Appendix E: Google's agreements with device manufacturers and app developers

Introduction

1. Chapters 3 and 4 set out at a high-level various information and concerns we have identified regarding Google's agreements with device manufacturers – or Original Equipment Manufacturers ('OEMs') – and a recent initiative aimed at app developers named 'Project Hug'. This appendix provides a greater level of detail and explanation to support the findings set out in those chapters. This introduction provides a brief overview of the different agreements and how they interrelate and sets out a summary of their competitive implications, before we discuss each agreement and the initiative Project Hug in more detail.

Overview

2. Most Android devices are manufactured by third-party manufacturers who license the 'Android' trademarks from Google, provided that they meet certain compatibility criteria (as explained in further detail below). In particular, Google's Pixel range of mobile devices only accounts for [0-5]% of new smartphones in 2021 and [0-5]% of new tablets in the same year.[1]

3. The Android operating system is based on open-source software and was originally developed by the Open Handset Alliance, a consortium of 84 technology companies with the objective of developing open standards for mobile devices.[2] Android is currently commercially sponsored by Google, which licenses the Android name and logo to manufacturers that enter the Android Compatibility Program.[3]

4. As further detailed below, Android manufacturers that also want to license Google's apps and services, including Google's proprietary application programming interfaces (APIs), are required by Google to enter an agreement called the Android Compatibility Commitment (ACC) under which they agree to maintain compatibility with a baseline version of Android as set out in the Compatibility Definition Document (CDD).

5. Manufacturers that have entered the ACC and thus meet the terms of the CDD, meaning they use a Google-compatible version of Android on their

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[1] Analysis of data from market participants.
[2] Open Handset Alliance.
[3] See Android Brand guidelines and Android Compatibility Program Overview | Android Open Source Project.

devices, can then enter the European Mobile Application Distribution Agreement (EMADA) under which they pay Google a per-device licence fee to license a collection of Google apps and services, named Google Mobile Services (GMS).

6. GMS (or the 'GMS suite') includes popular Google apps such as Gmail, Maps, YouTube and the Play Store, as well as Google Play Services, a set of proprietary features, functionalities, and APIs that can be included in apps developed for Android devices which use GMS. As further explained below, Google Play Services APIs allow third-party developers to make use of basic features and functionalities such as push notifications, location, advertising or security services or to communicate with Google's first-party services (such as Google Maps, Search, Gmail, and Translate on Android) and create rich features compatible with Android. If a manufacturer wants to pre-install one of Google's apps included in the GMS suite, then it has to pre-install all of them and place the Play Store on the default home screen and the rest of the apps in a 'Google' folder on the default home screen.

7. The EMADA does not include licences for the Google Search app or Google's Chrome browser, which are distributed under separate licence agreements to manufacturers. However, licensing Google Search and Chrome is conditional on a manufacturer entering the EMADA (or being an 'EMADA partner').

8. Google offers EMADA partners payments, both fixed payments per activated device and revenue shares. These payments are **conditional** on the manufacturer entering the EMADA (and thus the ACC) and compliance with certain requirements in relation to Google apps such as Google Search, Google Chrome and (in some cases) the Play Store. Payments from Google to device manufacturers are made through the following agreements:

    - **Placement agreements (PAs)**: these provide for per-device 'activation payments' for each device on which manufacturers pre-install either the Google Search app or the Google Search and Chrome apps and satisfy certain placement obligations for either Google Search or both. If manufacturers 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;

    - **Revenue sharing agreements (RSAs)**: pursuant to these agreements:

        – Google shares a proportion of net advertising revenue from specific search access points on manufacturers' devices in return for meeting a number of placement and promotion requirements relating to Google's apps including Google Search and Google Assistant such as setting the Google Search app as the default search engine on all preloaded

manufacturer browsers.[4] The proportion of revenue shared with the manufacturer increases with the more requirements met by a device;[5]

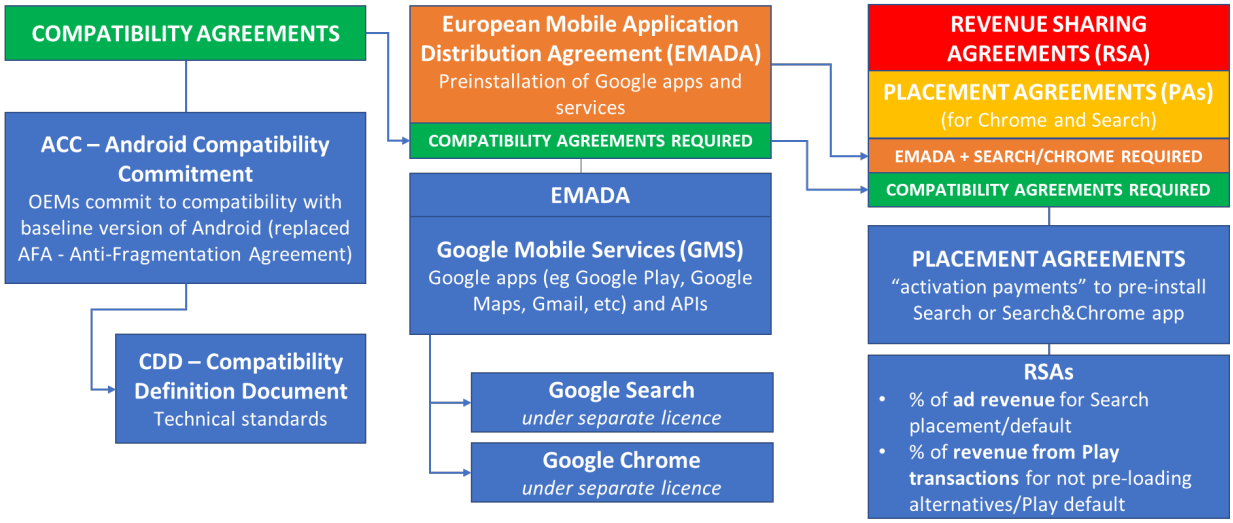
– Google shares a proportion of net revenue from Play Store transactions with some manufacturers where devices meet certain additional requirements in relation to the Play Store, namely setting the Play Store as the default app store and not preloading similar services, such as alternative app stores, launchers, and apps not available on the Play Store, on those devices.[6]

The exact proportion of revenue Google shares with manufacturers via its Revenue Sharing Agreements usually varies by manufacturer.[7]

9. Figure E.1 below summarises our understanding of the hierarchy of these Google agreements respectively governing: (i) the maintenance of Google-compatible versions of Android ('Compatibility Agreements'); (ii) the licensing of Google's apps and services ('EMADA'); and (iii) Google payments for preinstalling or respecting certain obligations in relation to Google apps such as Google Search, Google Chrome and the Play Store ('Revenue Sharing Agreements' and 'Placement Agreements').

[4] Google told us that third-party browsers (as opposed to manufacturer browsers) can have non-Google search services set as default instead, provided that they are not placed on the default home screen (unless in a folder) or the minus one screen. Google also told us that after the EC's decision in Google Android the default search service in Chrome is set according to the Android choice screen mechanism that applies in the UK and EEA.
[5] As further detailed below, Google has RSAs in place with MNOs as well as device manufacturers, including in respect of devices shipped into the UK.
[6] Google told us that '[a]s a technical matter, there is no concept of a default app store on Android. A link or advert would be specific to Play, Samsung Galaxy Store, or other Android app stores. There is no well-developed 'generic' or 'open' link functionality that could be handled by multiple stores and which requires a default to be set or a user selection to be made.' We understand launchers to be user interfaces initiated by, for example, pressing on the home button, invoking the default home screen, or by an initial boot-up of the device.
[7] For example, those of [✂].

