Appendix C: market outcomes

Introduction

1. This appendix presents data on market outcomes. We first present data on outcomes relating to mobile devices and operating systems including shares of supply and the prices of mobile devices. We then set out outcomes relating to app distribution. Finally, we present data on outcomes relating to mobile browsers.

Mobile devices and operating systems outcomes

2. In this section we present an analysis of:

- shares of supply in mobile devices;

- the prices of mobile devices including how they have changed over time and differ between mobile devices using different operating systems; and

- shares of supply in mobile operating systems.

Mobile device shares of supply

Source of data

3. The data underlying this analysis comes from market participants and Statcounter.[1] We first explain the nature of the data from market participants and then from Statcounter.

4. We received yearly data on the volume of sales of mobile devices from Amazon, Apple, Google, Huawei and Samsung. Each party's description of the data provided is listed below:

- **Google**: provided, in response to a formal CMA request, the number of Android device activations. Google explained that it does not have internal data on the number of third-party Android devices sold and device activations are a reliable proxy for the number of Android devices sold. Google also provided the number of Pixel smartphones that were activated in each year [✂].

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[1] We also received volumes data from IDC (International Data Corporation). As set out below, this data related to the number of units shipped into the UK rather than the volume of units sold. Therefore, while we have used it for our assessment of prices, we have not used it to estimate shares of supply.

- **Apple**: provided the number of devices sold net of the number of devices returned/traded-in.

- **Amazon**: provided the number of Fire OS tablets purchased in each year.

- **Huawei**: provided the number of devices purchased in each year.

- **Samsung**: provided the number of devices purchased in each year.

5. In addition, we received yearly data from the same market participants relating to active devices. Each party's description of the data provided is listed below:

- **Google**: provided, in response to a formal CMA request, separately the number of active Android smartphones,[2] the number of active Android tablets and the number of active Pixel smartphones for the UK in each year. [✂].

- **Apple**: provided the number of transacting accounts. Apple defined this as an account that performed a purchase (free or paid app, paid in-app, subscription) on a particular device/platform across all Apple services during the relevant period. The variable only includes transacting accounts as performed on the relevant device.

- **Amazon**: provided the number of active Fire OS tablets in each year.

- **Huawei**: provided the number of active devices in each year.

- **Samsung**: provided the number of active devices in each year.

6. While we only requested data from a limited number of manufacturers, the data provided covered the four main operating systems available on mobile devices in the UK. Namely, it included data from Apple on all iOS mobile devices, Google on all Android devices, data from Amazon on all its Fire OS tablets and data from Huawei on all its HMS devices.[3] As such we were able to estimate the total market size in terms of new sales using this data and then estimate shares of supply for the five manufacturers identified above.

7. We have also been able to source data from Statcounter. Statcounter is a web analytics service which uses tracking code to record page views to its

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[2] The term 'active devices' differs from 'devices activated'. This is because the number of active devices covers all devices being used by users in that year which includes devices that may have been activated by users in previous years.
[3] Huawei's HMS devices are a version of Android that meets Google's compatibility requirements but uses Huawei Mobile Services instead of Google Mobile Services.

'member sites', numbering over two million websites globally. Using the data generated, Statcounter publishes its Global Stats. These include shares of supply for mobile devices based on active devices.[4]

8.   We consider the possible limitations to Statcounter's methodology may include:

- The 'member sites' for which Statcounter records data may not be representative of the population of websites. Statcounter does not reweight its data to correct for any potential issues.

- It is possible that some consumers' adblockers and browser preferences may prevent data on consumers from being sent to Statcounter.

9.   Statcounter does not currently produce material assessing the extent of measurement error in its data. Further, we have heard concerns from Apple that because shares are extrapolated from internet usage rather than being based on the actual number of active devices, this 'tends to overestimate Apple's mobile device share for a number of reasons, including that Apple users tend to interact with their devices more frequently than other users.'

10.   Therefore, for the purpose of mobile devices we have primarily relied on the data provided by market participants, but use Statcounter data as a check for our data on active devices and also because its data is available over a longer period (in some cases as far as 2009) letting us look at historic trends.

Smartphones

11.   In this section we set out:

- shares of supply by manufacturer based on new smartphones data provided by market participants;

- shares of supply by manufacturer based on active smartphones data provided by market participants; and

- shares of supply by manufacturer based on active smartphones data from Statcounter.

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[4] For more detail see FAQ | Statcounter Global Stats, Mobile Vendor Market Share United Kingdom | Statcounter Global Stats and Tablet Vendor Market Share United Kingdom | Statcounter Global Stats.

12. Figure C.1 shows the shares of supply based on data from market participants for Apple, Samsung, Huawei and Google in terms of new smartphones in the UK for the period 2015 to 2020. As can be seen:

- Between [40-50%] and [40-50%] of new smartphones sold in each year of this period have been Apple's iPhones.

- Between [20-30%] and [20-30%] of new smartphones sold in each year of this period have been Samsung phones such that Samsung has been the second largest manufacturer and the largest manufacturer of Android devices.

- In at least 2018 and 2019 the second largest manufacturer of Android devices has been Huawei with its share peaking at [5-10%] in 2019, although its sales declined in 2020 following US legislation in May 2019, which prevented new Huawei devices from accessing Google's apps and mobile services. At this point Huawei moved to using a version of Android that relied on its Huawei Mobile Services, as outlined in Chapter 3.

- Google's Pixel smartphones only have a very small share at [0-5%] in 2019 and 2020.

Figure C.1: Manufacturer shares of supply in the sale of new smartphones in the UK – market participants data (2015-2020)
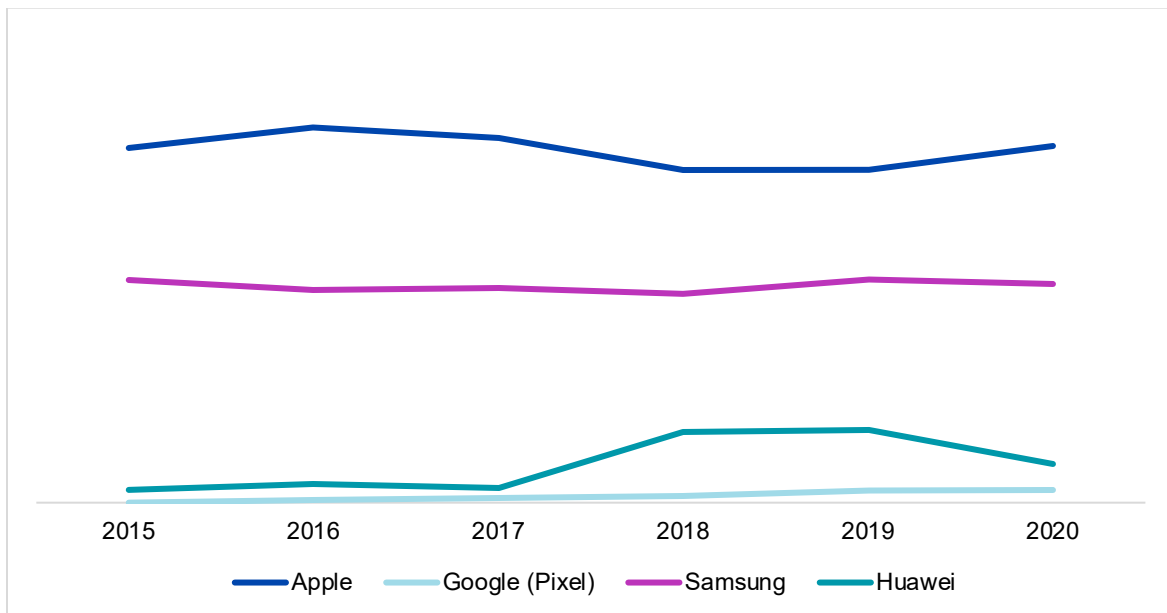
Source: CMA analysis of data from market participants.
Notes: We have only received data from a limited number of manufacturers, so shares do not sum to 100% as total volumes are based on operating systems data to calculate the total number of new sales.

