDACTED] response to the CMA's information request [REDACTED].

<sup>191</sup> Google's response to the CMA's information request [REDACTED].

<sup>192</sup> Google's response to the CMA's information request [REDACTED].

<sup>193</sup> Google's responses the CMA's information requests [REDACTED].

<sup>194</sup> DuckDuckGo's response to the CMA's information request [REDACTED].

<sup>195</sup> Notes from meetings with [REDACTED].

<sup>196</sup> Verian Group UK (2024) Mobile Browsers Quantitative Research Data Tables, browloc1.

were either not sure, could not remember or had someone else set up their smartphone.<sup>197</sup>

### (c) Default settings on Android devices

4.32 Google includes terms in its RSAs through which OEMs may elect to, on a device-by-device basis, receive higher tier payments for exercising certain configuration options in higher tiers (e.g., setting Chrome as the default browser on the device). These agreements also include terms that prohibit OEMs from changing the system default in relation to pre-installation, placement and default status, for pre-installed Google applications, including Chrome, and from encouraging users to change these settings.<sup>198</sup>

#### Evidence from Google

4.33 [REDACTED]<sup>199</sup>. [REDACTED]<sup>200</sup>

4.34 [REDACTED],<sup>201</sup> [REDACTED]

4.35 [REDACTED]<sup>202</sup>

4.36 [REDACTED].<sup>203</sup>

4.37 Google submitted that it did not currently track data on the number of Android users that have Chrome set as their default browser.<sup>204</sup>

4.38 [REDACTED]<sup>205</sup> [REDACTED].<sup>206</sup> [REDACTED].<sup>207</sup>

4.39 [REDACTED].

#### Evidence from third parties

4.40 Browser vendors view default status as an effective means of retaining users and increasing user engagement and would welcome the opportunity to achieve

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<sup>197</sup> Verian Group UK (2024) Mobile Browsers Quantitative Research, slide 47.

<sup>198</sup> Google's responses to the CMA's information requests [REDACTED].

<sup>199</sup> [REDACTED] internal document [REDACTED].

<sup>200</sup> [REDACTED] internal document [REDACTED].

<sup>201</sup> [REDACTED] internal document [REDACTED].

<sup>202</sup> [REDACTED] internal document [REDACTED].

<sup>203</sup> [REDACTED] internal document [REDACTED].

<sup>204</sup> Google's response to the CMA's information request [REDACTED].

<sup>205</sup> [REDACTED] internal document [REDACTED].

<sup>206</sup> [REDACTED] internal document [REDACTED].

<sup>207</sup> [REDACTED] internal document [REDACTED].



default status out-of-the-box.<sup>208</sup> For example, DuckDuckGo submitted that the majority of active browser use is by users who have its app set as the default.<sup>209</sup>

4.41 However, as previously mentioned, other browser vendors state that the agreements that allow Google to achieve default status are not financially viable for them.

4.42 Many OEMs comply with Google's RSAs which give OEMs the opportunity to receive higher tier payments for setting Chrome as the default browser on the device.<sup>210</sup> OEMs may elect to do this on a device-by-device basis. However, in some cases, OEMs may choose to use their own browser as the default at device setup (though Chrome is still pre-installed).<sup>211</sup>

4.43 Some OEMs also submitted that they do not collect device-level data on which browser a user has set as their default browser.<sup>212</sup> Instead, individual browser vendors can use an API to track when their browser is currently set as the default.<sup>213</sup>

### Evidence from consumer research

4.44 The Verian survey found that among Android users, Chrome was the default browser for 69% of respondents. Samsung Internet was the default browser for 21%. No other browser was the default for more than 3% of Android users.<sup>214</sup>

4.45 The Verian survey found that 56% of Android users had not changed their default browser, 27% had changed their default browser, and 17% were unsure whether they had or not.<sup>215</sup> Of those that had changed their default browser, the majority said they had found it very easy (54%) or fairly easy (34%), with just 2% reporting that they found it very difficult or fairly difficult.<sup>216</sup> Android users were almost twice as likely as iOS users to have changed their default browser (27% and 14% respectively).<sup>217</sup>

4.46 Respondents who indicated that they found the process of changing browsers to be 'fairly easy', 'fairly difficult' or 'very difficult', were then asked to indicate if they had experienced any specific issues. It was found that 65% experienced no issues, 14% indicated that too many steps were involved, 10% struggled to locate

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<sup>208</sup> Responses to the CMA's information requests [REDACTED].

<sup>209</sup> [REDACTED] response to the CMA's information request [REDACTED].

<sup>210</sup> [REDACTED] responses to the CMA's information requests [REDACTED].

<sup>211</sup> [REDACTED] response to the CMA's information request [REDACTED]. Note from meeting with [REDACTED].

<sup>212</sup> Responses to the CMA's information requests [REDACTED].

<sup>213</sup> [REDACTED] response to the CMA's information request [REDACTED].

<sup>214</sup> Verian Group UK (2024) Mobile Browsers Quantitative Research, slide 50.

<sup>215</sup> Verian Group UK (2024) Mobile Browsers Quantitative Research, slide 65.

<sup>216</sup> Verian Group UK (2024) Mobile Browsers Quantitative Research Data Tables, switchcase.

<sup>217</sup> Verian Group UK (2024) Mobile Browsers Quantitative Research, slide 65.

the menu in the settings, 4% could not follow the instructions and 5% were worried that they would not be able to change the settings back.<sup>218</sup>

- 4.47 Among Android users, with regard to the browser that they mostly used, 62% expressed a preference for that browser, ie stating either that it was their preferred browser (37%) or that they wanted to keep it based on their experience of using the browser (25%).<sup>219</sup>

#### **(d) Friction in the user journey for changing default browser on Android devices**

- 4.48 As set out in the CMA's MEMS report, Android users are required to take number of steps to change their system default browser under a specific setting in the device settings menu, making it a difficult task, often hard to complete.<sup>220</sup> The steps required to change this setting are shown in Figure 4.3. This friction in the user journey may discourage users from switching between browsers.

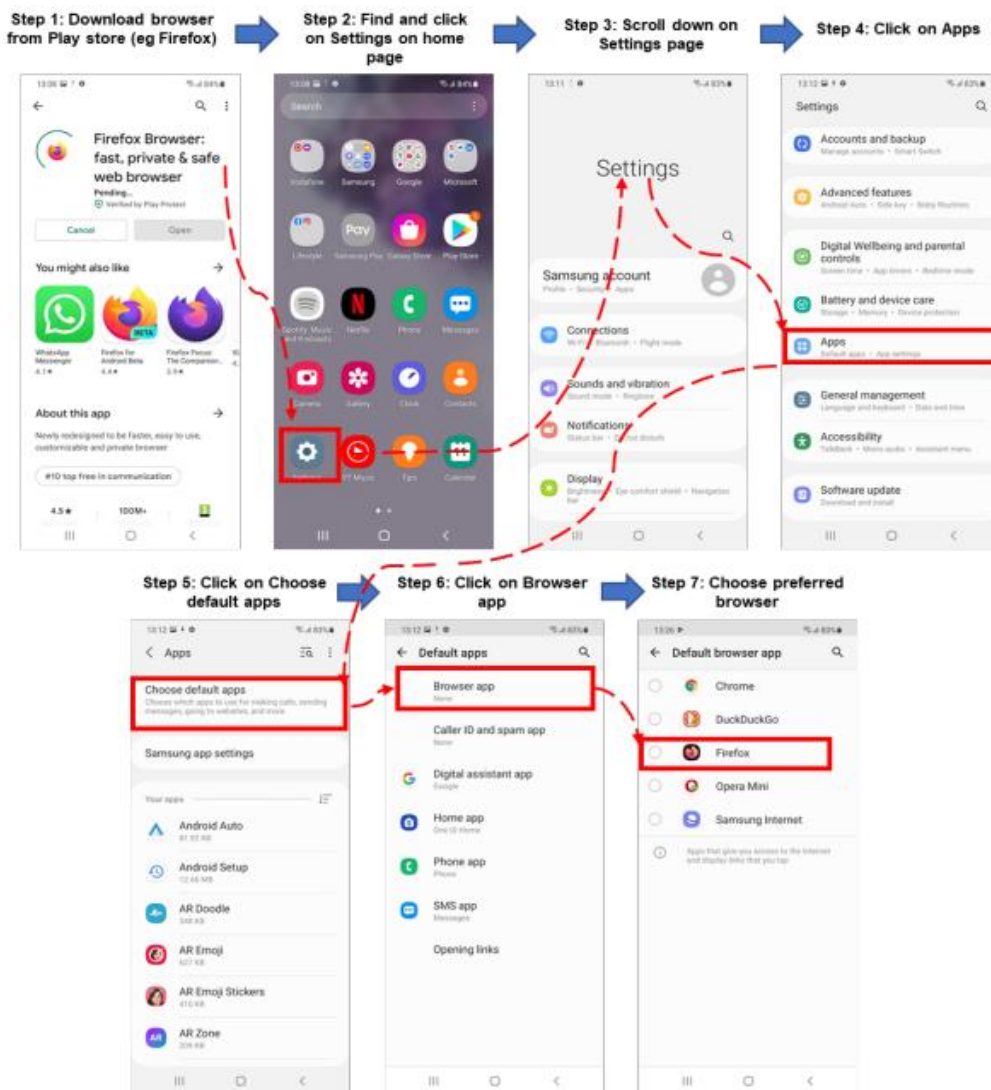
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<sup>218</sup> Verian Group UK (2024) Mobile Browsers Quantitative Research Data Tables, whydiff.