Figure E.1: Hierarchy of Google's agreements with manufacturers



Source: CMA analysis

10. In addition to the agreements described above, we are aware of an initiative implemented by Google as operator of the Play Store in 2019 which targeted a number of major app developers, namely 'Project Hug'. Under the initiative, Google provides developers with certain benefits to encourage them to continue to develop and distribute their apps via the Play Store. The value of these benefits, which takes several forms, including related to the use of other Google's products and services (eg cloud, advertising and marketing services), is estimated by Google to equate to an effective reduction in the commission rate to these developers (which we understand to be the service fee it charges them in relation to in-app transactions on Play Store apps). In exchange for these benefits, developers agree to treat Play at least comparably to other distribution platforms in terms of feature and content availability and timing of launch of their apps.

Summary of competitive implications

11. We consider Google's agreements with manufacturers to be relevant for multiple areas of our assessment, including competition in the provision of mobile devices and operating systems (Chapter 3), competition in native app distribution (Chapter 4), competition in the provision of browsers (Chapter 5) and competition in the provision of apps in general (Chapter 6). Moreover, we consider Project Hug to be relevant to our assessment of competition in native app distribution (Chapter 4).

12. We further consider that Google's agreements with manufacturers allow Google to use its market power in search to protect its position in mobile operating systems and native app distribution as well as ultimately reinforcing Google's position in search and search advertising, which is Google's largest source of revenue, as set out in Chapter 2.

13. Below we summarise the competitive implications of Google's agreements with manufacturers and Project Hug in relation to operating systems and native app distribution as we set out in the relevant chapters of the main report.

14. In Chapter 3 we set out how:

- Google is able to use its market power in search engines and search advertising[8] in order to protect its position in mobile operating systems. This in turn allows it to reinforce its position in search and search advertising. More specifically:
  - The revenue sharing agreements via which Google shares its search advertising revenue with manufacturers are conditional on them using a compatible version of Android and licensing Google's apps and APIs included in GMS (including the Play Store) which are important for ensuring that many native Android apps operate as they should. This ensures that manufacturers only receive a portion of Google's revenue if they use Google's version of Android, and a core set of Google's apps (including the Play Store and other GMS apps, such as Gmail, Maps and YouTube) are pre-installed on their devices.
  - Google's extensive pre-installation and default positions act as a significant barrier to expansion for rival search engines, by limiting their ability to access consumers, build their scale and grow into stronger competitors over time.[9]
  - The revenue sharing agreements also reinforce Google's position in search advertising. This is because manufacturers' use of Android allows Google to access extensive first party data which is likely to give it a substantial advantage over smaller rivals in advertising, creating a barrier to entry and expansion.[10]

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[8] In the Online Platforms and Digital Advertising Market Study the CMA found: (i) Google has significant market power in the general search sector, having had a share of supply of around 90% or higher in the UK for more than a decade, and in search advertising, where it accounts for over 90% of search advertising revenues. (ii) Google's market power in search advertising has allowed it to charge higher prices to advertisers than its competitors – on a like-for-like basis, Google's prices are on average [30-40]% higher on mobile devices than its main rival Bing. (iii) Having been by far the largest search engine for more than a decade, Google benefits from higher perceived quality among many consumers, can generate more search advertising revenues from a given default and is able to pay more for default positions than other search engines. See Online Platforms and Digital Advertising market study, Final report (publishing.service.gov.uk), pages 73 and 211 and paragraph 3.149.
[9] See also Online Platforms and Digital Advertising market study, Final report (publishing.service.gov.uk), paragraph 3.149.
[10] For example, Google can access extensive data on user location, including through Android smartphones, on which half to two thirds of users have location services activated; this allows search advertising to be more effectively targeted based on location. See Online Platforms and Digital Advertising market study, Final report (publishing.service.gov.uk), paragraph 5.60.

- Given that rivals are unlikely to be able to replicate the payments Google makes to manufacturers, switching away from Android would entail manufacturers missing out on significant financial benefits from pre-installing and meeting certain requirements in relation to Google's apps (which are all very popular with users).

- In addition, even a new entrant in mobile operating systems using a version of Android without GMS would lose access to many popular Google apps and other Android apps which rely on Google's APIs to function properly. This is because GMS and the APIs it includes are important to give access to developers to the mobile device's hardware features or to particular services and other apps installed on the device. Therefore, lack of access to GMS impacts alternative providers' ability to attract app developers and, in turn, users.

15. In Chapter 4 we set out how:

- Google's agreements ensure that the Play Store is pre-installed and prominently placed on the device home screen of the vast majority of Android devices. In particular, only if the Play Store is pre-installed and prominently placed can a manufacturer:

  - License key Google apps and APIs. This means manufacturers have a strong incentive to pre-install and prominently place the Play Store as the apps and APIs included in the GMS suite are popular and they ensure that as many Android native apps as possible will work on their devices.[11,12]

  - License Google Chrome and Search apps and, subject to certain additional requirements, receive substantial payments, including a proportion of Google's advertising revenue generated on relevant Android devices. This means manufacturers have a strong incentive to pre-install and prominently place the Play Store – as the Chrome and Search apps are very popular apps with users and the payments Google shares with manufacturers are material such that, without a similar position in search advertising, rivals cannot replicate them.

- The Play Store is not only linked to other elements of the GMS suite contractually (as set out in detail below), but also from a technical

[11] Where a developer uses Google proprietary APIs for its apps, the proper functioning of it can only be guaranteed if the device also runs Google Play Services. In this regard Google estimated that, as of April 2022, [70-80]% of apps available on the Play Store use at least one Google Play Services API.
[12] As set below, if a manufacturer wants to pre-install one of Google's apps included in the GMS suite then the manufacturer has to pre-install all of them and place the Play Store on the default home screen and the rest of the apps in a "Google" folder on the default home screen.

perspective. In particular, Google told us that its APIs in GMS are updated frequently to ensure new and improved features (including security updates) are consistently available on all Android devices and this process occurs via the Play Store. Google told us that the Play Store has always had this function and, given updating the APIs included in GMS requires the device manufacturer to grant it certain 'sensitive capabilities', it is particularly important for device security that this happens via a Google source. However, while Google has provided us with some reasons for this,[13] Google has not set out why such Google source should necessarily be an app store.

- The latest version of Google's revenue sharing agreements (RSA 3.0) allows it to use its current position in native app distribution to disincentivise the pre-installation of rival app stores and the usage of alternative distribution channels by manufacturers in a way that rivals cannot counter, given that they do not have the same number of users on their app stores and do not have the scale to match such payments.[14] In particular, under RSA 3.0, manufacturers can receive a share of Google's net revenue from Play Store transactions if they meet additional requirements relating to the Play Store.[15] These agreements, which lead to the exclusive pre-installation of the Play Store, cover a material number of new Android devices and could represent a further barrier to effective competition from alternative distribution channels.[16]

- Google can target major app developers with incentives and other complementary products via Project Hug. While Project Hug may offer benefits to certain app developers in the short term, we are concerned that it may create a barrier to emerging competition from other distribution channels, including other app stores, in the longer term. In particular, a possible strategy for alternative app stores would be to establish exclusive relationships with key developers, which may agree to abandon

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[13] Google told us that: "Updating Google software through proprietary app stores ensures swift, secure, and verified updating, which benefits consumers"; "Google has invested significantly in tuning its middleware update process through the Play Store to optimise between pushing timely updates and minimising the impact on the user"; and "Google has also combined its proprietary installation and update technology and infrastructure for first party and third party apps and [Google Play Services] through the Play Store because they share certain basic needs".