13. Figure C.2 shows the shares of supply based on data from market participants for Apple, Samsung, Huawei and Google in terms of active smartphones in the UK for the period 2015 to 2020. As can be seen:

- [✂]

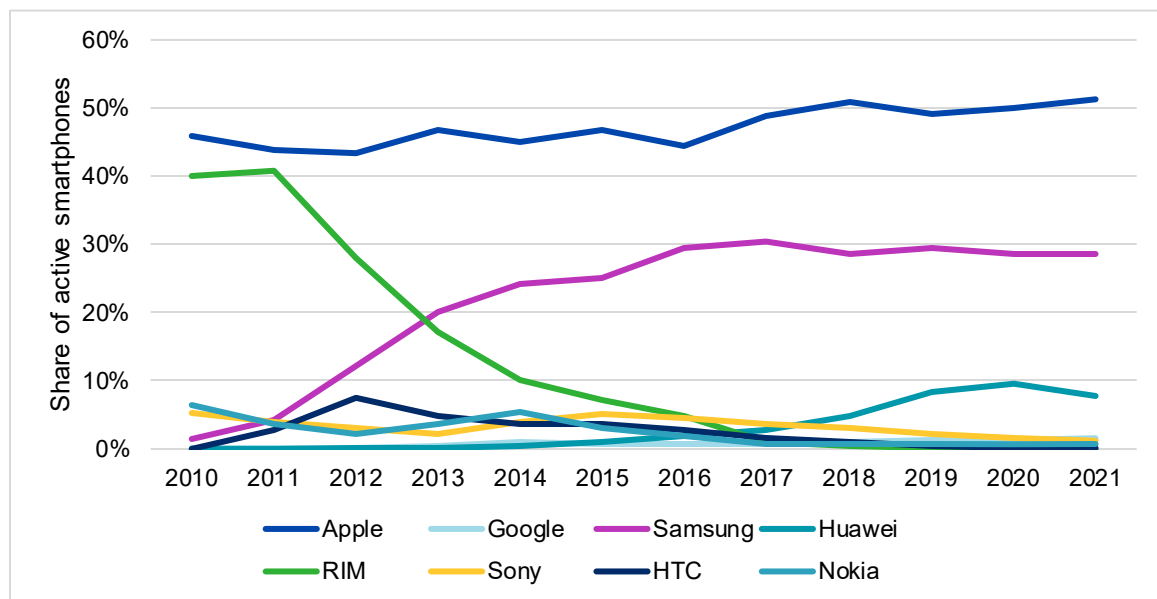**Figure C.2: Manufacturer shares of supply in active smartphones in the UK – market participants data (2015-2020)**

[✂]

14.   Figure C.3 shows the shares of supply based on data from Statcounter for Apple, Samsung, Huawei, Google and other manufacturers who have had at least a 5% share in one year since 2010. This shows that:

- Apple has consistently been the largest manufacturer over the last decade;

- while Samsung has been the second largest manufacturer for much of the last decade it has grown from a 1% share in 2010; and

- the last manufacturer that appeared to have a comparable share in active smartphones to Apple was RIM (subsequently know as Blackberry) with a share that peaked at 41% in 2011 before rapidly declining.

Figure C.3: Manufacturer shares of supply in active smartphones in the UK – Statcounter data (2010-2021)
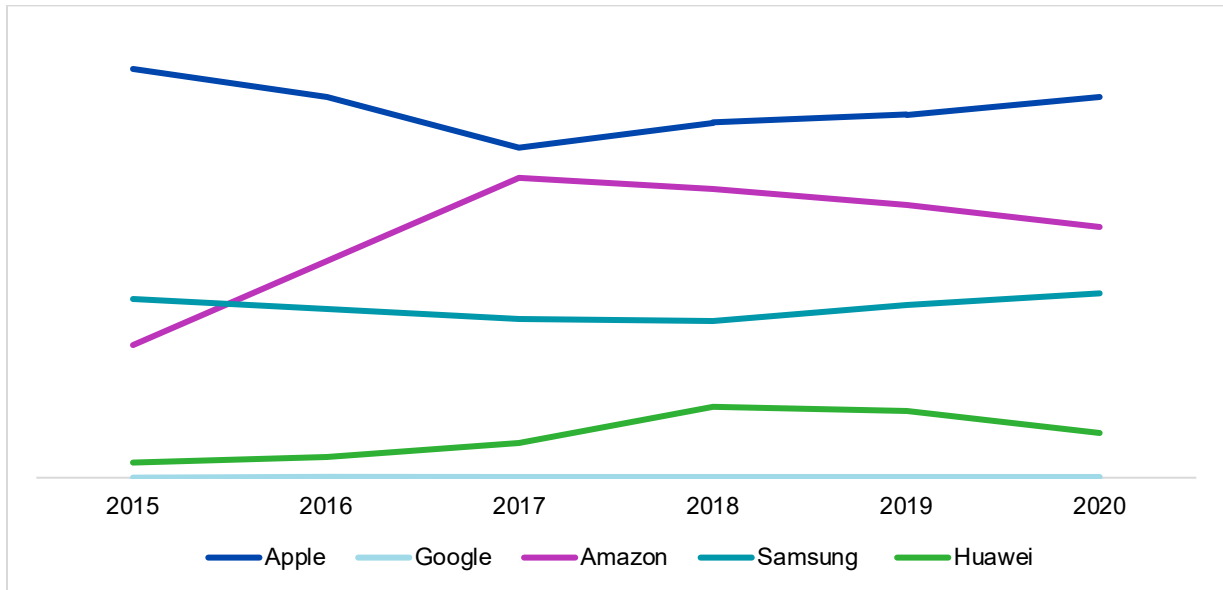
Tablets

15.   In this section we set out:

- shares of supply by manufacturer based on new tablets data provided by market participants;

- shares of supply by manufacturer based on active tablets data provided by market participants; and

- shares of supply by manufacturer based on active tablets data from Statcounter.

16. Figure C.4 shows the shares of supply based on data from market participants for Apple, Amazon, Samsung, Huawei and Google in terms of new tablets in the UK for the period 2015 to 2020. As can be seen:

- Apple has consistently been the largest tablet manufacturer although Apple's share has fluctuated starting at [40-50%] in 2015, before falling to [30-40%] in 2017 and then rising again to [30-40%] in 2020.

- Amazon's Fire OS is only available on its own Fire tablets, so Amazon's share of tablets mirrors its share of tablet operating systems. It has been the second largest tablet manufacturer for most of the period considered with Amazon's share of new tablets growing materially from [10-20%] in 2015 to [30-40%] in 2017 before declining to [20-30%] in 2020.

- As with smartphones, the share of Google's Pixel tablet is very small – [0-5%] of new tablets in 2020 in the UK – with most Android tablets being manufactured by third parties.

- Samsung has consistently been the largest manufacturer of Android tablets and the third largest tablet manufacturer for most of the period considered. Samsung's share of new tablets has been fairly consistent ranging between [10-20%] and [10-20%] of new tablets.

Figure C.4: Manufacturer shares of supply in the sale of new tablets in the UK – market participants data (2015-2020)

17.   Figure C.5 shows the shares of supply based on data from market participants for Apple, Amazon, Samsung and Huawei in terms of active tablets in the UK for the period 2017 to 2020 (data from all relevant market participants was not available before 2017). As can be seen:

   •   [✕]

**Figure C.5: Manufacturer shares of supply in active tablets in the UK – market participants data (2017-2020)**

[✕]
Notes: [✕]

18.   Figure C.6 shows the shares of supply based on data from Statcounter for Apple, Amazon, Samsung and Huawei since 2012. This shows that:

   •   Apple has consistently been the largest manufacturer over the last decade, although over time its share has declined;

   •   based on Statcounter, Samsung has the second largest number of active tablets at around 10% for most of the period, increasing in the last few years to 20%; and

   •   based on Statcounter, Amazon has the third largest number of active tablets, peaking at 10% in 2020.

Figure C.6: Manufacturer shares of supply in active tablets in the UK – Statcounter data (2012-2021)
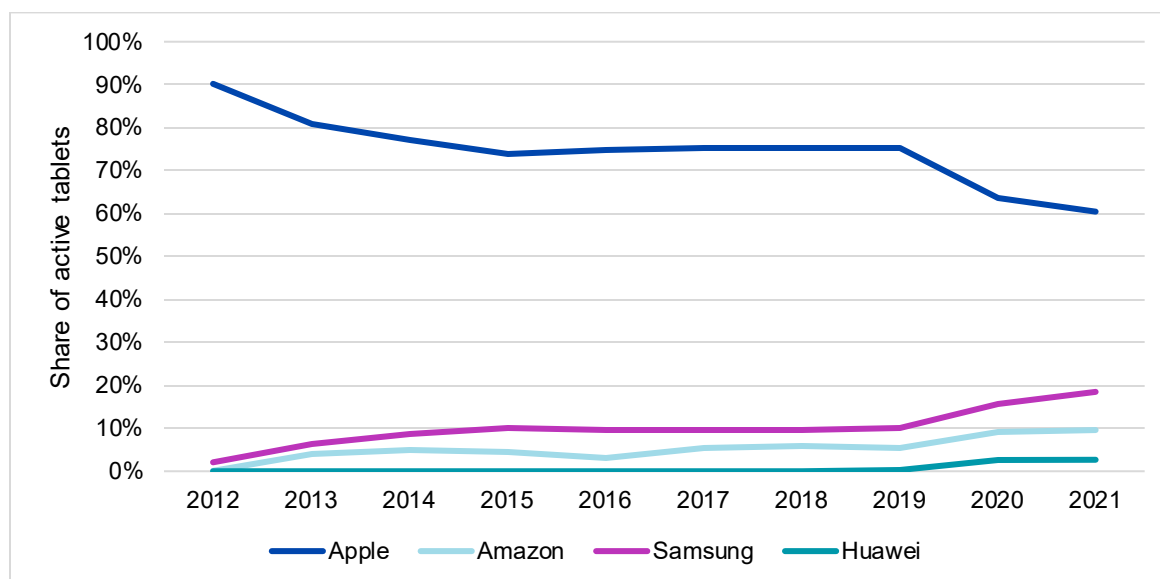
Source: Tablet Vendor Market Share United Kingdom | Statcounter Global Stats.
Notes: Apart from Huawei which was included for consistency only manufacturers with a share of 5 percentage points or more in any one year have been included.