<sup>219</sup> Verian Group UK (2024) Mobile Browsers Quantitative Research Data Tables, whymost1.

<sup>220</sup> MEMS [Final report](#), p.169

Figure 4.3: User journey to change the default browser on Android devices.



Source: MEMS, Appendix G, p18.

Note: Screenshots taken on Samsung Galaxy S20 running Android 11 in November 2021.

## Evidence from Google

4.49 Google told that us that it had limited visibility over default settings of other apps and that it did not maintain data on the proportion of current Android users that have changed their default browser on their devices.<sup>221</sup>

4.50 Prior to 2024, Google submitted that if a user switched the default browser on their Android device from a system default, this choice would not transfer to a new device, even if the user transferred content and data from their old device.<sup>222</sup> Instead, users were required to actively reset their default browser on their new device if they wanted to use any browser other than the pre-set default. However,

<sup>221</sup> Google's response to the CMA's information request [X].

<sup>222</sup> Google's response to the CMA's information request [X].

Google has recently reported that as of December 2023 this is no longer the case in the UK. Android users default browsers are now carried over to new devices when they use device backup and transfer content and data from their old device.<sup>223</sup>

- 4.51 Google stated that each OEM separately controlled the user journey for switching default browser and that Google was unaware of the rationale for the precise implementation across manufacturers.<sup>224</sup> However, we found that OEMs do not customise the user journey for changing default browser but rely on the Android operating system implementation.<sup>225</sup>
- 4.52 Google also submitted that the effectiveness of a user journey to switch defaults cannot be judged effectively solely on the number of steps involved but should instead be determined by how intuitive and well-signposted the journey is.<sup>226</sup>

### **Evidence from third parties**

- 4.53 Several device manufacturers reported that they have chosen not to customise the settings for switching default browser, instead relying on the default operating system implementation, which is set by Google.<sup>227</sup> This means that the user journey for changing default browser is currently uniform across most Android devices.
- 4.54 Some browser vendors have cited the Android user journey as simpler, in contrast to the complexity of Apple's implementation on iOS devices.<sup>228</sup>

### **Evidence from consumer research**

- 4.55 The Verian survey found that among Android users 76% indicated that they could definitely or probably change their default browser, with just 24% indicating that they could probably not or definitely not do so.<sup>229</sup>
- 4.56 As with the iOS users, only a minority of Android users stated that they had actually changed their default browser on their current phone (27%), though we note that this figure was significantly higher than the corresponding figure for iOS users (14%).<sup>230</sup>

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<sup>223</sup> Google's response to the CMA's information request [redacted].

<sup>224</sup> Google's response to the CMA's information request [redacted].

<sup>225</sup> Responses to the CMA's information requests [redacted].

<sup>226</sup> Google's response to the CMA's information request [redacted].

<sup>227</sup> Responses to the CMA's information requests [redacted].

<sup>228</sup> Notes from meetings with [redacted].

<sup>229</sup> Verian Group UK (2024) Mobile Browsers Quantitative Research, slide 64.

<sup>230</sup> Verian Group UK (2024) Mobile Browsers Quantitative Research, slide 65.

- 4.57 Overall, the Verian consumer survey found that 56% of Android users had not changed their default browser, 27% had changed their default browser, and 17% were unsure whether they had or not.<sup>231</sup>
- 4.58 Respondents who found the process of changing default browser to be ‘very difficult’, ‘fairly difficult’ or ‘fairly easy’, were asked which, if any, issues they had experienced. The majority indicated that they had not experienced any problems (65%). When issues were encountered the most commonly cited were ‘too many steps involved’ (14%) and ‘I struggled to locate the right menu in settings’ (10%). Of those Android users that had not changed their default browser, when asked for a reason why, the most commonly selected responses were a preference for the default browser (35%) and that they had never thought about it (27%). However, 6% had not done so because they were unaware that they could change default, 6% did not know how to change default and 5% said that for them all browsers were the same.<sup>232</sup>
- 4.59 Across iOS and Android users, those whose self-assessed technical confidence in relation to downloading and using a different web browser on their smartphone and those whose self-assessed confidence in relation to changing the default browser on their smartphone was lowest were significantly more likely to select “I didn’t know how to do this” as a reason for why they had not changed default browser, than those whose self-assessed technical confidence was highest (21% vs. 0%).<sup>233</sup>

### **(e) Prompts and push notifications for switching to or trying an alternative browser on Android devices**

- 4.60 While prompts from Google to encourage users to switch their default browser to Chrome can reduce friction in the user journey if a user decides that Chrome is their preferred browser, prompts can also have potential effects on competition, by nudging users to revert back to a pre-installed browser at the expense of other browser vendors.

#### **Evidence from Google**

- 4.61 Google submitted that it could show prompts to users of Chrome both on iOS and Android devices, to encourage them to switch to Chrome as their default browser, if it was not already set as the default.<sup>234</sup> According to Google, there were four ways Google could use prompts on Android devices:

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<sup>231</sup> Verian Group UK (2024) Mobile Browsers Quantitative Research, slide 65.

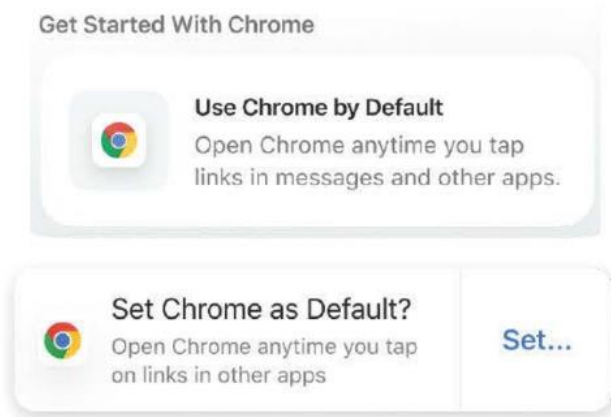
<sup>232</sup> Verian Group UK (2024) Mobile Browsers Quantitative Research Data Tables, switchease.

<sup>233</sup> Verian Group UK (2024) Mobile Browsers Quantitative Research, slide 70.

<sup>234</sup> Google’s response to the CMA’s information request [38].

- (a) **Prompts on Chrome:** On devices running Android 10 or later, Chrome shows prompts to users in Chrome through the API, which allows any browser to prompt users to set them as default. On iOS, there is no equivalent API.<sup>235</sup> Google said it showed these prompts to users early in their journey (eg when they first open Chrome).<sup>236</sup> See Figure 4.4 below. Google did not specify the frequency of display of these prompts. However, [redacted].<sup>237</sup> According to Google, the main prompts that Google ran were on iOS.<sup>237</sup>

**Figure 4.4: Prompt on Chrome asking users to set it as a default browser. Android.**<sup>238</sup>



Source: Google.