[14] Consistent with this interpretation, one app developer told us that it was impeded in coming to an agreement with manufacturers to have its installer pre-loaded on devices due to agreements between manufacturers and Google.

[15] These requirements are setting the Play Store as the default app store and not preloading similar services, such as alternative app stores, launchers, and apps not available on the Play Store, on their devices.

[16] As detailed in Chapter 4, [10-20]% Android devices activated in 2021 in the UK comply with these additional obligations not to preinstall similar services to the Play Store such that they receive a share of revenue from Play Store transactions. This number includes Google's Pixel devices which account for [0-5]% of both smartphones and tablets. Further, [30-40]% of Android devices activated in 2021 in the UK had the Play Store as the only pre-installed app store.

distribution via the Play Store and only list on a rival app store.[17] However, following Project Hug, alternative Android app stores would have to better Google's offer in some way, in order to encourage them to forego Google's benefits (as well as its large user base) and abandon distribution via the Play Store.[18] Therefore, by ensuring that important game developers keep distributing via the Play Store, Google makes it more difficult for rival app stores to compete by attracting material from these top apps which would not already be present on the Play Store.

16. In the remainder of this appendix, we cover in detail all the agreements mentioned above in the following sections:

- some background information on the Android Open Source Project and the Android Compatibility Program;
- Google's licensing of Google's apps and services, including GMS and Google proprietary APIs (or Google Play Services), under the EMADA;
- Google's payments to manufacturers for pre-installing Google Search and Chrome apps and for respecting certain placement and promotion requirements in relation to apps such as Google Search, Google Assistant, Google Chrome and (in some cases) the Play Store; and
- Google's initiative targeting major game developers, also known as Project Hug.

Android Open Source Project (AOSP)

17. As noted above, Android is currently commercially sponsored by Google, which retains the 'Android' trademarks and licenses the Android name and logo to manufacturers that meet certain compatibility criteria. More specifically, to license the Android name and logo, manufacturers need to enter the Android Compatibility Program,[19] under which Google also provides them with tools that ensure Android apps run smoothly on their devices.[20]

18. In this appendix, we use the term 'Android' to describe all versions of the Android mobile operating system which enter the Android Compatibility

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[17] Samsung's 2018 agreement with Epic in relation to the Fortnite app as well as its approaches to other popular developers to get exclusive distribution deals for the Galaxy Store, as referred in the Utah complaint, are examples of this. See State of Utah et al v. Google LLC et al, Case Number 3:2021cv05227, first amended complaint filed 1 November 2021.
[18] As detailed in Chapter 4, the Play Store currently accounts for [90-100]% of native app downloads on Android devices, HMS devices and Fire OS devices).
[19] Android Compatibility Program Overview | Android Open Source Project.
[20] We understand this includes Android Software Development Kits (SDKs) meaning the software development tools used to produce Android apps which provide built-in tools for developers to clearly state the device features required by their applications. See Android Compatibility Program Overview | Android Open Source Project.

Program. We use 'Android Forks' instead to refer to versions which are outside Google's Android Compatibility Program and whose development is not generally subject to the monitoring and control of Google – this does not include Huawei's HMS devices which, as set out in Chapter 3, use a version of Android that falls within Google's compatibility requirements, but relies on Huawei's Huawei Mobile Services (HMS).

Android Compatibility Program

19. The Android Compatibility Program defines technical details of the Android platform and provides tools for manufacturers to ensure developer applications developed for the Android operating system run smoothly on a variety of devices. The Program consists of three key components:

- the Android Open Source Project source code;
- the CDD, which sets out the requirements that must be met in order for devices to be compatible with the latest version of Android; and[21]
- the Compatibility Test Suite (CTS) which is a free online tool that Android partners can download from the Android website and use to detect major CDD compatibility issues in a device.[22]

20. To build an Android compatible device and thus ensure Android apps work on their devices as they should, manufacturers must comply with the technical specification contained in the Android CDD and pass the tests contained in the CTS.[23]

21. Android manufacturers that also want to license Google's apps and services, including Google proprietary APIs, are required by Google to enter the ACC (formerly called the Anti-Fragmentation Agreement (AFA)). Under the ACC, Google's Android partners agree to maintain compatibility with a baseline version of Android as set out in the CDD. [24] In Figure E.2 below, we refer to the ACC and the CDD together as 'Compatibility Agreements', meaning those governing the maintenance of Google-compatible versions of Android.

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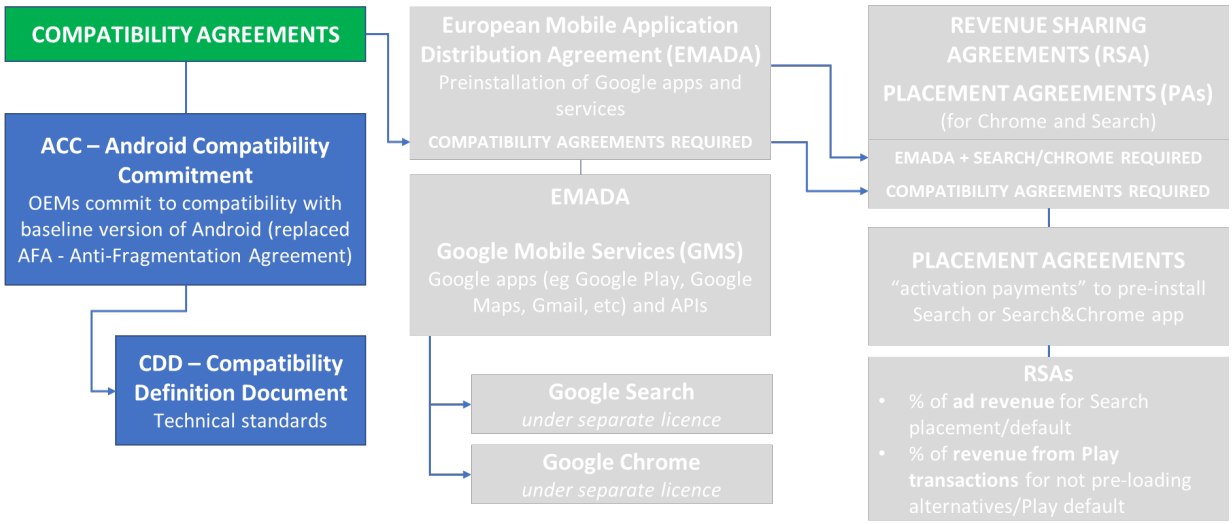
[21] Android 12 Compatibility Definition.
[22] Compatibility Test Suite.
[23] Android Compatibility Program Overview | Android Open Source Project.
[24] Although after the European Commission's 2018 Google Android decision the ACC allows manufacturers to distribute incompatible Android variants on smartphones and tablets supplied into the EEA and the UK, alongside compatible versions, subject to Android branding requirements.