Mobile device pricing

Source of data

19.   The data underlying this analysis comes from IDC, a market intelligence firm identified by several market participants.

20.   We use data from IDC's:

- Worldwide Quarterly Mobile Phone Tracker.[5] This data covered smartphones and featurephones[6] in the UK for the period 2015 to 2021 and included the following for each model:

    − Information on the model name, the brand name under which the phone was sold, the vendor or company who owns and produces the device.

    − Information on the operating system used on that model.

    − Information on if it was a smartphone or featurephone.

    − The units of that model shipped into the UK.

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[5] Worldwide Quarterly Mobile Phone Tracker (idc.com).
[6] Featurephones are mobile phones that have reduced features and functionality compared to a smartphone, they may come with a small non-touch screen and press buttons.

- The value of those units based on UK selling prices collected from channel and supply sources across the business to business (B2B) and business to consumer (B2C) markets.

- Worldwide Quarterly Personal Computing Device Tracker.[7] This data covered tablets in the UK for the period 2015 to 2021 and included the following for each model:

  - Information on the model name, the brand name under which the phone was sold, the vendor or company who owns and produces the device.

  - Information on the operating system used on that model.

  - Information on if it was a slate tablet or a detachable tablet.

  - The units of that model shipped into the UK.

  - The value of those units based on UK selling prices collected from channel and supply sources across the business to business (B2B) and business to consumer (B2C) markets.

21. IDC volume data is based on Unit shipments. Unit shipments are a measure of the number of new mobile phones (branded or unbranded) shipped by a vendor to all distribution channels or directly to end users. Units are counted as the title (ie ownership) is transferred from the vendor to a channel or customer and in doing so IDC seeks to address any potential double counting. A 'shipment' corresponds to the sale of a complete system[8] into the channel within the country of final use, or directly to an end user in a given period. Products sold through a channel in one country, but for final use in another country, are only counted in the country of final use.

22. IDC's tracking methodology is based on a combined sell-in and sell-out approach which may lead to some differences when comparing to sell-out data only on a monthly or quarterly basis due to the time gap and inventory management.[9]

23. By comparing IDC data with data from market participants, the differences in volumes for smartphones appear to be more limited for the period 2017 to 2020 and this is therefore the period in which we have focused our analysis

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[7] Worldwide Quarterly Personal Computing Device Tracker (idc.com).
[8] A complete system refers to having a product that is fully equipped to function. That is, not missing parts such as the operating system, keyboard when sold together, etc.
[9] This only relates to indirect sales, as direct sales to customers are sell-out.

for smartphones.[10] In relation to tablets we restricted our analysis to just 2019 and 2020.[11] Differences between market data sources can be related to several factors – definitions, segmentation, data sources, geography and time capture at supplier or channel level which can lead to differences on volume or revenue measurement in a given market segment, geography and period. Such differences are only likely to bias the results of the analysis set out below if there is a systematic difference between how this affects iOS devices and Android devices.

24.   IDC pricing data reflects the end-user price level, and the value calculations are the result of unit shipments multiplied by ASPs. The Average selling price (ASP) is the average end-user (street) price paid for a typically configured mobile phone or tablet and based on the product specifications. The ASP includes all freight, insurance, and other shipping and handling fees, such as taxes (import/export) and tariffs, that are included in vendor or channel pricing. Point-of-sale taxes (eg value-added tax (VAT) or sales tax) are generally excluded. Subsidies offered by mobile operators are also not factored into this price. Pricing is collected across several direct and indirect channels, and while specific purchasing conditions or channel rebates are not taken into account, volume purchases by a retailer or large businesses buying in larger volumes will weigh into the average selling prices of devices.

25.   Despite these potential limitations with the data, we understand that IDC's data is widely used within the industry we are examining, and that IDC itself conducts and provides to clients an analysis based on price bands that is similar to the one we have conducted.

Smartphones

26.   In this section we set out:[12]

- The proportion of smartphones shipped into the UK by £100 price bands for iOS smartphones and Android smartphones respectively.

- The average price, excluding VAT, of smartphones shipped into the UK for iOS smartphones and Android smartphones respectively.

27.   In order to assess the proportion of smartphones shipped into the UK by £100 price bands for iOS smartphones and Android smartphones the average selling price for each model and specification was calculated. Based on this,

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[10] In these years the difference was less than 20% in relation to Android and iOS smartphones.
[11] In these years the difference was less than 20% in relation to Android and iOS tablets.
[12] For the purposes of this analysis we have not split out Huawei's HMS devices.

the volumes of each model and specification were allocated to a price band, for example, a £150 model would be in the £100-£200 price band which included all devices that cost more than £100, but £200 or less.

28. The total number of smartphones shipped in each price band for iOS smartphones and Android smartphones was then calculated and based on this the proportion in each price band was calculated. This was done separately for iOS smartphones and Android smartphones.

29. This was done separately for 2017 and 2020 and the results are provided in Figures C.7 and Figure C.8 below. As can be seen, IDC's data indicates that there is a price gap between the price at which most iOS smartphones are sold and the price at which most Android smartphones are sold. In particular, IDC's data indicates that:

- **iOS dominates the sale of higher priced smartphones**. In 2017, 66% of iOS devices were sold for more than £500 compared to just 19% of Android devices. By 2020 this gap had expanded with 81% of iOS devices being sold for more than £500 compared to just 20% of Android devices. [13]

- **Android dominates the sale of lower priced smartphones**. In 2017 only 8% of iOS devices were sold for £300 or less compared to 63% of Android devices. By 2020 this gap had expanded with less than 1% of iOS devices being sold for £300 or less compared to 66% of Android devices. [14]

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[13] CMA analysis of IDC data from "IDC Mobile Phone Tracker_FinalHistoricalPivot_2021Q2".
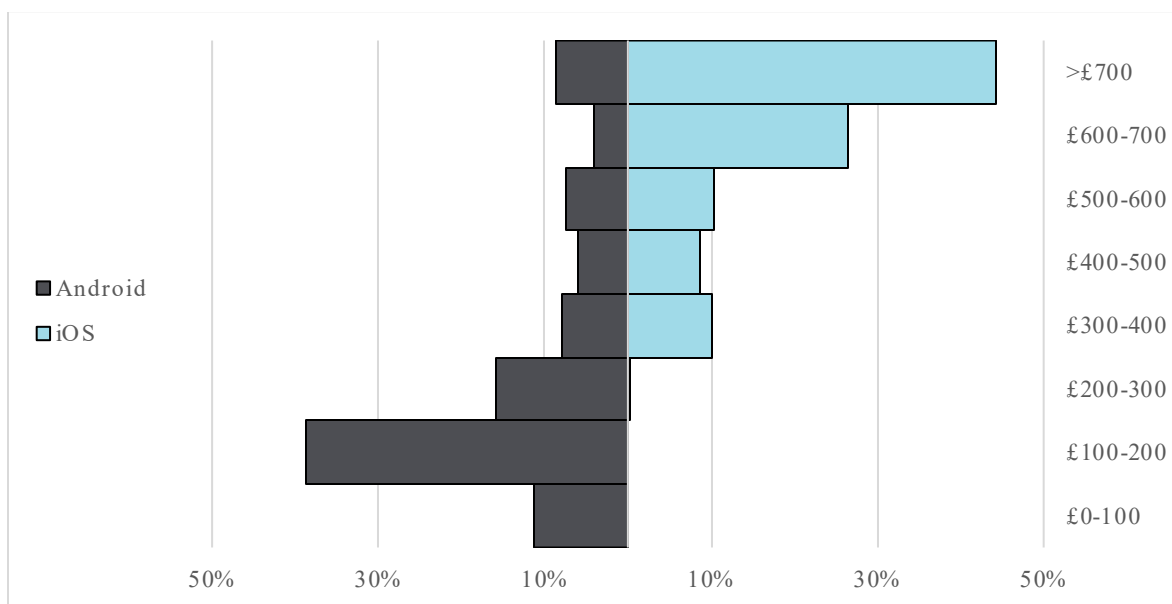[14] CMA analysis of IDC data from "IDC Mobile Phone Tracker_FinalHistoricalPivot_2021Q2".