- (b) **Prompts on other Google apps.** Google said that it did not show prompts on other Google apps on Android.<sup>239</sup> However, the CMA noted a prompt type known as 'Setup promotion', whereby Google sends an email to users that recently signed into their Google account on Android device for the first time, suggesting that they try various Google apps and services, including Chrome. This promotion is illustrated in figure 4.5 below.

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<sup>235</sup> Google's response to the CMA's information request [redacted].

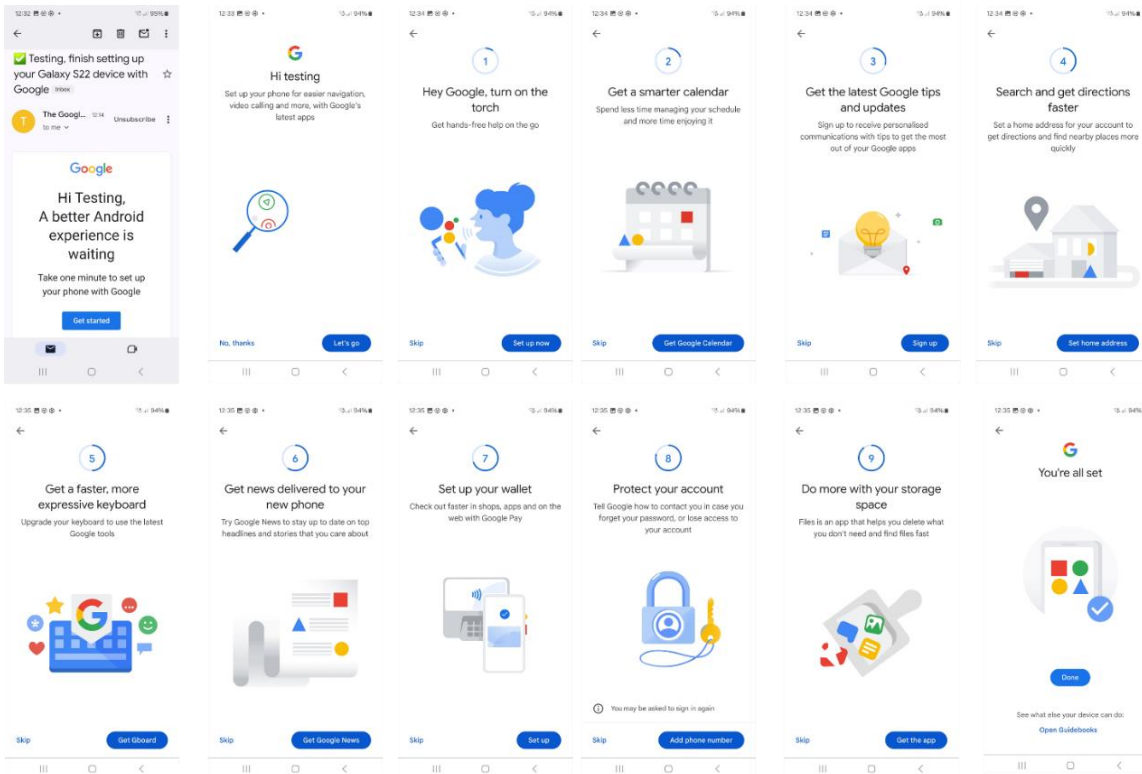
<sup>236</sup> Google's response to the CMA's information request [redacted].

<sup>237</sup> Google's response to the CMA's information request [redacted].

<sup>238</sup> Google's response to the CMA's information request [redacted].

<sup>239</sup> Google's response to the CMA's information request [redacted].

**Figure 4.5: 'Setup Promotion' prompt on Android.**



Source: CMA.

Note: Screenshots taken on iPhone 14 running iOS 17.5.1 in June 2024.

- (c) **Prompts on third-party browsers.** Google submitted that it currently did not show prompts on third-party browsers on Android devices but Google could technically surface a prompt if it wanted to do so.<sup>240</sup>
- (d) **In-app browsing.** When a user open links in a third-party apps, Google stated that it did not show active prompts/notifications asking the user whether they want to open the link instead in a separate browser, or to switch default browsers. Instead, Google stated that it generally gave users the option to open the relevant content in their default browser by opening a settings menu. See also 'WP4 - In-app browsing within the iOS and Android mobile ecosystems'.<sup>241</sup>

4.62 Google also said that other browser vendors also had visibility over whether their browser was set as the default on the Android mobile device (including Pixel) by calling on the above-mentioned API. If the browser was not the current default browser, the browser could prompt the user to make it the default browser.<sup>242</sup>

<sup>240</sup> Google's response to the CMA's information request [X].

<sup>241</sup> Google's response to the CMA's information request [X].

<sup>242</sup> Google's response to the CMA's information request [X].

- 4.63 Google submitted that the user had the option to tell Android not to ask them again about the default browser request for a given app. The user could tick the “don’t ask again” checkbox and the OS would never ask them again to set that app as the default browser; the option is not ticked by default. According to Google, there were no restrictions on browsers requesting to be the default browser.<sup>243</sup>
- 4.64 Google also submitted that Chrome did not currently show system-level push notifications on either Android or iOS mobile devices encouraging users to switch to Chrome or set it as default. [REDACTED].<sup>244</sup>
- 4.65 Google submitted that Android ‘technically’ could not prevent browsers from sending standard push notifications to their users asking them to switch defaults.<sup>245</sup>

### Evidence from third parties

- 4.66 Browser vendors view prompts as helpful for getting users to choose their browser as the default.<sup>246</sup> For example, Mozilla stated that it saw an increase in the number of days users engaged with their browser following Android’s introduction of prompts in 2021.<sup>247</sup>
- 4.67 On Android, Google submitted that browser vendors are able to both know when their browser is chosen as the default and are able to display prompts to users who do not have their browser set as the default because Google allows access to those APIs.<sup>248</sup> Browser vendors’ visibility of when their own app is set as the default (they do not have visibility over when other browsers are set as default) allows them to display prompts effectively.<sup>249</sup> (see Figures 4.6 and 4.7 as an example).

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<sup>243</sup> Google’s response to the CMA’s information request [REDACTED].

<sup>244</sup> Google’s response to the CMA’s information request [REDACTED].

<sup>245</sup> Google’s response to the CMA’s information request [REDACTED].

<sup>246</sup> Responses to the CMA’s information requests [REDACTED].

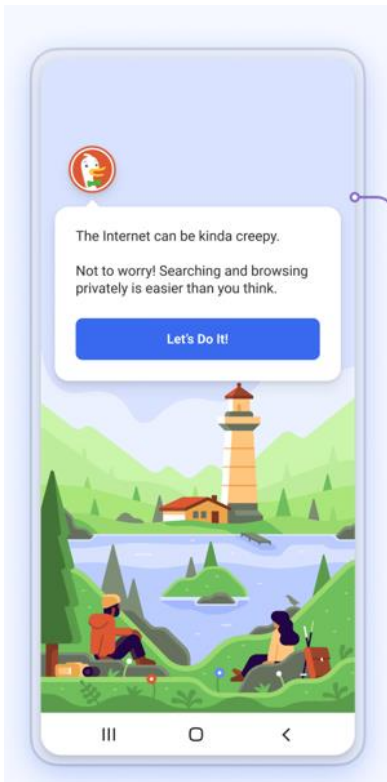
<sup>247</sup> Mozilla’s response to the CMA’s information requests [REDACTED].

<sup>248</sup> Google’s response to the CMA’s information request [REDACTED].

<sup>249</sup> Google’s response to the CMA’s information request [REDACTED].