Figure E.2 – Google's compatibility agreements



Source: CMA analysis

22. Google told us that it only licenses its apps for use on Android devices that meet the CDD requirements but that the ACC does not prevent manufacturers from using or developing alternative operating systems on their devices. In particular, Google told us that:

- in the UK and EEA, manufacturers are free to implement Android variants that do not comply with the CDD (albeit Google does not license its apps for use on those devices), subject to the Android branding requirements;
- the CDD sets only a low baseline of minimum compatibility specifications that leave manufacturers free to customise their devices; and
- nothing in the ACC prevents manufacturers from using non-Android OSs alongside or instead of Android.

23. In its antitrust case AT.40099 – Google Android – the European Commission (EC) deemed the AFA to be anti-competitive, concluding that through AFAs Google hampered the development of Android Forks.[25] The provisions considered to be problematic were those that obliged manufacturers not to fork Android and not to distribute any devices that were based on a fork alongside devices (including smartphones and tablets) running on Google-compatible versions of Android, as the AFAs applied to the entire product portfolio of a manufacturer.[26]

24. In 2016, Google replaced the AFA with the ACC. Google told us that in order to comply with the EC's decision in Google Android, it amended the terms of

[25] CASE AT.40099, Google Android, dated 18 July 2018, paragraphs 1036 (3) and 1076 (currently on appeal).
[26] CASE AT.40099, Google Android, dated 18 July 2018, paragraph 1106 (currently on appeal).

the ACC to remove compatibility obligations in respect of smartphone or tablet devices supplied into the UK and the European Economic Area (EEA).

25. Following these changes manufacturers can distribute incompatible Android variants on mobile devices supplied into the EEA and the UK, alongside compatible versions, subject to certain branding requirements.[27] However, as already noted above, Google does not license its proprietary apps and APIs for use on such devices.

Google's rationale for the Android Compatibility Program

26. Google told us that the AFA was its response to the threat of incompatibility or 'fragmentation' to Android. Incompatibility or fragmentation occurs where there are multiple different versions of the same operating system and those differences are such that apps developed for that operating system do not work properly on every version. Google explained that such incompatibility would increase costs to developers (who would need to develop multiple versions of their app to access all of the operating systems users) and confuse consumers (if apps for that operating system did not work on the version on their device), 'making the platform less attractive to all'.

27. Indeed, Google told us that ensuring compatibility across Android devices not only promotes developer interest in Android, but also ensure consumers' favourite apps will be available and function properly if they purchase a new Android device or switch Android devices.

28. Google identified 'prior open source mobile platforms like Symbian, Linux Mobile, and Java Mobile' that failed because of incompatibility issues. For instance, according to Google 'Symbian was the leading platform in 2007 with an estimated 73% share of mobile [operating systems]' but 'had almost entirely disappeared' by 2013 as Symbian's owners 'failed to define a single set of standards for apps to rely on'. As a result, the platform fragmented into numerous incompatible variants, creating significant costs for developers, reluctant to write apps for multiple incompatible versions.

29. Google told us that it 'sought compatibility commitments when Android was nascent and had no assurance of any success and against the backdrop of Symbian and other open-source platforms that succumbed to fragmentation'. Google told us that the CDD's baseline compatibility requirement incentivised developers to write apps for Android, improved the availability and reliability of

[27] The ACC requires manufacturers to comply with Google's branding guidelines. These guidelines state that only compatible Android devices can use the term 'Android' and other Google trademarks and brands, and also reserve the right for Google to require that compatible devices display 'Android' or other Google brands.

Android apps and enabled Android to compete better with iOS and other operating systems to attract developers.

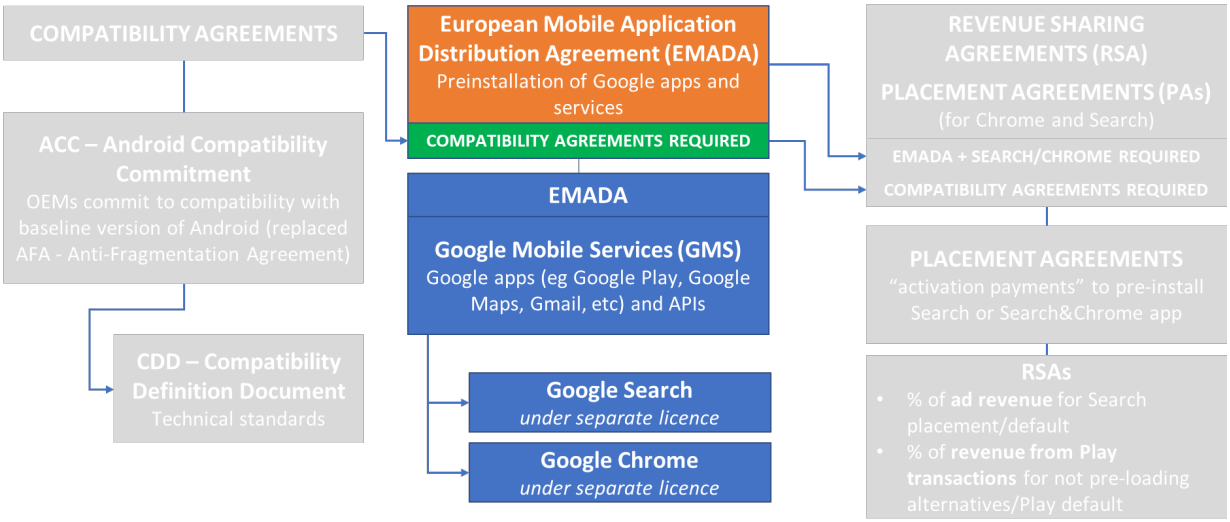
30. According to Google, '[t]he ACC, in short, has facilitated through contract what successful vertically integrated platforms, such as iOS, achieve through unilateral decisions: compatibility across devices.' Google also said that it 'prevents damage to the Android brand' as apps malfunctioning due to incompatible devices would cause the whole Android ecosystem to suffer. Google submitted that, notwithstanding the amendments it made to the ACC following the EC's 2018 Google Android decision, it 'strongly believes that its compatibility requirements are necessary to prevent harmful fragmentation and enhance competition'.

Google's licensing of Google's apps and services

31. Manufacturers which license Android and meet Google's compatibility criteria can also license GMS (as noted above, a collection of Google apps and services including popular Google apps such as Gmail, Maps, YouTube, the Play Store and APIs) under the EMADA.

32. As further detailed below, to enter the EMADA and license GMS manufacturers need to have entered the 'Compatibility Agreements' as well. Separately, Google licenses Google Search and Chrome apps to manufacturers which entered the EMADA – see Figure E.3 below.

Figure E.3 – Google's licensing of GMS, Google Search and Google Chrome



Source: CMA analysis.

European Mobile Application Distribution Agreement (EMADA)

33. Manufacturers can only enter the EMADA, and thus license GMS, if they have entered the ACC. As a result, **the licensing of Google's apps and services is conditional on the use of a compatible version of Android**.

34. Under the EMADA, Google licenses the GMS suite (containing the Play Store and a set of other Google apps and services but excluding the Google Search app and Chrome) to manufacturers. If a manufacturer wants to preload one of the apps contained in the GMS suite on its device, it has to preload the full suite and place all of the following on the default home screen on the device:

- the Play Store icon; and
- a folder labelled 'Google' that contains all the remaining Google apps.

35. As mentioned above, the EMADA does not include licences to the Google Search app or Chrome, which are distributed under separate licence agreements to manufacturers, provided they entered the EMADA.