Figure C.7: Proportion of smartphones shipped into the UK by £100 price bracket (2017)
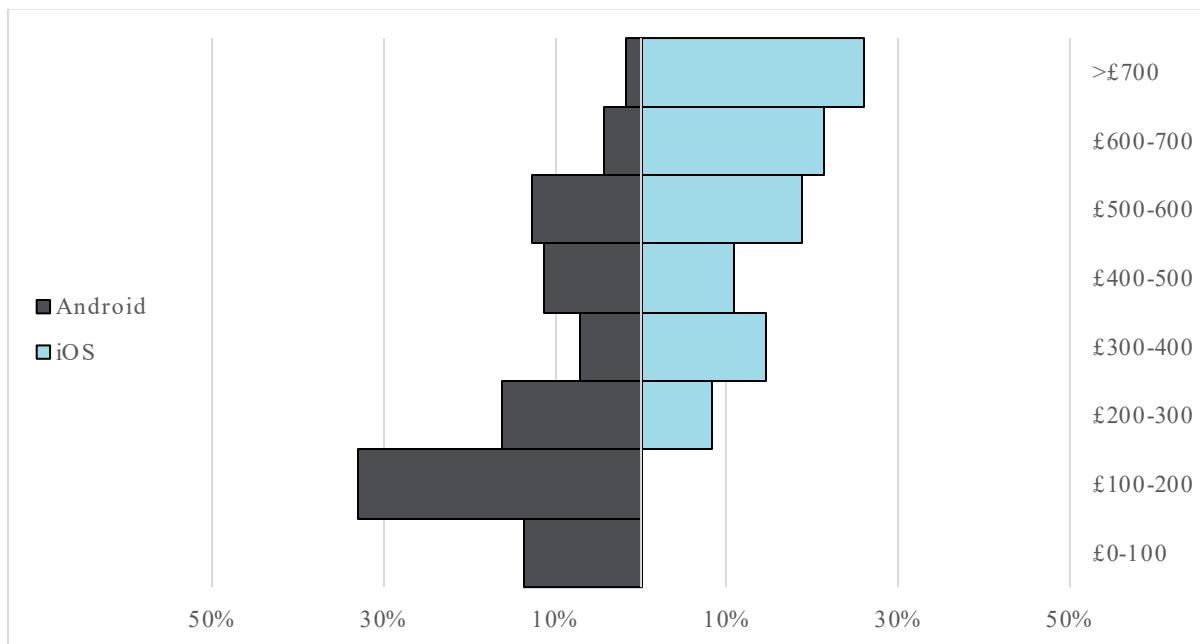
Source: CMA analysis of IDC data from "IDC Mobile Phone Tracker_FinalHistoricalPivot_2021Q2"
Notes: For details on how the number of units shipped and average selling price data were consolidated, see above.

Figure C.8: Proportion of smartphones shipped into the UK by £100 price bracket (2020)

Source: CMA analysis of IDC data from "IDC Mobile Phone Tracker_FinalHistoricalPivot_2021Q2"
Notes: For details on how the number of units shipped and average selling price data were consolidated, see above.

30.   We also used this data to calculate the average price, excluding VAT, of devices shipped separately for iOS smartphones and Android smartphones. As can be seen in Figure C.9, IDC's data indicates:

- between 2017 and 2020 the average price, excluding VAT, of an iOS smartphone increased year on year from £575 in 2017 to £721 in 2020;[15] and

- the average price, excluding VAT, of an Android smartphone initially increased from £282 in 2017 to £336 in 2019 before falling to £300 in 2020.[16]

Figure C.9: Average price, excluding VAT, of iOS devices and Android devices (not adjusted for inflation)
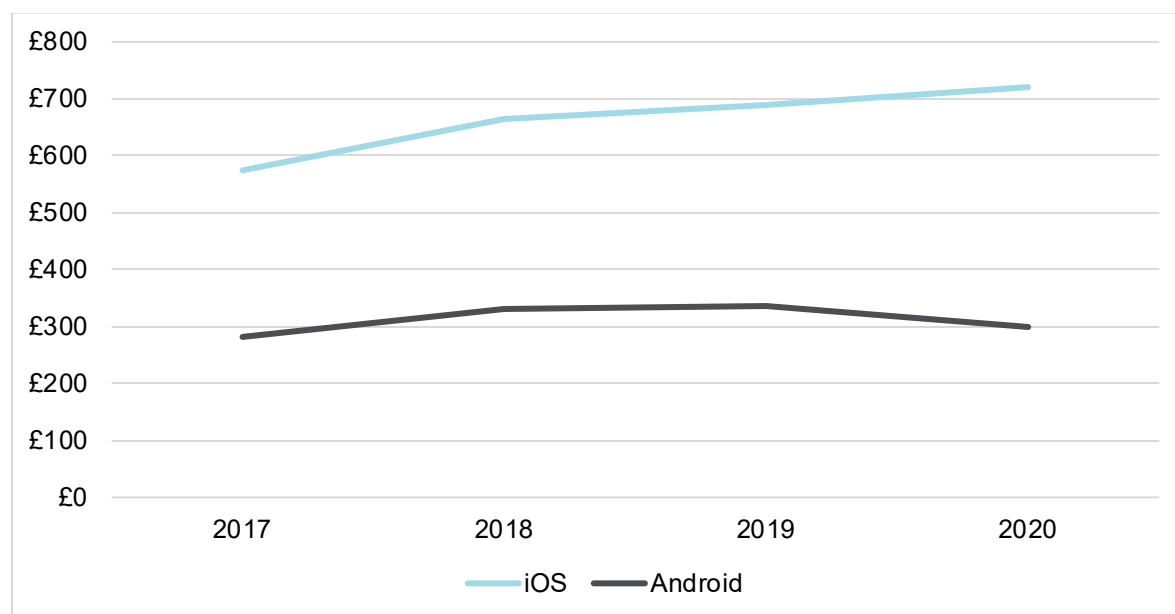

Source: CMA analysis of IDC data from "IDC Mobile Phone Tracker_FinalHistoricalPivot_2021Q2".
Notes: For details on how the number of units shipped and average selling price data were consolidated, see above.

Tablets

31.	In this section we set out:[17]

- The volume of tablets shipped into the UK by £100 price bands for iOS tablets, Android tablets (including Fire OS tablets)[18] and Windows devices which could be categorised as tablets[19] respectively.

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[15] From 2017 to 2018 the average price of iOS devices increased by 16%, between 2018 and 2019 it was 4% for iOS devices and between 2019 and 2020 it was 4% for iOS devices. CMA analysis of IDC data from "IDC Mobile Phone Tracker_FinalHistoricalPivot_2021Q2".

[16] From 2017 to 2018 the average price of Android devices increased by 18%, between 2018 and 2019 it was 1% for Android devices and between 2019 and 2020 it was -11% for Android devices. CMA analysis of IDC data from "IDC Mobile Phone Tracker_FinalHistoricalPivot_2021Q2".

[17] For the purposes of this analysis we have not split out Huawei's HMS devices.

[18] Amazon's tablets were identified as using an Android operating system in the dataset. We have as yet not been able to split out Amazon's Fire OS tablets in our analysis of volume of tables shipped into the UK by price bracket.

[19] The majority of these devices identified as those with a Windows operating system are those produced by Microsoft, see CMA analysis of IDC data from "IDC PCD Tracker (Tablet)_FinalHistoricalPivot_2021Q2".

- The average price, excluding VAT, of tablets shipped into the UK for iOS tablets, Android tablets (excluding Fire OS tablets),[20] Fire OS tablets and Windows devices which could be categorised as tablets respectively.

32. In order to assess the volume of tablets shipped into the UK by £100 price bands for each operating system the average selling price for each model and specification was calculated. Based on this, the volumes of each model and specification were allocated to a price brand, for example, a £150 model would be in the £100-£200 price band which included all devices that cost more than £100, but £200 or less.