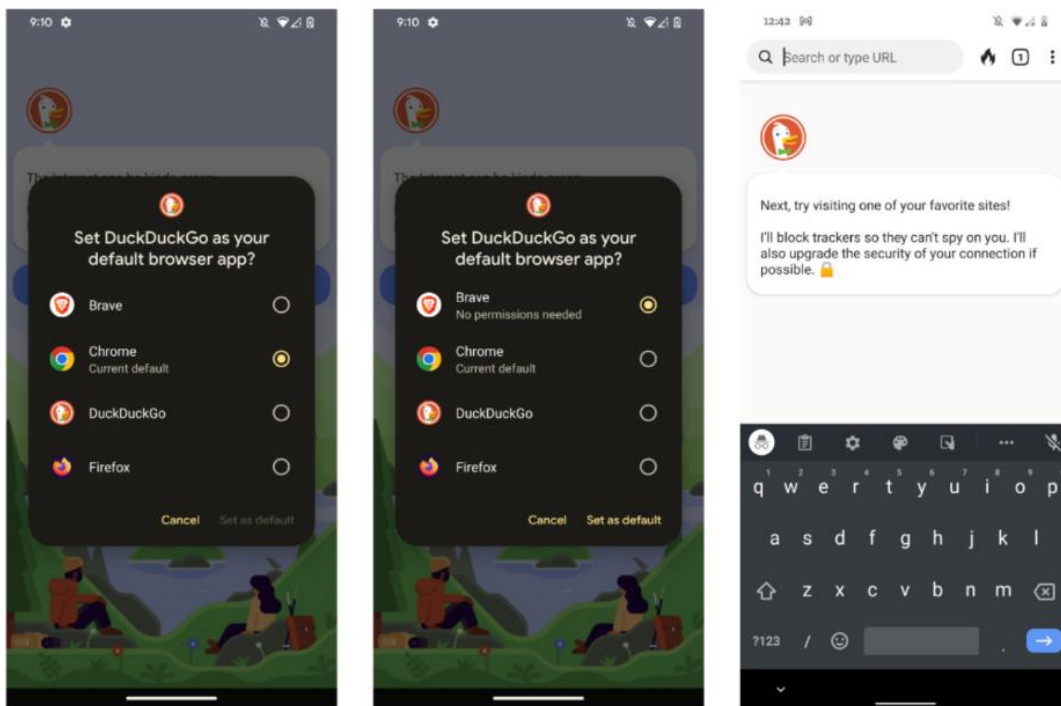


**Figure 4.6: Prompt surfaced by DuckDuckGo (DDG) encouraging the user to set DDG as a default browser.**



Source: DuckDuckGo.

**Figure 4.7: Screen displayed after the interaction with the DuckDuckGo (DDG) prompt.**



**Step 1:**  
Select Browser of choice from promo screen

**Step 2:**  
Tap 'Set as default' to confirm selection

**Action Complete**  
User remains in browser app

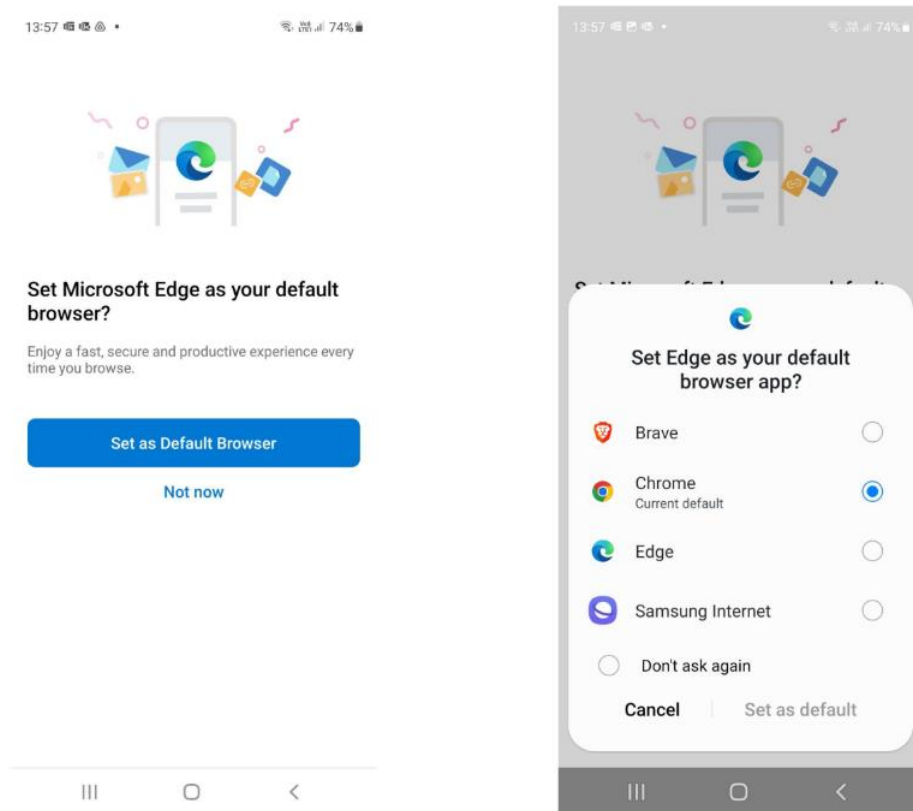
Source: Google.

4.68 Android OEMs that install Google’s proprietary apps and services are unable to alter the design of the prompt. Developers have no control over the choice dialog itself, but are encouraged to include introductory screens and dialogs, containing some justification and support for the change. For example, Edge implements the introductory window, which Microsoft is able to customise. See Figure 4.8 below.

**Figure 4.8: Edge introductory dialogue (customisable by Microsoft) and switching dialogue (not customisable by Microsoft).**

**Introductory dialogue (fully customisable)**

**Switching dialogue (not customisable, but adapted for prompting browser with icon and app name at the top)**



Source: Google.

### Evidence from consumer research

4.69 The Verian survey found that around 60% of Android users who had changed their default browser remembered seeing a prompt asking them to change their default browser back to a previous default browser; 20% reported not having seen such a prompt and the remaining 20% were unsure.<sup>250</sup>

4.70 As with iOS users, the majority of Android users that had switched browser found prompts asking them to switch back to Chrome usually helpful (30%) or

<sup>250</sup> Verian Group UK (2024) Mobile Browsers Quantitative Research, slide 72.

occasionally helpful (43%), with fewer finding them rarely helpful (19%) or never helpful (7%).<sup>251</sup>

4.71 The Verian qualitative research indicated that respondents disliked interruptions and therefore if a prompt was perceived as an interruption, users were likely to click 'no/’later’.<sup>252</sup>

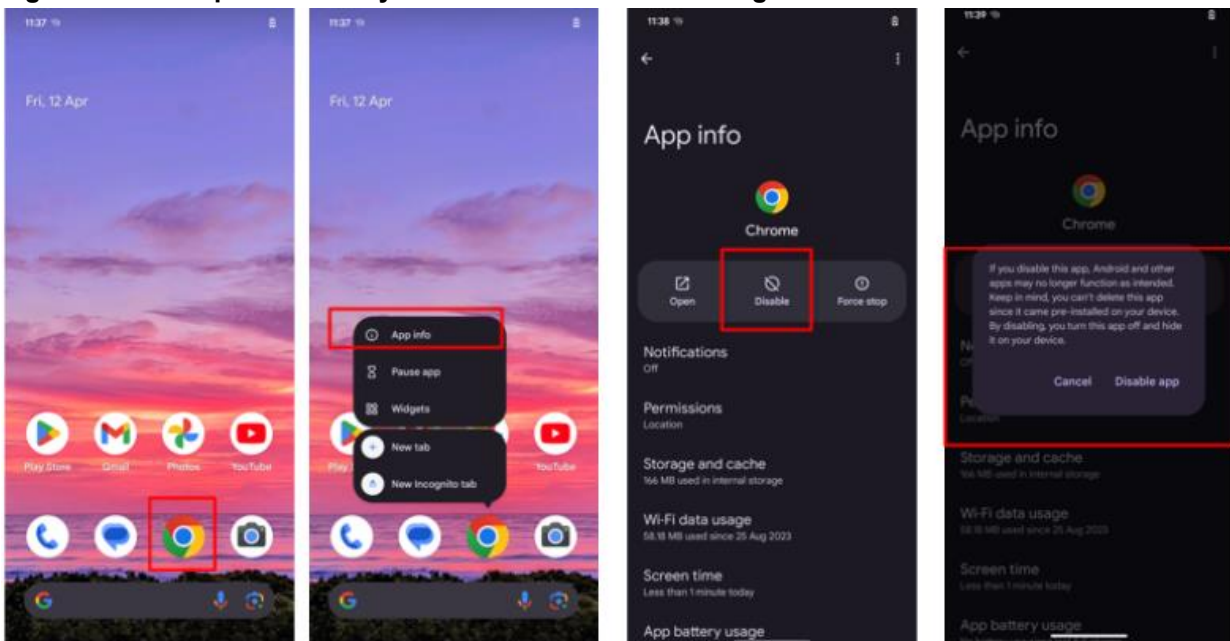
## (f) The ability of users to uninstall Chrome

4.72 Android users are unable to uninstall Chrome on their mobile devices when it has been installed by the OEM, while all other browsers that are downloaded by the user can subsequently be uninstalled. However, users are able to remove Chrome from their device home screen.