36. Google generates revenue from manufacturers entering the EMADA, which pay Google a licence fee per activated device, depending on device type, certain device characteristics and activation location [✂].

Figure E.4 – [✂]

37. In the section below, we explain in further detail what GMS includes.

Google Mobile Services (GMS)

38. Google told us that GMS is a proprietary collection of Google's apps and services 'that supports functionality across devices with the aim of providing a user-friendly out of the box experience' and that providing it 'ensures an attractive look and feel and a seamless integration of the apps'.

39. As mentioned above, this collection includes popular Google apps such as Gmail, Maps, YouTube, the Play Store, and also a selection of Google proprietary APIs known as Google Play Services which consist of a set of proprietary features, functionalities, and APIs that apps developed for devices using GMS can include – for instance, via Google Play Services APIs, third-party developers can make use of basic features and functionalities such as push notification, location, advertising or security services, to communicate with Google's first-party services (such as Google Maps, Search, Gmail, and Translate on Android) and create rich features compatible with Android.[28]

[28] Further, Google apps rely on some of these APIs to work properly.

40. More specifically, GMS includes:

- Apps which must be preloaded on the system partition of the device[29] and thus cannot be deleted but only disabled by the user.[30] In the UK, these include Gmail, Maps, YouTube and the Play Store. [✂] The Play Store itself also includes specific APIs which developers can use for certain functionalities, such as integrating the Play Store's billing system into their apps, prompting users to submit Play Store ratings and reviews without leaving their apps, offering Play-related promotions and discounts, etc.

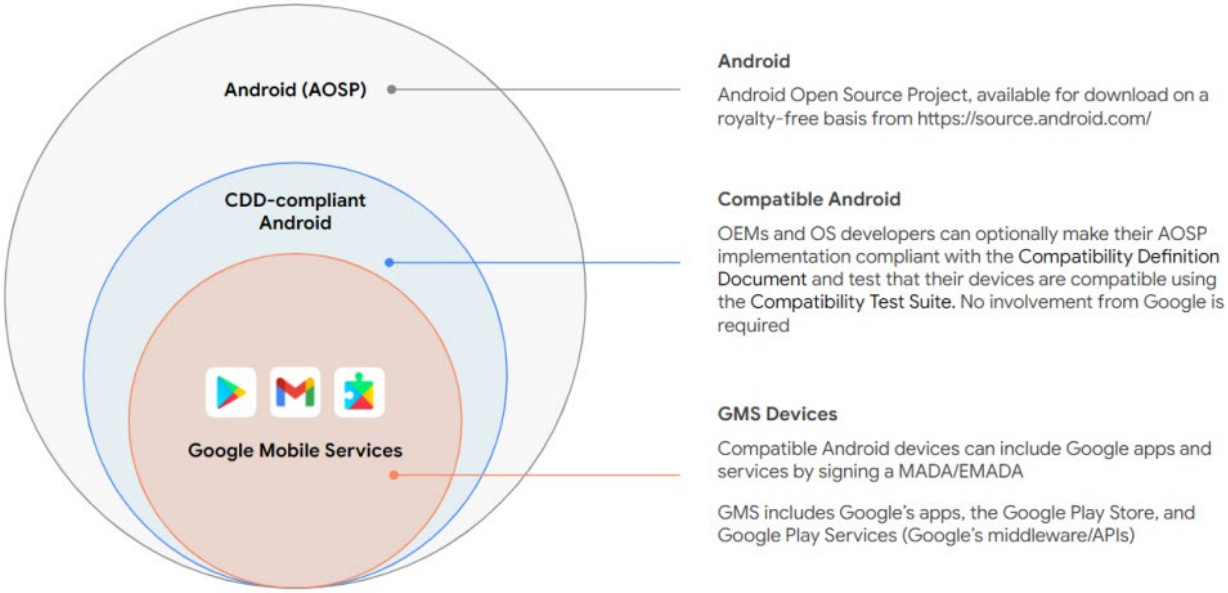
- Apps which must be made available to end users as preloaded apps on the device when the device is turned on for the first time, but users are able to subsequently delete them. [✂]

- Google Play Services – a software layer that houses Google proprietary APIs and works in the background of Android to enable device functionality for GMS devices and enable developers to use the continually updated set of APIs. Google told us that its APIs in Google Play Services are updated frequently to ensure new and improved features (including security updates) are consistently available on all Android devices and this process occurs via the Play Store.[31]

41. Figure E.5 below illustrates the relationship among GMS, the CDD for OEMs using a Google-compatible version of the Android operating system and the Android Open Source Code. Google told us that it 'does not require OEMs or developers that use it [Android] to license Google's GMS suite of apps or any other apps' and that '[t]he GMS licensing arrangements are therefore not linked to the licensing of Android or the Android Open Source Project'. It also told us that 'GMS is not compulsory and including it or not does not alter the availability of Android or any of its features'.

[29] Any computer device's storage is usually divided into separate 'partitions'. An Android device's 'system partition' contains the operating system, including the device's user interface and preinstalled apps that cannot be deleted.
[30] Disabling one of these apps prevents it from performing any function on the device, while also ensuring the app can be easily re-enabled by the user.
[31] Google told us that with each major Android version release, it introduces a plethora of new features and functionalities which are not present on devices running older versions. However, it told us that it is the manufacturers' responsibility to upgrade devices to new Android versions in order for existing devices to make use of these features but that many fail to do so quickly or at all. Therefore, Google can ease the challenges developers face due to the lack of consistent updates by providing Google Play Services APIs consistently across Android versions. Google Play Services APIs update much more frequently than manufacturers and MNOs push out updates for AOSP Android and this ensures that developers and users can access newer features and functionalities on their Android devices, even if their device runs an older version of Android.

Figure E.5 – GMS within the Android Ecosystem



Google's submission.

42. However, we understand from Google and others that having GMS installed on a given mobile device, which is **conditional** on using a compatible version of Android, is needed to ensure that both Google apps and many third-party Android apps work properly on that device.[32] This is because many such Google and Android apps rely on functionality included in GMS.

43. Indeed, Google told us that:

- Its first party Android apps depend on the presence of the Play Store and Google Play Services and the features, functionalities, and APIs they include in order to function properly and on the presence of the Play Store as 'trusted updater.'[33]

- If Google's apps did not have access to Google Play Services APIs, such features and functionalities would stop working[34] and Google would either need to create new versions of its apps that depend on third party APIs or recreate Google's own Google Play Services features in each first party app, which could potentially result in app speed and efficiency decreasing and also potentially lead to extreme battery, network, and data usage.

[32] See also Chapter 3 on barriers arising from lack of access to GMS and its importance both in terms of the popularity of the apps included and the fact that APIs included in it are necessary to ensure that as many native Android apps as possible will work on the device.
[33] For example, they rely on Google account services, Google-specific infrastructure, direct-to-device services (such as the ability to change settings), Google's location APIs, and Google's push notifications services.
[34] For example, Chrome would lose the ability to sync information to the user's Google Account and would not be able to offer Safe Browsing.

- The cost of developing versions of Google's first party apps that do not depend on the presence of Google Play Services or the Play Store could be significant and it is unclear that there would be demand from Android manufacturers to preinstall Google's apps without Google Play Services.

- Some third-party Android applications also integrate with one or more Google applications, and thus require the Google application(s) to be installed on the device in order to work appropriately. Further, third-party developers can more easily design applications for Android phones if they can anticipate the package of Google applications that also will be installed.