33. The total number of tablets shipped in each price band by operating system was then calculated.

34. This was done separately for 2019 and 2020 and the results are provided in Figures C.10 and Figure C.11 below. As can be seen, IDC's data indicates that there is a price gap between the price at which most iOS tablets are sold and the price at which most other tablets are sold. For example, IDC's data indicates that, in 2020:

- the majority of Android tablets (including Fire OS tablets) (83%) were sold for £200 of less, whereas the data indicates that no Apple tablets were sold for £200 or less in 2020;[21]

- all iOS tablets were sold for £200 or more, while only 26% of rival devices were sold at that price range;[22] and

- the majority of Windows devices in the data were sold for more than £700 and Apple's tablets in the same price bracket only account for 9% of its sales.[23]

Microsoft explained that it offers Surface devices that run Windows but does not offer any tablets running a mobile operating system. However, Microsoft also explained that certain devices such as its Surface laptop face competition from Apple's high-end iPad Pro.

[20] While we have as yet not been able to split out Amazon's Fire OS tablets in our analysis of volume of tables shipped into the UK by price bracket, we were able to calculate the average price of Fire OS tablets in 2019 and 2020. Our findings are presented below.

[21] CMA analysis of IDC data from "IDC PCD Tracker (Tablet)_FinalHistoricalPivot_2021Q2".

[22] This includes both Windows devices and Android devices (including Fire OS tablets). CMA analysis of IDC data from "IDC PCD Tracker (Tablet)_FinalHistoricalPivot_2021Q2".
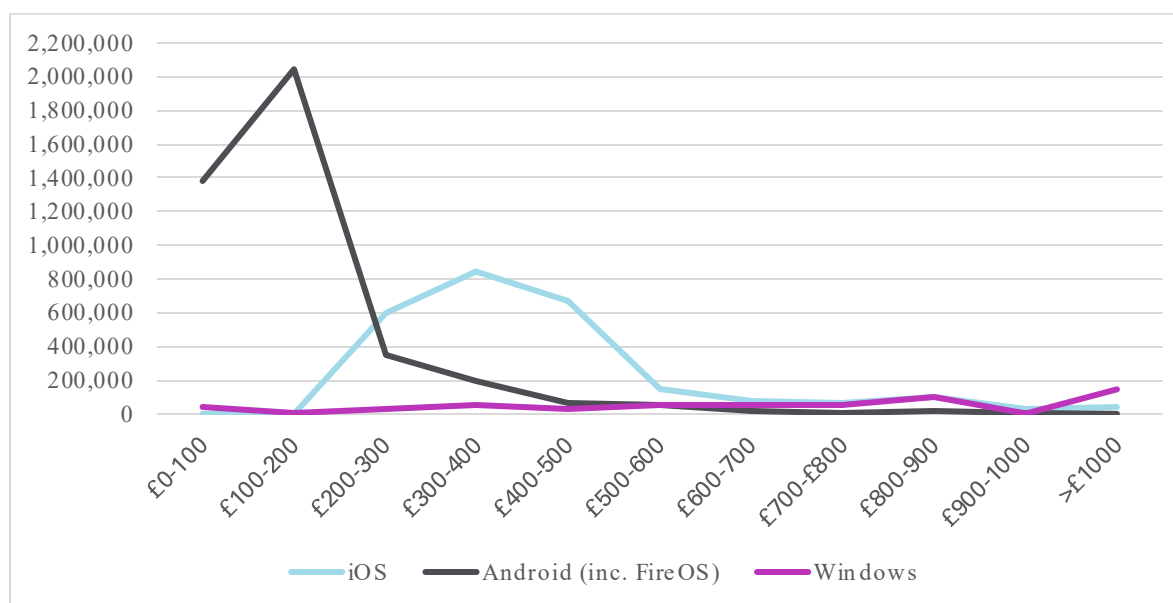
[23] CMA analysis of IDC data from "IDC PCD Tracker (Tablet)_FinalHistoricalPivot_2021Q2".

Figure C.10: Volume of tablets shipped into the UK by £100 price bracket (2019)
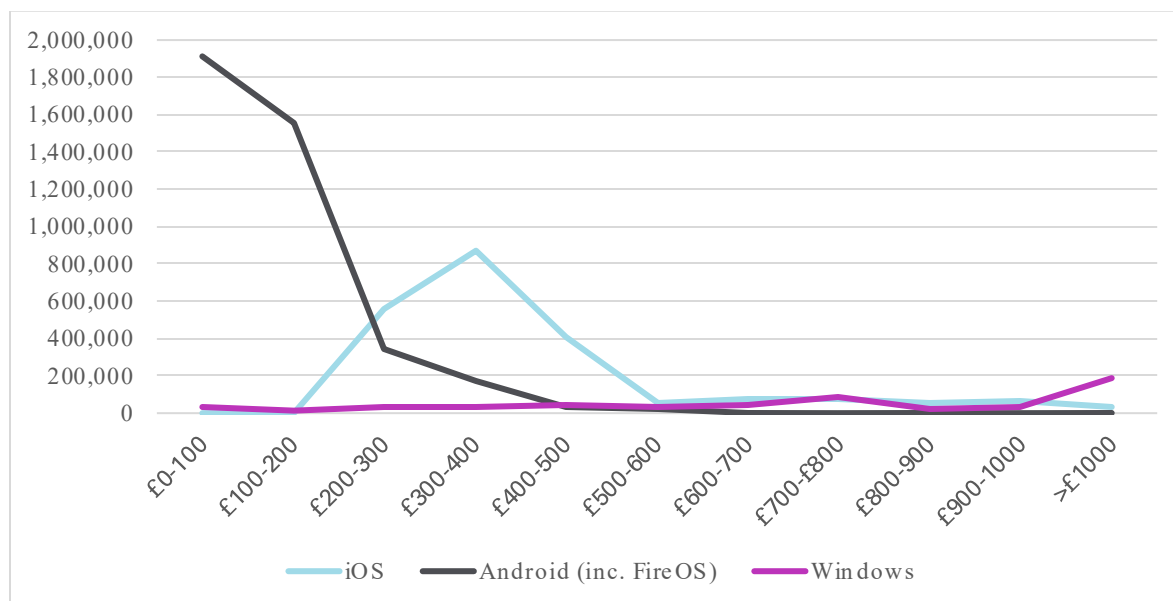
Source: CMA analysis of IDC data from "IDC PCD Tracker (Tablet)_FinalHistoricalPivot_2021Q2"
Notes: For details on how the number of units shipped and average selling price data were consolidated, see above.

Figure C.11: Volume of tablets shipped into the UK by £100 price bracket (2020)

Source: CMA analysis of IDC data from "IDC PCD Tracker (Tablet)_FinalHistoricalPivot_2021Q2"
Notes: For details on how the number of units shipped and average selling price data were consolidated, see above.

35. We also used this data to calculate the average price, excluding VAT, of devices shipped separately for iOS smartphones and Android smartphones. As can be seen in Table C.1, IDC's data indicates that iOS tablets are materially more expensive than Android tablets and, while closer in price, Android tablets were more expensive than Amazon's Fire OS tablets.[24] [25]

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[24] CMA analysis of IDC data from "IDC Mobile Phone Tracker_FinalHistoricalPivot_2021Q2".
[25] We note that, while we have as yet not been able to split out Amazon's Fire OS tablets in our analysis of volume of tables shipped into the UK by price bracket, we were able to calculate the average price of Fire OS tablets in 2019 and 2020 as set out in Table C.1.

Table C.1: Average price, excluding VAT, of tablets based on operating system (not adjusted for inflation)

Operating system	2019	2020
iOS	£430	£441
Android (exc. Fire OS)	£160	£179
Fire OS	£74	£78
Windows	£862	£813

Source: CMA analysis of IDC data from "IDC PCD Tracker (Tablet)_FinalHistoricalPivot_2021Q2".
Notes: For details on how the number of units shipped and average selling price data were consolidated, see above.

Mobile operating system shares of supply

Source of data

36. The data underlying this analysis is the same as that used for the mobile device shares of supply provided above.

37. Specifically, in relation to market participants we relied on:

- Google's data covering all active mobile Android devices for the UK, which Google provided in response to a formal CMA request;

- Apple's data covering all iOS devices;

- Amazon's data covering all Fire OS tablets; and

- Huawei's data covering all of its devices that use a version of Android that relies on its Huawei Mobile Services (HMS devices).

38. Due to the limitations outlined above in relation to the data from Statcounter, for the purpose of mobile operating systems, we have primarily relied on the data provided by market participants and use Statcounter data as a check for our data on active devices. Statcounter's data is also available over a longer period as set out above, which lets us look at historic trends.

Smartphones

39. In this section we set out:

- shares of supply by operating system based on new smartphones data provided by market participants;

- shares of supply by operating system based on active smartphones data provided by market participants; and

- shares of supply by operating system based on active smartphones data from Statcounter.