4.73 Not allowing Android users to uninstall Chrome may restrict users from exercising effective choice as it forces them to keep Chrome on their devices, even if they never intend to use it. The inability to uninstall Chrome may lead to the ‘endowment’ effect as noted in the section on Safari.

4.74 Users may also believe that there may be a functional reason as to why they cannot uninstall Chrome, that might give the impression that the pre-installed browser is the endorsed browser by Google and therefore should be used. Finally, this may allow Google to self-preference Chrome over other third-party browsers on Android potentially limiting competitive pressure.

**Figure 4.9: Example of inability to uninstall Chrome on Google Pixel.**



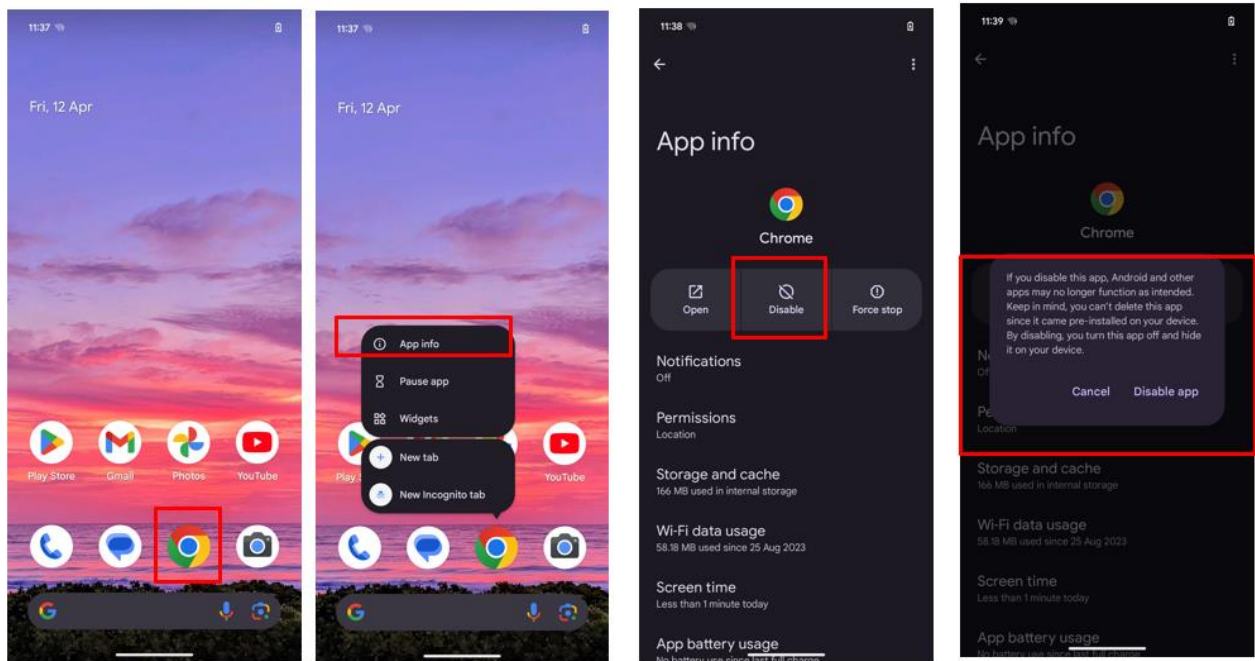
Source: CMA.

<sup>251</sup> Verian Group UK (2024) Mobile Browsers Quantitative Research Data Tables, promptpurp.

<sup>252</sup> Verian Group UK (2024) Mobile Browsers Qualitative Consumer Research, slide 41.

Note: Screenshots taken on Google Pixel 6a running Android 14 in May 2024.

Figure 4.10: Example of inability to uninstall Chrome on a Pixel device.



Source: CMA.

Note: Screenshots taken on Google Pixel 6a running Android 14 in May 2024.

## Evidence from Google

4.75 Google submitted that when Chrome has been installed by the OEM, it can be disabled but not fully deleted. When disabled, the app's icon disappears from the home screen and the app stops running in the background and stops collecting data.<sup>253</sup>

<sup>253</sup> Google's response to the CMA's information request [X].

## 5. Summary of emerging thinking on the impact of choice architecture on browser competition

- 5.1 The evidence gathered so far in this investigation suggests that 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, increasing barriers to entry and expansion for third-party browser vendors.
- 5.2 On iOS, Apple has control over the choice architecture shown to users of mobile browsers through the iOS operating system, which is a closed ecosystem that is not licensed to any other OEMs.
- 5.3 On Android, Google licenses the Android operating system to other OEMs, but has considerable influence over the choice architecture on Android devices as a result of various agreements with OEMs, which leads to Chrome being pre-installed, prominently placed and pre-set as default on Android devices. These agreements are discussed further in the Appendix A of this paper.
- 5.4 These choice architecture practices mean that:
- (a) On iOS devices, only Safari is pre-installed on new devices, placed on the 'hotseat' on the home screen, and pre-set as the default browser in factory settings.
  - (b) 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. Apple does not provide API functionality for third-party browser vendors that would enable them to target prompts specifically to users who have downloaded, but not yet set, an alternative browser as their default browser. Apple also does not permit users to uninstall Safari from iOS devices.
  - (c) On Android devices, Chrome is often pre-installed and pre-set as a default on the device and prominently placed either in the 'hotseat' or in a 'Google' folder in factory settings.
  - (d) After the point of device set up on Android devices, users face additional friction in the user journey for changing default settings because Chrome is usually set as the default browser. Google also uses prompts extensively to encourage users to change their default browser to Chrome, especially if users have changed their default browser to an alternative browser across both OS. In some cases, Chrome cannot be uninstalled from Android devices.

- 5.5 Certain choice architecture practices considered above are of potential concern, in particular:
- (a) Apple and Google's use of pre-installations and placement of browser apps on the device home screen means that users may be less aware of alternative browsers and less likely to make active choices between browsers.
  - (b) Various practices relating to the use of default browsers means that it is more likely that Safari and Chrome remain the default browser across different access points (eg Siri and Spotlight for Apple, Gmail and Google Search app) therefore protecting their usage and overall browser traffic.
  - (c) There is friction in the user journey for changing the default browser settings on iOS and Android which may make it hard for users to switch their default browser.
  - (d) Prompts to switch or change default settings used by Google have the effect of nudging users when they have set an alternative browser to return to Chrome across a number of different access points, while Apple restricts third-party browser vendors from accessing an API that would enable them to target users more effectively when using prompts to switch to alternative browsers (eg target users at the right time to avoid the intrusiveness of repeated prompts).
  - (e) The inability to uninstall Safari and Chrome further limits user control and choice over the customisation of their device, and could appear to create an implicit endorsement and self-preference Safari on iOS and Chrome on Android in comparison to other browsers.
- 5.6 Consumer research (including qualitative interviews and a quantitative survey conducted by Verian that has been commissioned by the CMA for the purpose of this investigation demonstrates a low level of consumer awareness of the choices that are available to them or the choice architecture that has been applied relating to the use of mobile browsers.
- 5.7 Overall, Apple's and Google's use of choice architecture for mobile browsers on mobile devices is likely to reduce user awareness, engagement and choice, which in turn is likely to reinforce the position of their own browsers (and browser engines) on iOS and Android devices.