- 'Where a developer uses Google proprietary APIs for its app(s), the proper functioning of the app can only be guaranteed if the device also runs Google Play Services (though some Google proprietary APIs may function without Google Play Services)' – in this regard Google estimated that, as of April 2022, [70-80]% of apps available on the Play Store use at least one Google Play Services API.[35]

- [✂].

44. To the extent that the gap between the features and functionalities offered by the APIs in Android Open Source Project and the APIs in GMS increases over time, the cost of replicating these APIs for alternative providers would also increase and it would be more difficult for app developers to port their apps to Android Forks or other versions of Android not using GMS.[36]

45. Google told us that housing such APIs in GMS allows Android devices to have the most up to date version of these APIs. This ensures that apps relying on these APIs work on all Android devices, even when the manufacturer does not update the underlying Android operating system version.

46. In relation to where these APIs are placed, Google submitted there are reasons for including an API in Google Play Services and not in open-source Android code, including the extent to which the API contains proprietary software to Google, the frequency of updates it needs, whether it enables services that require contact with Google's servers or that should be consistently deployed on all versions of Android (including older ones).

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[35] Google told us that while many third-party Android apps use at least one Google Play Services API, this is not a good indication of the effort/costs a developer would need to incur to port their app to an Android device that does not include Google Play Services.
[36] As set out in Chapter 3, Huawei currently uses a version of Android that falls within Google's compatibility requirements but relies on Huawei's Huawei Mobile Services instead of Google Mobile Services.

47. Google told us that the availability of Google Play Services' features, functionalities, and APIs does not depend on how an app is installed onto a GMS device and that developers do not need to sign up for the Android developer program to access Google Play Services Software Development Kits (which are publicly available) to integrate such functionalities.[37] However, it also told us that the extent to which an app developer would need to adjust their app when distributing outside of the Play Store depends on whether its app calls on Play Store-specific APIs housed in the Play Store.

- If an app calls on one of these Play Store APIs, the developer can still distribute its app outside of the Play Store. However, in order for the Play-specific features to work, the developer would need to distribute its app on Play in parallel.

- Alternatively, if the developer decides to distribute off-Play only, it would have to disable or remove the relevant features in its app that rely on the Play API and instead need to call on the equivalent APIs offered by the alternative distribution channel.

48. In addition, as set out above, the APIs included in GMS are effectively linked to the Play Store not only contractually, but also from a technical perspective, given that they are updated via it. In particular, Google told us that its first party apps and Google Play Services rely on the presence of the Play Store on the device to act as their 'trusted updater' and updates to third-party applications follow the same mechanism. It told us that this has always been the case, and, given updating Google Play Services requires the device manufacturer to grant it certain 'sensitive capabilities', it is particularly important for device security that this happens via a Google source. However, while Google has provided us with some reasons for this,[38] Google has not set out why such Google source should necessarily be an app store.

Google Search and Chrome Apps Licence Agreements

49. Google offers separate licences to EMADA partners to distribute the Google Search and Chrome apps on compatible Android devices in the EEA and UK. Under these separate licence agreements, the Google Search app and

[37] The majority of Google Play Services APIs are available to third party developers, with the exception of a small number of APIs which are only available to Google's first-party apps.
[38] Google told us that: 'Updating Google software through proprietary app stores ensures swift, secure, and verified updating, which benefits consumers'; 'Google has invested significantly in tuning its middleware update process through the Play Store to optimise between pushing timely updates and minimising the impact on the user'; and 'Google has also combined its proprietary installation and update technology and infrastructure for first party and third party apps and [Google Play Services] through the Play Store because they share certain basic needs'.

Chrome are distributed for free to manufacturers and on a device-by-device basis.

50. Licensing Search and Chrome for Android is **conditional** on signing the EMADA. Google told us that this is [✂].

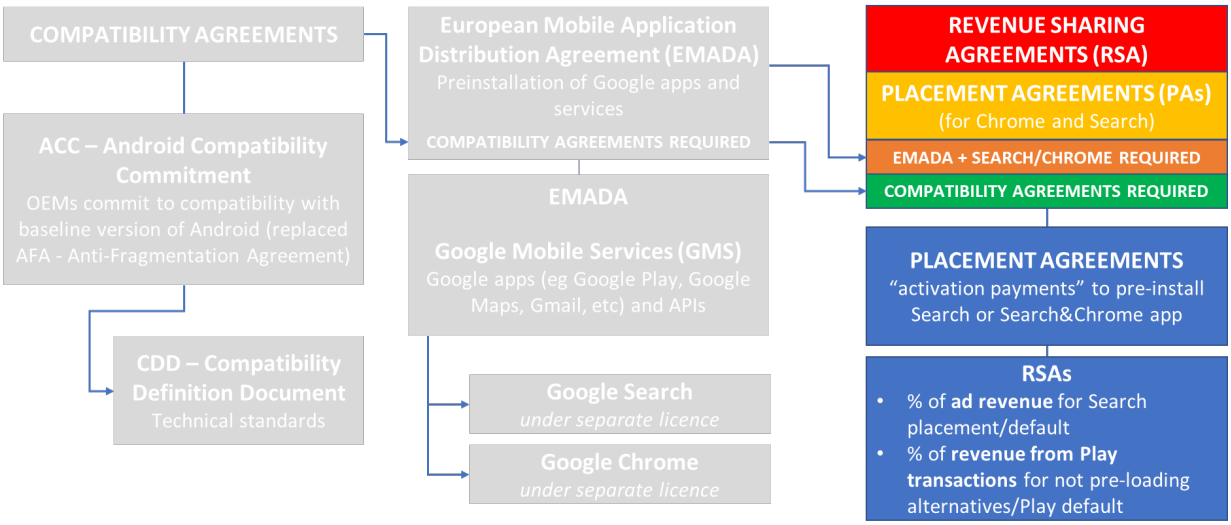
51. As mentioned above, Google Search and Chrome were removed from the GMS suite in the EEA and the UK following the EC's decision on Google Android, where the EC established that Google infringed Article 102 TFEU including by tying the Play Store with Google Search and Google Chrome apps.[39]

52. As further explained below, Google may also enter into PAs and RSAs with manufacturers who enter the EMADA and license Google Search and Chrome,[40] as explained in the next section.

Google's payments to manufacturers in connection with requirements relating to Search, Chrome and the Play Store

53. As mentioned above, Google makes payments to manufacturers that comply with certain placement and promotion requirements in relation to Google apps, including Google Search, Google Chrome and the Play Store (see Figure E.5 below).

Figure E.6 – Google's Revenue Sharing and Placement Agreements



Source: CMA analysis

[39] CASE AT.40099, Google Android, dated 18 July 2018, paragraph 5 (10) (currently on appeal).
[40] Google told us that some MADAs with an effective date of 2015 or earlier included a requirement for the manufacturer to set Google as the default search provider. This requirement did not apply to default settings on preinstalled browsers. The requirement was removed from MADAs executed from late 2014 and was waived for legacy MADAs that remained in place, such that there are no active MADAs that contain this requirement today.