40.   Figure C.12 shows the shares of supply based on data from market participants for iOS, Android and Huawei's HMS devices in terms of new smartphones in the UK for the period 2015 to 2020. As can be seen:

- [✂]

Figure C.12: Operating system shares of supply in the sale of new smartphones in the UK – market participants data (2015-2020)
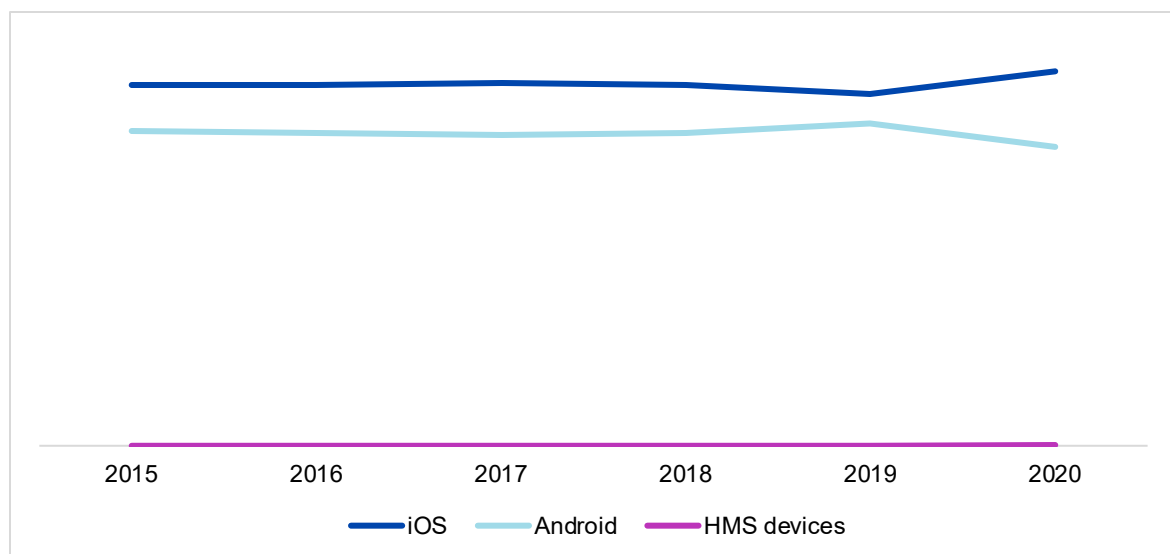
[✂]
Source: CMA analysis of data from market participants.

41.   Figure C.13 shows the shares of supply based on data from market participants for iOS, Android and Huawei's HMS devices in terms of active smartphones in the UK for the period 2015 to 2020. As can be seen:

- between [50-60%] of active smartphones in each year of this period have been Apple's iOS devices (ie iPhones);

- between [40-50%] of active smartphones in each year of this period have been Android devices; and

- currently Huawei's HMS devices have a very small share of active smartphones at [0-5%] in 2020, as set out in Chapter 3, Huawei's HMS devices have only been available since 2019.

Figure C.13: Operating system shares of supply in active smartphones in the UK – market participants data (2015-2020)

Source: CMA analysis of data from market participants.
Notes: Apple provided data on "Transacting accounts". Transacting accounts correspond to the number of accounts that performed a transaction (download, purchase etc.) on the device. A transacting account could be linked to more than one smartphone, and one smartphone could be linked to more than one transacting account. This means that the number of transacting accounts may over- or underestimate the number of active smartphones.

42. Figure C.14 shows the shares of supply based on data from Statcounter for iOS, Android, Blackberry OS, Windows and Symbian OS since 2009. This shows that:

- Apple's iOS devices have had a share of supply of between 40% and 51% throughout the last decade and it has been the largest provider of operating systems for active smartphones in every year except 2016 and 2019.

- Google's Android was actually the fourth largest provider of operating systems with just 2% in 2009, but its share grew rapidly to 25% in 2012 and has been over 40% since 2015, reaching a peak of 50% in 2019 and 2020.

- In contrast Blackberry OS (17%) and Symbian OS (16%) were the second and third largest providers of operating systems in 2009. During this period Symbian OS was owned by Nokia and its share of supply was already in decline in 2009, Blackberry OS (owned by RIM which became Blackberry) initially increased its share of supply, peaking at 37% in 2011, before declining swiftly as Google increased its share. These rivals, and Microsoft's Windows, whose share peaked at 3% in 2015, are essentially no longer active.[26]

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[26] Blackberry announced that it will stop supporting mobile devices using its operating systems from 4 January 2022. See BlackBerry 10 and BlackBerry OS Services FAQ - End of Life. Nokia announced it would stop using Symbian as its main mobile operating system in 2011 and the last mobile device using the Symbian operating system was released by Nokia in 2012. See From birth to death: why Nokia's Symbian was the future of mobile tech | TechRadar, Nokia and Microsoft seal Windows Phone alliance | ZDNet and 'Android before Android': The long, strange history of Symbian and why it matters for Nokia's future | ZDNet. Microsoft announced that there would be no further updates to its last mobile operating system (Windows 10 Mobile) in 2017 and that it would no longer support that operating system in 2019. See Saying goodbye to Windows 10 Mobile: Microsoft ends support for its mobile OS - GSMArena.com news and Windows Phone was a glorious failure - The Verge.

Figure C.14: Operating system shares of supply in active smartphones in the UK – Statcounter data (2009-2021)
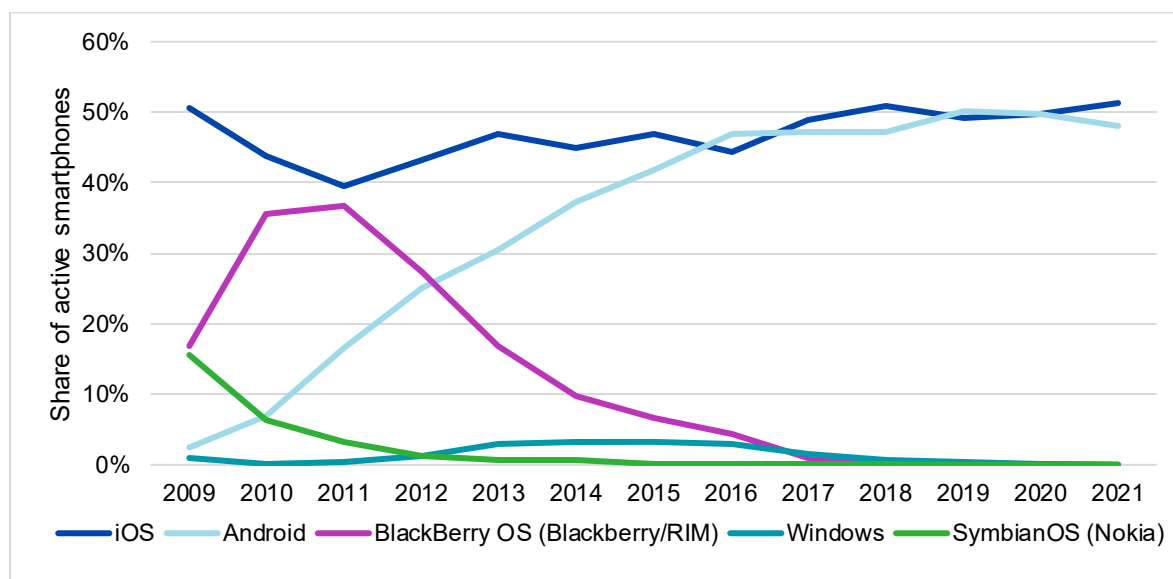
Source: Mobile Operating System Market Share United Kingdom | Statcounter Global Stats
Notes: Only operating systems with a share of 5 percentage points or more in any one year have been included except Microsoft's Windows which is included for illustrative purposes. Because it uses a version of Android, Huawei's HMS devices are likely to be included within Android. In addition, Fire OS is likely to be included within Android as it is an Android Fork, however, we understand that Fire OS was only used in Amazon's Fire Phone which was launched in the UK in September 2014 and discontinued in 2015. [27]

Tablets

43.   In this section we set out:

   - shares of supply by operating system based on new tablets data provided by market participants;

   - shares of supply by operating system based on active tablets data provided by market participants; and

   - shares of supply by operating system based on active tablets data from Statcounter.

44.   Figure C.15 shows the shares of supply based on data from market participants for iOS, Android, Amazon's Fire OS and Huawei's HMS devices in terms of new tablets in the UK for the period 2015 to 2020. As can be seen:

   - [✂]

Figure C.15: Operating system shares of supply in the sale of new tablets in the UK – market participants data (2015-2020)

[✂]
Source: CMA analysis of data from market participants.

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[27] See Amazon Fire Phone UK Release: Handset launches today | Trusted Reviews and Amazon stops selling Fire smartphone - BBC News.