## Appendix A: Google's agreements with device manufacturers and their impact on Android choice architecture

- A.1 Section 5 (see paragraph 5.3) of this working paper on refers to the agreements that Google has entered into with OEMs that affect browser choice architecture across Android devices.
- A.2 This Appendix provides a greater level of detail regarding:
- (a) the key agreements in place between Google and device manufacturers
  - (b) the key terms of agreements relating to choice architecture for mobile browser
  - (c) Summary of emerging analysis of Google's agreements with OEMs

### Key agreements in place between Google and device manufacturers

#### Android Compatibility Program, EMADA and Chrome/Search licences

- A.3 We focus primarily in this working paper on the PAs and RSAs between Google and Android manufacturers, pursuant to which manufacturers receive payments from Google for activated devices that fulfil conditions regarding the placement and access to Google Search and Chrome.
- A.4 However, entering into these agreements is dependent on being party to other agreements, which we explain briefly here. These other agreements are explained in more detail in the CMA's MEMS report.<sup>254</sup>
- A.5 While the Android operating system is based on open-source software, to license the Android name and logo, OEMs must enter into an agreement called the Android Compatibility Commitment (**ACC**) and comply with the definition of the Android operating system set out in the Compatibility Definition Document (**CDD**).<sup>255</sup>
- A.6 OEMs that have entered into the ACC and comply with the CDD can then enter into the European Mobile Application Distribution Agreement (**EMADA**). Under this agreement, OEMs pay Google a per-device licence fee to license a collection of Google apps and services (including popular Google apps such as Gmail, Maps, YouTube and the Play Store), known as Google Mobile Services (GMS).<sup>256</sup>

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<sup>254</sup> MEMS [Appendix E: Google's agreements with device manufacturers and app developers \(publishing.service.gov.uk\)](#)

<sup>255</sup> MEMS [Appendix E: Google's agreements with device manufacturers and app developers \(publishing.service.gov.uk\)](#), p. E9, para. 19-21

<sup>256</sup> MEMS [Appendix E: Google's agreements with device manufacturers and app developers \(publishing.service.gov.uk\)](#), p. E12-E13, para. 31-36

- A.7 Prior to 2018, the Google Search App and Chrome applications were licensed on Android through the GMS suite of applications. In a 2018 decision, the European Commission mandated that the Google Search App and Chrome apps could no longer be bundled in this way.<sup>257</sup>
- A.8 Following this decision, OEMs can now also choose to license the Google Search App and/or Google Chrome apps through separate licences, as these services are not included in the GMS suite. There are no fees associated with these licences.
- A.9 OEMs that have entered into the ACC, CDD, the EMADA and Google Search and Chrome licences, are then eligible to enter into a PA and/or an RSA.<sup>258</sup> Figure 5.1 illustrates the relationship between the different types of agreements.<sup>259</sup>

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<sup>257</sup> MEMS [Appendix E: Google's agreements with device manufacturers and app developers \(publishing.service.gov.uk\)](#), p. E18, para. 51

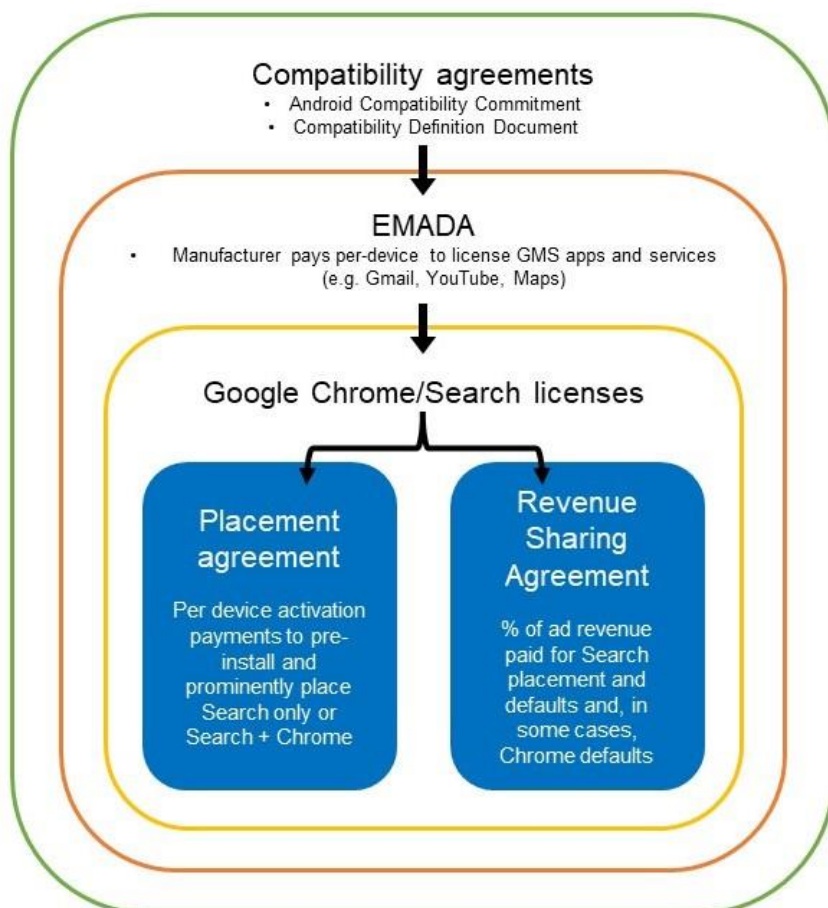
<sup>258</sup> MEMS [Appendix E: Google's agreements with device manufacturers and app developers \(publishing.service.gov.uk\)](#), p. E18, para. 52

<sup>259</sup> Adapted from the MEMS [Appendix E: Google's agreements with device manufacturers and app developers \(publishing.service.gov.uk\)](#), p. E4, figure E1



## Placement and Revenue Sharing Agreements

Figure 5.1: Relationship between agreements. Eligibility for PAs and RSAs is dependent on the manufacturer having Chrome and Search licences and a valid EMADA, which is in turn dependent on being compliant with the ACC.



Source: Illustration created by the CMA.

- A.10 OEMs can choose to enter into a PA and/or an RSA, conditional on entering into the EMADA and having licensed Google Search and Chrome. For some OEMs, the type of RSA they enter into is known as the Google Mobile Incentive Agreement (**GMIA**).<sup>260</sup> Henceforth, we use the term RSA to also include the GMIA.
- A.11 PAs allow manufacturers to earn per-device activation payments, paid by Google, provided that they comply with agreement terms to pre-install and place prominently either the Google Search App only or both the Google Search and Chrome apps.<sup>261</sup>

<sup>260</sup> Google's response to the CMA's information request [38].

<sup>261</sup> MEMS Appendix E: Google's agreements with device manufacturers and app developers ([publishing.service.gov.uk](https://publishing.service.gov.uk)), p. E19, para. 54

- A.12 RSAs allow manufacturers to earn revenue share through specific search access points on Android devices.<sup>262,263</sup>
- A.13 These agreements are not mutually exclusive; device manufacturers may enter into both a PA and an RSA.

### Current agreements between Google and Android device manufacturers

- A.14 Most OEMs that enter into the EMADA and separate licences for Google Search and Chrome also opt to have a PA. Both the PAs and the RSAs are dependent on the OEM being party to an EMADA agreement and obtaining Google Search and Chrome licences. Google has stated that typically manufacturers that enter into an RSA, will also have a PA with Google.<sup>264</sup>
- A.15 However, it is also possible to enter only into a PA and not an RSA. Google has stated that many OEMs do this.<sup>265</sup>
- A.16 Both PAs and RSAs appear to be prevalent across the top device manufacturers in the UK. Google has PAs and RSAs with at least [REDACTED] manufacturers that ship to the UK.<sup>266</sup> We have reviewed agreements from OEMs that represent a large majority of UK Android users.<sup>267</sup>
- A.17 Device activations covered by the agreements we have reviewed account for, in 2022, a total of [REDACTED] individual devices in the UK.<sup>268</sup> Google stated that not all such activations qualified for revenue sharing under the OEMs' RSAs.<sup>269</sup>

### Google's motivations for developing these agreements

- A.18 The majority of Google's revenue comes through Google Search and advertising.<sup>270, 271</sup> Though advertisers can publish across multiple different services (eg Search, YouTube, Maps), Google Search remains central to generating revenue from advertisers,<sup>272</sup> where, for example, publishers may pay an amount every time a user clicks on their content in the search results.

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<sup>262</sup> Ibid.

<sup>263</sup> [REDACTED] response to the CMA's information request [REDACTED].

<sup>264</sup> Google's response to the CMA's information request [REDACTED].

<sup>265</sup> Google's response to the CMA's information request [REDACTED].

<sup>266</sup> Google's response to the CMA's information request [REDACTED].

<sup>267</sup> The sample is defined based on Android UK market share [Mobile device vendors: market share 2012-2023 | Statista](#), as well as [REDACTED].