54. Google has in place, with certain Android manufacturers in respect of UK devices, voluntary commercial agreements. For example, it has PAs in place with certain manufacturers regarding the placement of the Google Search app and Chrome on Android devices and RSAs for respecting a number of placement and promotion requirements with respect to certain Google apps, including Google Search, Google Assistant and in some cases the Play Store. Both the PAs and the RSAs are only available to EMADA partners. More specifically:

- 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. If manufacturers 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. Google told us that the placement obligations in the Placement Agreements are non-exclusive, and do not prevent rivals from being pre-installed or displayed prominently on the device. [✂]

- Under its RSAs, Google pays some manufacturers a proportion of its net ad revenue from specific search access points on their devices in return for meeting a number of placement and promotion requirements, such as setting the Google Search app as the default search engine on all preloaded manufacturer browsers.[41]

- In addition, under the RSAs, some manufacturers may receive a proportion of Google's net revenue from the Play Store's transactions for setting the Play Store as the default app store on their devices and not pre-loading on their devices any similar services to the Play Store, such as alternative app stores. We understand this was introduced in the most recent RSA contract framework ('RSA 3.0') and that under the previous RSA, no payments for Play Store revenues were made to manufacturers by Google.

55. The exact proportion of revenue Google shares with manufacturers via its Revenue Sharing Agreements usually varies by manufacturer.[42]

[41] Google told us that third-party browsers (as opposed to manufacturer browsers) can have non-Google search services set as default instead, provided that they are not placed on the default home screen (unless in a folder) or the minus one screen. Google also told is that after the EC's decision in Google Android the default search service in Chrome is set according to the Android choice screen mechanism that applies in the UK and EEA.
[42] For example, those of [✂].

56. Google told us that its RSAs give manufacturers a choice as to how they configure their devices [✂].

57. Google also told us that its commercial arrangements for placement of Search/Chrome and RSAs are voluntary agreements, and manufacturers are free to opt into most of the requirements in those agreements for some of their devices.

58. However, we consider that these agreements create significant financial incentives for manufacturers not only to pre-install Google Search and Chrome, but also to grant those apps alongside the Play Store, prominent placement, a default status and, in some cases, ensuring that no similar services are preloaded on the device. For instance, all RSAs include setting Google Search as the default search engine on various access points on the device as a requirement while certain RSAs include setting the Play Store as the default app store on the device as well as not preloading any similar services, including alternative app stores, as a requirement.

59. In the sections below we explain in more details what provisions are included in the PAs and RSAs.

Placement Agreements (PAs)

60. Google offers manufacturers the possibility to enter PAs in relation to the Google Search and Chrome apps **conditional** on the manufacturer using a compatible version of Android, having licensed the GMS suite and, under separate licences, Google Search and Chrome apps.

61. [✂].

62. This means that manufacturers have a financial incentive to pre-install Google Search and Google Chrome on their devices, which we consider relevant for our assessment of competition in supply of browsers (Chapter 5).

Size of Google's payments under PAs

63. Google provided aggregate figures for payments it made under PAs both in the UK and EEA. Google paid Android manufacturers approximately £[100-200] million in Search and Search/Chrome Activation Payments under PAs covering the UK in 2021.[43] Most of that figure was paid to Samsung [✂].

[43] We used Bank of England data to convert from US Dollars into Great British Pounds, this was done using the yearly data from XUAAUSS | Bank of England | Database.

64. PAs outweigh the EEA licence fees manufacturers incur when entering the EMADA, which means that Google ends up not charging manufacturers at all for licensing its proprietary apps. Data from Google shows that in 2020 and 2021 payments made under the PAs were slightly larger than the license fees revenues generated under the EMADA. This was the case both in the UK and the EEA.

65. Google told us that the placement obligations contained in the PAs are non-exclusive and do not prevent rivals from being pre-installed or displayed prominently on the device [✂]. However, Google rewards manufacturers for granting Google's apps default positions and respecting some placement and promotion requirements for certain apps, as covered in the section below.

Revenue Sharing Agreements (RSAs)

66. Google offers manufacturers the possibility to enter RSAs **conditional** on the manufacturer using a compatible version of Android, having licensed the GMS suite under the EMADA and Google Search and Chrome apps under separate licence agreements. Google told us that it currently has RSAs with a range of manufacturers and mobile network operators. The exact proportion of revenue Google shares with manufacturers via its Revenue Sharing Agreements usually varies by manufacturer.

67. As mentioned above, under its RSAs, Google pays some manufacturers a proportion of its net ad revenue from specific search access points on their devices in return for meeting a number of placement and promotion requirements in relation to Google Search, Google Assistant and in some cases the Play Store, such as setting the Google Search app as the default search engine on all preloaded manufacturer browsers.

68. We understand that after the EC's decision in Google Android, RSAs are now available only on a per device basis in the EEA and UK. This means that Google's RSAs cannot apply automatically to the manufacturers' whole portfolio of devices but need to allow them to select the ones for which they want to opt in.[44]

69. Google told us that 'the obligations in Google's RSAs may differ depending on the negotiated terms of each RSA.' The revenue share a manufacturer may

[44] In particular, the EC's decision concluded that Google abused its dominant position in the national markets for general search services by granting portfolio-based revenue share payments conditional on the pre-installation of no competing general search service. See CASE AT.40099, Google Android, dated 18 July 2018, paragraph 5 (12) (currently on appeal).

get increases with the number of obligations they meet for their devices. For instance [✂].

70. In addition to RSAs with manufacturers, Google also has RSAs in place with all non-virtual Mobile Network Operators (MNOs) active in the UK and which cover Android devices shipped into the UK. Under these RSAs, MNOs agree to promote Google's apps and services on their devices in exchange for a share of Google's net search advertising revenue generated by those devices' users when searching through access points covered by the MNOs' RSAs in the same fashion as Google's RSAs with manufacturers.[45]

71. Google told us that the RSAs it has in place with Android manufacturers and MNOs provide them with an additional revenue stream, which enables them to reduce prices and invest in innovative hardware and software, improving end user experiences.

The Play Store component in Google RSAs

72. As mentioned above, Google provides manufacturers respecting certain additional requirements in relation to the Play Store with an additional revenue share from Play Store transactions. In exchange, manufacturers agree to set the Play Store as the default app store and are prohibited from preloading similar services to the Play Store, including alternative app stores, launchers, and apps not available on the Play Store, on their devices.

73. Google told us that it introduced the latest version of its RSAs, meaning the 'RSA 3.0 contract framework' in late 2019 and implemented it with some manufacturers in the course of 2020. Under the previous RSA version, no payments for Play Store revenue were made to manufacturers. [✂].

74. Google told us that Play transaction revenue is only shared in respect of devices that meet certain additional requirements in relation to the Play Store [✂]. For those manufacturers whose RSAs entail the possibility to earn a share of revenue from Play transactions, Google told us that the precise level of the shared revenues can vary, with manufacturers getting between [✂] and [✂].

75. Google told us that '[i]t is important to note that RSAs are voluntary agreements', [✂].

[45] Google told us that its current RSAs with UK MNOs also contain obligations relating to software upgrades and security updates but do not contain any provisions related to the preinstallation of alternative app stores on Android devices.

76. According to Google, 'RSAs reflect the normal competition that takes place between apps (and app stores) to seek promotion on OEMs' devices' and this competition better enables manufacturers to 'monetise the screen space on their devices, which in turn leaves them with more funds to invest in new and improved handsets (or to facilitate lower prices)' and to 'offer a user interface that competes closely with Apple's 'clean' out-of-the-box set-up'.