45. Figure C.16 shows the shares of supply based on data from market participants for iOS, Android, Amazon's Fire OS and Huawei's HMS devices in terms of active tablets in the UK for the period 2017 to 2020 (data from all relevant market participants was not available before 2017). As can be seen:

- between [50-60%] and [50-60%] of active tablets in each year since 2017 have been Apple's iOS devices (ie iPads) – its share has declined slightly over time;

- Google's Android has been the second largest operating system in terms of active tablets, but its share of active tablets has decreased from [20-30%] in 2017 to [20-30%] in 2020; and

- Amazon's Fire OS has been the third largest operating system in terms of active tablets with its share of active tablets increasing from [10-20%] in 2017 to [20-30%] in 2020.

Figure C.16: Operating system shares of supply in active tablets in the UK – market participants data (2017-2020)
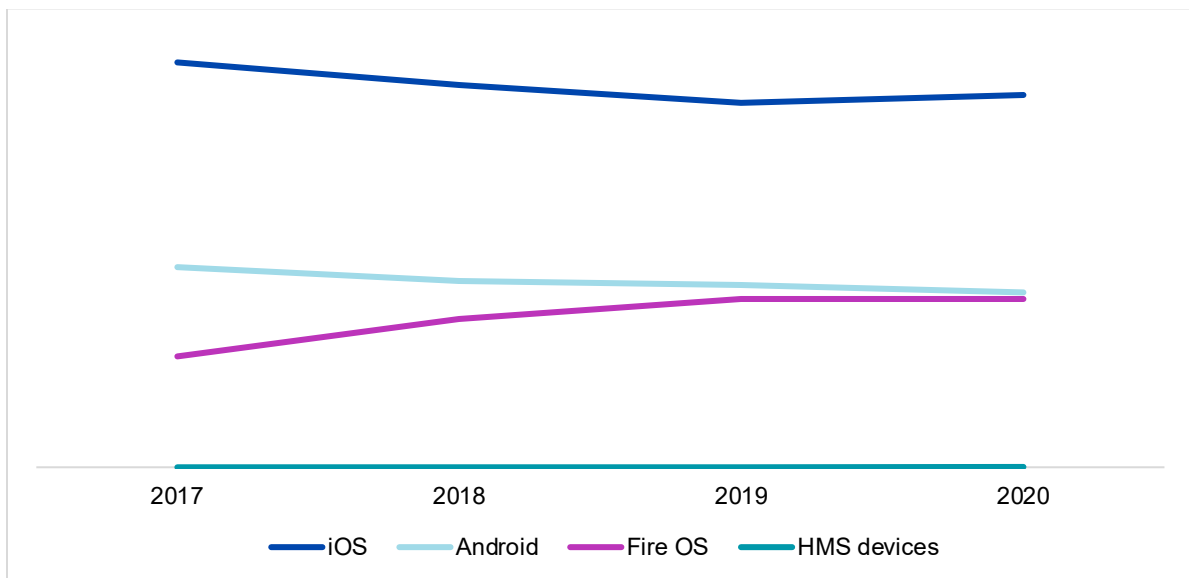

Source: CMA analysis of data from market participants.
Notes: Huawei's HMS devices have only been available since 2019 as set out in Chapter 3. Apple provided data on "Transacting accounts". Transacting accounts correspond to the number of accounts that performed a transaction (download, purchase etc.) on the device. A transacting account could be linked to more than one tablet, and one tablet could be linked to more than one transacting account. This means that the number of transacting accounts may over- or underestimate the number of active tablets.

46. Figure C.17 shows the shares of supply based on data from Statcounter for iOS, Android and Amazon's Fire OS since 2012. This shows that:

- essentially all active tablets have either been iOS devices, Android devices or Fire OS devices; and

- that Apple's share of supply was historically as high as 90% and, while it has declined over time, it is still 60% of active tablets with Android being the second largest, peaking at 30% in 2021.

Figure C.17: Operating system shares of supply in active tablets in the UK – Statcounter data (2012-2021)
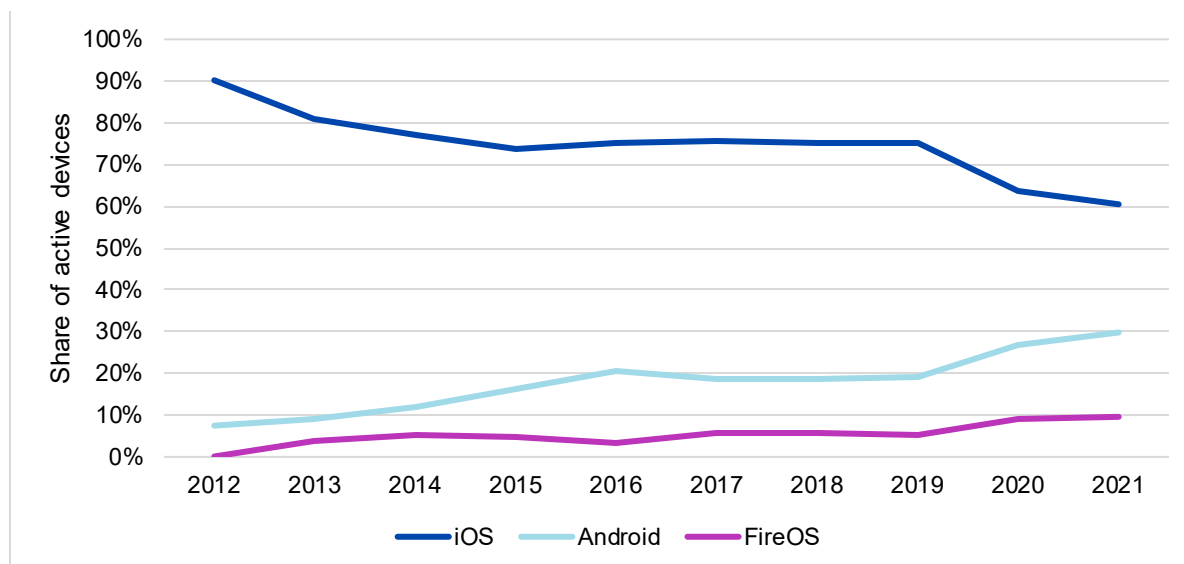
Source: CMA analysis of Tablet Operating System Market Share United Kingdom | Statcounter Global Stats and Tablet Vendor Market Share United Kingdom | Statcounter Global Stats.
Notes: Our understanding is that Fire OS is identified as Android within the Statcounter data so we have used Amazon's share as a manufacturer to calculate the share of Fire OS and adjust the share of Android. This is possible because Fire OS is only used in Amazon's own devices. Only operating systems with a share of 5 percentage points or more in any one year have been included. As they use a version of Android, Huawei's HMS devices are likely to be included within Android.

App distribution outcomes

47. In this section we present key statistics on volumes and revenues for the App Store, the Play Store, and a number of alternative app stores, as well as analysis of consumers routes to app downloads on the App Store and Play Store.

Comparative volume and revenue figures

48. We received monthly category-level data for the UK on the number of apps, number of app developers, number of downloads, and number of active users (measured by the number of users that downloaded at least one app) from Amazon, Apple, Google, Huawei, and Samsung. We also received monthly category-level data for the UK on customer billings from in-app purchase systems and revenue from in-app purchase systems from Apple and Google. All data includes first-party apps.

- **Amazon**: provided us with data for their app store on Fire Phones, Fire Tablets, and non-Amazon Android devices separately. When analysing

the number of downloads and the number of active users, we summed the figures from these app stores together. [✂].

- **Apple**: due to limitations in the datasets held by Apple, Apple provided us with data for June 2019 to December 2020 for the number of apps and number of app developers. For all the other metrics, they provided us with data for the period from June 2010 to the end of 2020.

- **Google**: for the number of apps and number of app developers, in response to a formal CMA request, Google provided us with data for the UK from March 2013 and June 2017, respectively, until July 2021. For the number of app downloads, Google provided us with data from July 2016 to September 2021. For the number of active users, it provided us daily data covering [a short period in 2021]. For customer billings and revenue from their in-app purchase system they provided us with data from January 2012 to December 2020.

- **Huawei**: the metrics Huawei provided us with cover the period from May 2018 (Huawei's app store, AppGallery, launched in the UK in 2018) until July 2021.

- **Samsung**: For the number of apps and number of developers, Samsung provided us with yearly data from 2009 until 2020. For the number of downloads and number of active users, it provided us with monthly data from January 2014 until December 2020.