<sup>268</sup> [REDACTED] response to the CMA's information request [REDACTED].

<sup>269</sup> Google response to the CMA's information request [REDACTED].

<sup>270</sup> Google's response to the CMA's information request [REDACTED].

<sup>271</sup> MEMS [Appendix E: Google's agreements with device manufacturers and app developers \(publishing.service.gov.uk\)](#), p. E19, para. 54

<sup>272</sup> One Google VP commented: "Search is the revenue engine of the company", p.1 [Trial Exhibit-UPX2044: U.S.v. Plaintiff States v. Google LLC. \(justice.gov\)](#), accessed by the CMA 3 July 2024.

- A.19 As such, one possible avenue to increase revenue is through the search access points covered by the terms of the Placement, Revenue Sharing Agreements and the GMIA – ensuring that Google Search is highly visible and accessible to users compared to other search engines. Google Chrome is a key access point for search,<sup>273</sup> listed as such in the Revenue Sharing Agreements. This is also reflected in the structure of the RSAs. For example, Chrome Browser is one of the ‘Search Access Points’ in some RSAs.<sup>274</sup>
- A.20 Google has also acknowledged the role that default apps have in driving Search traffic, [REDACTED].<sup>275</sup>
- A.21 Google views the agreements it has with device manufacturers as [REDACTED].<sup>276</sup>
- A.22 As such, they make significant investment into agreements with manufacturers, covering a large proportion of activated Android devices ([REDACTED]<sup>277</sup>).
- A.23 Several OEMs reported that pre-loading the Google Search and Chrome apps as laid out in the terms of PAs and RSAs carries benefits for their users, for example, offering an improved and consistent experience to users.<sup>278</sup> [REDACTED] commented that its users expect apps such as Google Search and Chrome to be available on Android devices.<sup>279</sup>
- A.24 OEMs also receive financial incentives for entering into the agreements. For example, OEMs receive per-device activation payments for fulfilling terms of the PAs, [REDACTED]. Importantly, OEMs have the opportunity to offset the per-device licensing costs paid under the EMADA, which are similarly divided by country and device tier.<sup>280</sup> [REDACTED].

**Table 5.2:** [REDACTED]<sup>281</sup>

[REDACTED]

- A.25 Based on these payments, OEMs will only recoup the licence fees paid under the EMADA if they comply with terms in the PA relating to both Google Search and Chrome (as opposed to search terms only), providing an incentive to comply maximally with the terms of the PAs.
- A.26 Payment data from 2023 suggests that OEMs do recoup the payments made under the EMADA with Google paying out more in PA activation payments for UK

<sup>273</sup> As described by one Google VP: “Chrome exists to serve search”, p.3 [Trial Exhibit - UPX0809: U.S. and Plaintiff States v. Google LLC \(justice.gov\)](#)

<sup>274</sup> Google’s response to the CMA’s information requests [REDACTED].

<sup>275</sup> Google’s internal document [REDACTED].

<sup>276</sup> Google’s response to the CMA’s information requests [REDACTED]. Google’s internal documents [REDACTED].

<sup>277</sup> Google’s internal documents [REDACTED].

<sup>278</sup> Responses to the CMA’s information requests [REDACTED]. Note from meeting with [REDACTED].

<sup>279</sup> Note from meeting with [REDACTED].

<sup>280</sup> Google’s response to the CMA’s information request [REDACTED].

<sup>281</sup> [REDACTED].

devices ([REDACTED]) than it receives in UK EMADA licensing revenues ([REDACTED]).<sup>282</sup> [REDACTED] acknowledged that the earnings made through its PA are used to offset the costs it pays to enter the EMADA.<sup>283</sup>

- A.27 As mentioned in paragraph 7.29, OEMs that choose to enter into RSAs will then receive further financial incentives by complying with terms relating to Google's apps and services, depending on the device tiers that they choose for the configuration of their devices on a device-by-device basis.<sup>284</sup>
- A.28 Google makes substantial payments to OEMs under these agreements – in 2023, it paid approximately [REDACTED] globally under RSAs to OEMs that comprise a majority market share in the UK Android market.<sup>285</sup>
- A.29 Several OEMs told us that the financial incentives they receive from PAs and RSAs are key motivators for entering into and complying with the terms of these agreements.<sup>286</sup>
- A.30 [REDACTED]<sup>287</sup> However, negotiating power may be conditional on the OEM and its relationship with Google, such that the financial benefits of these agreements may be more favourable to larger manufacturers with a larger market share.
- A.31 Stakeholders have submitted that it is very difficult for other browser vendors to replicate these types of agreements with OEMs. Firstly, pre-installation and default status out-of-the box are considered desirable by multiple browser vendors, and several browser vendors have expressed the view that they welcome opportunities to develop agreements of their own.<sup>288</sup>
- A.32 Google pays substantial revenue shares and activation payments to device manufacturers for fulfilling the terms of the PAs and RSAs. Many of the browser vendors we spoke to told us that, while they had attempted to set up agreements of their own, these agreements were difficult to set up and mostly unsuccessful.<sup>289</sup> Several of these browser vendors said that they deem the cost of these agreements to be too high,<sup>290</sup> especially given that any incentive agreements they developed would have to compete with the agreements Google currently has in place.

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<sup>282</sup> Google's response to the CMA's information request [REDACTED].

<sup>283</sup> [REDACTED] response to the CMA's information request [REDACTED].

<sup>284</sup> Google's responses to the CMA's information requests [REDACTED].

<sup>285</sup> Google's response to the CMA's information request [REDACTED].

<sup>286</sup> Notes from meeting with [REDACTED]; Responses to the CMA's information requests [REDACTED]

<sup>287</sup> [REDACTED] response to the CMA's information requests [REDACTED].

<sup>288</sup> Notes from meetings with [REDACTED] Response to the CMA's information request [REDACTED].

<sup>289</sup> Responses to the CMA's information requests [REDACTED].

<sup>290</sup> Responses to the CMA's information requests [REDACTED].

- A.33 Secondly, the PAs and RSAs Google has in place allows them to be pre-installed, placed prominently and, in some cases, set as the default browser on Android devices out-of-the-box.
- A.34 While OEMs party to either a PA or RSA are able to pre-install other browsers onto their devices, most manufacturers do not pre-install multiple browsers unless it is the manufacturer's first party browser. For example, data from Google shows that in the 12 month period from March 2023 – February 2024, Android devices were pre-installed with an average of 1-2 browsers.<sup>291</sup>
- A.35 Therefore, the current pre-sets may limit rival browser vendors from accessing users of Android devices (see section 5 on emerging thinking on the impact of choice architecture on mobile browsers).
- A.36 Finally, some device manufacturers are also browser vendors. While the agreements they have with Google do allow them to pre-install, place prominently and set as default their own browser, the PAs and RSAs mean that they receive payments if they comply with terms of the agreements in relations to Chrome. They can also receive payments if they comply through [REDACTED].<sup>292</sup>
- A.37 Overall, the agreements between Google and OEMs mean that Google is able to specify detailed requirements about the use of choice architecture in relations to Chrome across Android devices.

## **Key terms of agreement relating to choice architecture for mobile browsers**

- A.38 Under the PAs and RSAs, Google pays OEMs in return for the OEMs agreeing to certain pre-installation and placement conditions for Google's apps and services on the OEMs' devices.<sup>293</sup>

### **Placement Agreements**

- A.39 Under the PAs, Google pays manufacturers 'activation payments' for each device on which they pre-install the Google Search or Google Search and Chrome apps and satisfy certain placement obligations for either (i) the Google Search app, or (ii) the Google Search and Chrome apps.<sup>294</sup>

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<sup>291</sup> [REDACTED].

<sup>292</sup> Google's responses to the CMA's information requests [REDACTED].

<sup>293</sup> Google's response to the CMA's information request [REDACTED].