77. In total, [30-40]% of Android devices activated in 2021 in the UK had the Play Store as the only pre-installed app store. This number includes Google's Pixel devices which account for [0-5]% of both smartphones and tablets. In addition, [10-20]% of the Android devices activated in 2021 in the UK comply with the additional obligations not to preinstall an alternative service to the Play Store such that they receive a share of revenue from Play Store transactions.[46]

Figures for Google payments under RSAs

78. Google provided aggregate figures for payments it made to the top five third-party Android manufacturers shipping devices into the UK, according to Statcounter.[47] According to Google, the remaining third-party Android manufacturers account for under 6% of mobile devices sold in the UK.

79. Google paid these manufacturers approximately £[1.5-2] billion in ad and Play Store transactions revenue from their devices under worldwide RSAs in 2021.[48] Most of that figure was paid to Samsung, [✂]. As set out in Appendix C and Chapter 5, Google's estimated payments to Apple for search default status on the Safari browser were £[1-1.5] billion in 2021 for the UK, with the substantial majority of this (£[0.5-1] billion) relating to mobile.

Google's agreements with developers

Project Hug

80. Project Hug is an initiative implemented in 2019 by Google targeting a number of major app developers, and particularly game developers, aimed at ensuring their presence on the Play Store (meaning, encouraging them to continue to

[46] Google told us that the RSA between Samsung and Google does not contain any restriction preinstalling alternative app stores.
[47] Mobile Vendor Market Share United Kingdom | Statcounter Global Stats.
[48] We used Bank of England data to convert from US Dollars into Great British Pounds, this was done using the yearly data from XUAAUSS | Bank of England | Database.

develop and distribute their apps via Play) and thus mitigating the risk to the Play Store from alternative distribution channels.[49]

81. In particular, under Project Hug, Google provides developers with certain benefits, including commercial benefits which relate to other Google complementary products and services, in exchange for treating the Play Store at least comparably to other distribution platforms in terms of feature and content availability and timing of launch of their apps.

82. As mentioned in Chapter 4, documents received from Google indicate that Project Hug was a reaction to increasing competition from alternative app distribution channels.[50] Although, at the same time, Google's internal assessment concluded that scaling distribution outside the Play Store could be challenging for developers and [✂]. We are also aware of some attempts from Samsung to establish exclusive arrangements with developers for some of their apps or in-app content.[51]

83. Based on Google's documentary evidence, we understand Project Hug to be part of a number of related initiatives targeting several stakeholders participating in Google's ecosystem, namely app developers (and particularly games) and manufacturers, including alternative app store providers.

84. More specifically, based on Google's internal documents in relation to Project Hug, it appears that the aim of this initiative is to ensure the presence of important developers on the Play Store and to encourage them to use other Google services.

85. In particular, the key aims of Project Hug are to:

- Encourage relevant developers to continue to distribute their native apps via the Play Store. This was in the face of app developers establishing exclusive distribution relationships with alternative distribution channels and app stores, which is what Epic Games did in 2018 with the Samsung's

[49] Project Hug is referred to in two complaints made in the US, namely a complaint filed by a coalition of 39 attorneys general in the United States District Court, Northern District of California ('the **Utah Complaint**') and a complaint filed by Epic Games against Google in the same court ('the **Epic Complaint**'). See State of Utah et al v. Google LLC et al, Case Number 3:2021cv05227, first amended complaint filed 1 November 2021; Epic Games, Inc. v. Google LLC et al, Case Number 3:2020cv05671, updated complaint filed 19 August 2021.
[50] We consider this includes alternative app stores seeking exclusive listings from app developers – as noted in the Utah compliant, the Galaxy Store, had secured an exclusive listing from the popular app Fortnite. See State of Utah et al v. Google LLC et al, Case Number 3:2021cv05227, first amended complaint filed 1 November 2021.
[51] A large app developer discussed with Samsung the possibility to offer some exclusive content for one of their games through the Galaxy Store however this agreement did not materialise.

Galaxy Store and, based on the Utah complaint, Samsung was pursuing with other popular app developers as well.[52]

- Improve the sentiment/satisfaction of relevant developers towards distribution on Play (including on the commission rate).

- Discourage relevant developers from co-listing on other app stores in addition to the Play Store – with the view that this would create a cycle for the Play Store whereby alternative app stores would have less top titles and in turn less users, which in turn would reduce smaller developers' incentive to co-list on several app stores.

- Encourage developers' adoption of other complementary products and services offered by Google (as outlined below, the initiative included value for developers in the form of Google's cloud, advertising and marketing services) and thus deepen its relationship with such developers.

Google's submission to the CMA in relation to Project Hug

86. Google told us that the value it provides to developers under Project Hug comes in several forms, including in relation to the use of other Google's products and services such as Google's cloud, advertising and marketing services. In particular, [✂].

87. We understand from Google that, in exchange for the benefits listed above, developers agree to treat Play at least comparably to other distribution platforms in terms of feature and content availability and timing of launch of their apps. In particular, developers agree to [✂].

Google's internal documents provided to the CMA in relation to Project Hug

88. We have received documentary evidence from Google in relation to Project Hug. In summary, Google's internal documents in relation to Project Hug show that:

- Google considered the Play Store faced increased risk from alternative app distribution channels in 2019.

- Google targeted certain important game developers.

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[52] According to the Utah complaint, in 2018, Samsung partnered directly with top game developer Epic to launch the mobile version of Epic's game Fortnite exclusively on the Samsung Galaxy Store. According to the same complaint, Samsung also pursued exclusive deals with other popular app developers such as Riot Games, Activision, and Blizzard and indicated its intent to place the Galaxy Store on the home screen of its next Generation devices. See Utah complaint, paragraphs 137-138.

- Project Hug included a range of commercial proposals which were expected to deliver significant value to developers, equivalent to an effective reduction in the commission rate to those developers.

- Google identified that Project Hug might create a cycle whereby top developers would not co-list on third-party stores (such as the Galaxy Store), which would translate into fewer apps on such stores and thus fewer users of them. This would in turn lead to fewer smaller developers co-listing and hence reduce the risk of spending being diverted away from Play to alternative stores. We consider this shows that Google was seeking to strengthen the impact of indirect network effects which as set out in Chapter 4 are inherent in the provision of app stores.

- Project Hug is one of a number of strategic initiatives by Google aimed at mitigating the risk to the Play Store from alternative distribution channels.

- Google considered that Project Hug would encourage developers' adoption of other complementary products and services offered by Google and thus deepen Google's relationship with such developers.

89. Internal documents received from Google in the second half of this study further show that:

- Project Hug appears to have been successful. For example, none of the developers left the Play Store, it generated significant value for Google and shifted discussions towards cross Google opportunities.

- Google has started to introduce an updated version of the Project Hug initiative aimed at ensuring that app developers provide Play Store users with equivalent content as they do on other platforms and they launch their apps on Play at the same time as they are launched on iOS.[53] In addition, Google told us that the updated version of Project Hug 'was designed to promote Play as the go-to destination for top games developers, and to foster the opportunity for cross-Google collaboration with its gaming partners'. We understand that this version of Project Hug has been agreed with a small number of developers so far and that:

  – this initiative is targeted at top games developers (eg AAA developers, PC/console developers) as well as gaming developers that are large and growing;

[53] We understand that the requirement to launch their apps on the Play Store before or at the same time as when launched on iOS was also a requirement for developers participating in the original version of Project Hug.

- participation in this initiative would depend on the revenue generated by the developer in the Play Store and provides additional benefits including tech consultations, advertising and marketing services;
- as part of this initiative gaming developers may commit to certain parity conditions, and investments in Google's strategic products.