<sup>294</sup> MEMS [Appendix E: Google's agreements with device manufacturers and app developers \(publishing.service.gov.uk\)](#), p. E19, para. 54

- A.40 The following section focuses on pre-installation, placement and default clauses as regards Chrome for UK devices under the PAs for OEMs representing a large majority of UK Android users.
- A.41 If OEMs pre-install and comply with the placement requirements in respect of Google Chrome in addition to Google Search they earn a substantially larger payment per device.<sup>295</sup>
- A.42 Google submitted that the PAs are optional and standalone, ie there is no requirement in any other Google agreement for an OEM to also enter into a PA. Google further submitted that the PAs operate on a per-device basis, ie the OEM can choose on a device-by-device basis whether to meet the requirements in the PAs and earn activation payments. Google further submitted that the PAs are non-exclusive, ie they do not prevent an OEM from pre-installing other browsers or placing them favourably.<sup>296</sup>

### **Pre-installation requirements under the Placement Agreements**

- A.43 Our review of PAs for OEMs that represent a large majority of UK Android users indicates that in order for an OEM's mobile device to qualify for the higher Chrome-related activation payments, the OEM is required to pre-load Chrome under a licence granted by a 'Chrome License Agreement'.<sup>297</sup>

### **Placement requirements under the Placement Agreements**

- A.44 Our review of PAs for OEMs that represent a large majority of UK Android users indicates that in addition to pre-loading Chrome, for an OEM's device to qualify for the higher Chrome-related activation payments under the PAs, the OEM must commonly place Chrome in the Google folder on the device's default home screen (if not more prominently).<sup>298</sup>
- A.45 Our review of PAs for OEMs that represent a large majority of UK Android users indicates that for a device to be eligible to receive the higher Chrome-related activation payments the OEM is commonly required to [REDACTED].<sup>299</sup>

### **Default clauses under the Placement Agreements**

- A.46 Our review of PAs for OEMs that represent a large majority of UK Android users has not identified clauses that require Chrome to be set as the default browser.<sup>300</sup>

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<sup>295</sup> MEMS [Appendix E: Google's agreements with device manufacturers and app developers \(publishing.service.gov.uk\)](#), p. E19, para. 54

<sup>296</sup> Google's response to the CMA's information request [REDACTED].

<sup>297</sup> [REDACTED].

<sup>298</sup> [REDACTED].

<sup>299</sup> [REDACTED].

<sup>300</sup> [REDACTED].

Google confirmed that its PAs do not contain obligations to set Chrome as default.<sup>301</sup>

### Uninstallation clauses under the Placement Agreements

- A.47 Our review of PAs for OEMs that represent a large majority of UK Android users has not identified any clauses that require OEMs to prevent users from uninstalling Chrome.<sup>302</sup>
- A.48 However, we have found clauses that [REDACTED].<sup>303</sup>

### Revenue Sharing Agreements

- A.49 As set out in the CMA's MEMS report, under its RSAs, Google pays some manufacturers a proportion of its net advertising revenue from specific search access points on their devices in return for meeting a number of placement and promotion requirements.<sup>304</sup>
- A.50 Our review of RSAs of OEMs that represent a large majority of UK Android users shows that payments from Google can include [REDACTED].<sup>305</sup>
- A.51 Google explained that Google's RSAs [REDACTED].<sup>306</sup>
- A.52 This Appendix focuses on pre-installation, placement and default requirements as regards Chrome for UK devices under RSAs of OEMs representing a large majority of UK Android users.

### Placement clauses under the Revenue Share Agreements

- A.53 Our review of RSAs of OEMs representing a large majority of UK Android users indicates that some RSAs contain clauses that give OEMs the option to qualify for certain higher revenue share tier by [REDACTED].<sup>307</sup>
- (a) [REDACTED].<sup>308</sup>
- (b) [REDACTED].<sup>309</sup>

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<sup>301</sup> Google's response to the CMA's information request [REDACTED].

<sup>302</sup> [REDACTED].

<sup>303</sup> [REDACTED].

<sup>304</sup> MEMS [Appendix E: Google's agreements with device manufacturers and app developers \(publishing.service.gov.uk\)](https://publishing.service.gov.uk), p. E19, para. 54

<sup>305</sup> [REDACTED].

<sup>306</sup> Google's response to the CMA's information request [REDACTED].

<sup>307</sup> [REDACTED].

<sup>308</sup> [REDACTED].

<sup>309</sup> [REDACTED].

(c) [REDACTED].<sup>310</sup>

(d) [REDACTED].<sup>311</sup>

### Default clauses under the Revenue Share Agreements

A.54 Our review of RSAs of OEMs representing a large majority of UK Android users indicates that some RSAs contain clauses that require Chrome to be set as the default browser on the device for a device to qualify for certain revenue share tiers.<sup>312</sup>

(a) [REDACTED].<sup>313</sup>

(b) [REDACTED].<sup>314</sup>

(c) [REDACTED].<sup>315</sup>

(d) [REDACTED].<sup>316</sup>

A.55 We have also found an instance of a clause that [REDACTED].<sup>317</sup>

A.56 [REDACTED].<sup>318</sup>

### Pre-installation clauses under the Revenue Share Agreements

A.57 Our review of RSAs of OEMs representing a large majority of UK Android users indicates that clauses that appear to *de facto* requirement to pre-install Chrome for a device to qualify for additional revenue share (that OEMs may elect for on a device-by-device basis) are common.<sup>319</sup>

(a) [REDACTED].

(b) [REDACTED].

A.58 Our reviews of RSAs of OEMs representing a large majority of UK Android users indicates that some RSAs contain clauses that [REDACTED]. These clauses apply to certain higher tiers of devices that OEMs may elect to configure on a device-by-device basis.<sup>320</sup>

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<sup>310</sup> [REDACTED].

<sup>311</sup> [REDACTED].

<sup>312</sup> [REDACTED].

<sup>313</sup> [REDACTED].

<sup>314</sup> [REDACTED].

<sup>315</sup> [REDACTED].

<sup>316</sup> [REDACTED].

<sup>317</sup> [REDACTED].

<sup>318</sup> [REDACTED].

<sup>319</sup> [REDACTED].

<sup>320</sup> [REDACTED].



- (a) [REDACTED].<sup>321</sup>
- (b) [REDACTED].<sup>322, 323</sup>
- (c) [REDACTED].<sup>324 325 326</sup>
- (d) [REDACTED].<sup>327 328 329</sup>

### Uninstallation clauses under the Revenue Sharing Agreements

A.59 Our review of RSAs for OEMs representing a large majority of UK Android users has not identified any clauses that require OEMs to prevent users from uninstalling Chrome.<sup>330</sup>

### Summary of emerging analysis of Google’s agreements with OEMs

A.60 The agreements made between Google and device manufacturers detailed above appear to be prevalent across Android OEMs. Our analysis covers the majority of the Android market in the UK and all manufacturers that form a part of our analysis have both a PA and an RSA in place with Google.

A.61 The dependencies between PAs, RSAs and other agreements, such as the EMADA and compatibility requirements means that OEMs enter into a suite of related agreements that make Google applications and services prominent across the choice architecture of the Android ecosystem.

A.62 While some device manufacturers suggest that the presets mandated in these agreements can serve to improve the user experience, it is also the case the manufacturers receive substantial financial incentives to fulfil the terms of these agreements.

A.63 Those financial incentives may allow manufacturers to reduce their costs and therefore reduce device costs for consumers in the short term. However, there are also relevant considerations concerning the effect that such financial incentives have on manufacturers to:

- (a) consider other browser vendors for pre-installation on their devices; and

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321 [REDACTED].  
 322 [REDACTED].  
 323 [REDACTED] response to the CMA’s information request [REDACTED].  
 324 [REDACTED] response to the CMA’s information request [REDACTED].  
 325 [REDACTED].  
 326 [REDACTED] response to the CMA’s information request [REDACTED].  
 327 [REDACTED] response to the CMA’s information request [REDACTED].  
 328 [REDACTED].  
 329 [REDACTED] response to the CMA’s information request [REDACTED].  
 330 [REDACTED].

- (b) for OEMs that also provide their own browser, develop a competitive first-party browser app on the same device on which Chrome is pre-installed.

A.64 In addition, other browser vendors may face barriers relating to:

- (a) the opportunity to develop similar agreements with device manufacturers;  
and
- (b) the effects that the current choice architecture on Android devices out-of-the-box has on consumer choice, and the ability of browser vendors to access new users and provide a quality user experience.

A.65 Overall, through the agreements detailed in this Appendix, Google has considerable influence over the choice architecture on Android devices and this leads to Chrome being prominently installed and placed on Android devices.