49.   The following figures show how these figures have changed over time for the different app stores.

Figure C.18: Number of apps in each app store for the UK over time (yearly averages of monthly data)

[✂]
Source: CMA analysis of the parties' data
Notes: [✂]

Figure C.19: Number of app developers in each app store for the UK over time (yearly averages of monthly data)

[✂]
Source: CMA analysis of the parties' data
Notes: [✂]

Figure C.20: Number of app downloads in each app store for the UK over time (yearly sums of monthly data)

[✂]
Source: CMA analysis of the parties' data

Figure C.21: Number of active users in each app store for the UK over time (yearly averages of monthly data) (Google provided daily data on the number of active users and so this is not comparable)

[✂]
Source: CMA analysis of the parties' data

App Store and Play Store statistics

50.   We received data on monthly app-level consumer spend, revenue and first-time downloads from Google and Apple. Spend and revenue were split between billings from:

- in-app purchases, excluding subscriptions;

- subscriptions; and

- payments to download apps.

51.   A description of the data provided by each party is listed below:

- **Google**: provided, in response to a formal CMA request, monthly data on the level of consumer spend and Google revenue for apps (including Play pass) in the UK Play Store between [✂]. The equivalent data was also provided for the global Play Store, but this data was not used in the analysis. [✂]. In addition to the above, Google also provided, in response to a formal CMA request, a dataset of all apps available in the UK Play Store during 2020. It includes basic information about each app and its payment settings (ie whether it has a purchase price, whether in-app purchases are enabled and whether subscriptions are enabled). In response to a further CMA request, Google provided a complete summary of first-time downloads to the Play Store for the UK in 2020.

- **Apple**: provided monthly data on the level of consumer spend, amounts retained by Apple and first-time downloads for apps in the UK App Store between January 2016 and May 2021. Apple does not maintain data on the number of active users.

52.   We received detailed data on the source of individual first-time downloads for the Google Play Store and Apple App Store, in response to a formal CMA request. The source includes whether the download originated from search, browse or referral as well as details of specific referrers, browse pages etc. We requested that this data cover the full year period to 31 May 2021. A description of the data provided by each party is listed below:

- **Google**: provided details of the source of all first-time downloads from the UK Play Store from [✂].

- **Apple**: provided details of the source of all first-time downloads from the UK App Store covering the period from 1 June 2020 to 31 May 2021.

53. The following tables provide key metrics for the App Store and Play Store in 2020.

Table C.2: Summary of Google Play Store in 2020 in the UK

[✂]

Source: CMA analysis of Google's data

Table C.3: Summary of Apple App Store in 2020 in the UK

[✂]

Source: CMA analysis of Apple's data, received 4 August 2021

54. The figures below show how Apple and Google's revenues from different types of payments made through their app stores (payments for app downloads, for in-app purchases and for subscriptions) have evolved over time.

Figure C.22: Google revenues on apps (including Play pass) from the Play Store in the UK, by revenue type, 2016 to 2020

[✂]

Source: CMA analysis of Google's data,

55. [✂]

Figure C.23: Apple retained amounts from the App Store, by transaction type, 2016 to 2020 in the UK

[✂]

Source: CMA analysis of Apple's data

56. [✂]

57. The figures below show how both revenues and downloads from Apple and Google's app stores are distributed between categories of apps.

Figure C.24: Share of Google Play Store revenues between app categories in 2020 in the UK

[✂]

Source: CMA analysis of Google's data. Higher level groupings of categories were done by the CMA for illustrative purposes.

Figure C.25: Share of Google Play Store downloads between app categories in 2020 in the UK

[✂]

Source: CMA analysis of Google's data. Higher level groupings of categories were done by the CMA for illustrative purposes.

58.   [✂]

Figure C.26: Share of Apple App Store retained amounts between app categories in 2020 in the UK

[✂]

Source: CMA analysis of Apple's data. Higher level groupings of categories were done by the CMA for illustrative purposes.

Figure C.27: Share of Apple App Store downloads between app categories in 2020 in the UK

[✂]

Source: CMA analysis of Apple's data. Higher level groupings of categories were done by the CMA for illustrative purposes.

59.   [✂]

60.   The figures below show how Apple and Google's revenues from apps categorised as games have evolved over time relative to revenues from other categories of app.

Figure C.28: Google Play Store revenues from apps (including Play pass) in "Games" categories versus other categories for the UK, 2016 to 2020

 [✂]

Source: CMA analysis of Google's data.

Figure C.29: Apple retained amounts from apps in "Games" categories versus other categories, 2016 to 2020 in the UK

 [✂]

Source: CMA analysis of Apple's data.

61.　[✂]

62.　The figures below illustrate the level of concentration of revenues in both the Google Play Store and Apple App Store ie how many apps account for the top X% of revenues in each store.

Table C.4: Concentration of Google's Play Store app revenue in the UK – how many apps account for the top 50% and 90% of all revenues, 2016 to 2020

[✂]

Source: CMA analysis of Google's data

Table C.5: Concentration of Apple's App Store retained amounts – how many apps account for the top 50% and 90% of all retained amounts, 2016 to 2020 in the UK

[✂]

Source: CMA analysis of Apple's data

63.　[✂]

Consumer route to app downloads – acquisition

64.　The figures below show the distribution of acquisition sources for first-time installations on both the Google Play Store and Apple App Store for the UK. First time installations can be broadly divided between those coming from search, referral or browse. The data from the Apple App Store covers a full year whereas the Google Play Store data covers a [✂] period. The Google Play Store data also excludes downloads with no source of information, which accounted for [30-40%] of UK Play Store downloads during the relevant period.

Table C.6: Acquisition sources for first time installations on the UK Google Play Store, between [✂].

Acquisition source	Share of first-time installations
Organic search	[60-70%]
Third party referrals	[10-20%]
Search ads	[5-10%]
Play Store browse – Games section	[5-10%]
Play Store browse – Apps section	[0-5%]

Source: CMA analysis of Google's data. Excludes downloads with no source of information, which accounted for [30-40%] of all Google's UK Play Store downloads.

Table C.7: Acquisition sources for first time installations on the UK Apple App Store, between 1 June 2020 and 31 May 2021

Acquisition source	Share of first-time installations
Organic search	[60-70%]
App referral	[20-30%]
Web referral	[10-20%]
Search ads	[0-5%]
App Store browse – Games section	[0-5%]
App Store browse – 'Today' section	[0-5%]
App Store browse – Apps section	[0-5%]
App clip	[0-5%]

Source: CMA analysis of Apple's data

Figure C.30: Acquisition sources for first time installations on the UK Google Play Store, by category, between [✕]

[✕]

Source: CMA analysis of Google's data

Figure C.31: Acquisition sources for first time installations on the UK Apple App Store, by category, between 1 June 2020 and 31 May 2021

[✕]

Source: CMA analysis of Apple's data

Mobile browser outcomes

Sources of data

65.   Statcounter and App Annie are the key data sources which we used to calculate shares of supply in browser markets.[28]

66.   Statcounter is an important public source for shares of supply in browser markets.[29] Statcounter provides shares on the basis of page views, which is a request to load or reload a single web page of an internet site.[30] This request usually results from a user who clicks on a link that points to the web page. We did not receive any specific concerns about Statcounter data for browser

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[28] In addition to these data sources, stakeholders also commented on the following sources: Google said that it has Google-only data on the number of installations of the Chrome browser and the number of page loads using Chrome. Mozilla provided Firefox-only mobile monthly active users data from the UK in the last four years. Microsoft said that Comscore is another source of browser usage information, however, it does not make its data available publicly.
[29] Statcounter was mentioned as a source for shares of supply by Apple, Microsoft, and Opera.
[30] Statcounter, FAQ.

shares,[31] although we note the possible limitations to Statcounter's methodology, discussed above, regarding representativeness of the population of websites and consumers' adblockers and browser preferences.

67.   App Annie is a data source Google referred to for shares of supply in browser markets. App Annie measures shares according to usage in minutes.[32] An advantage of App Annie's data is that it provides shares of supply per mobile operating system, and not in an aggregated form as is the case with Statcounter.

Mobile browsers: shares of supply

68.   Both globally and at the UK level, Apple's Safari and Google's Chrome browser are the largest browsers on mobile devices.[33]

69.   Figure C.28 below shows the evolution of shares of supply for browsers on mobile devices in the UK from 2012 until 2021.[34] In particular:

*   Currently, Safari and Chrome are the largest browsers. In 2020, their combined share of supply amounted to almost 90%, with Safari accounting for 48% and Chrome for 40%.

*   Over time, Safari's share of supply has been relatively stable, although it has decreased slightly since 2012. In contrast, Chrome's share of supply increased substantially, from 2% in 2012 to 40% in 2021.

*   Samsung Internet is the only other browser with a market share above 5%. It gained share significantly in 2016 and has remained at around 6% to 8% since.

*   While BlackBerry used to be the third largest mobile browser in the UK (15% in 2012), it has had virtually no presence (<1%) since 2017.

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[31] Opera told us that Statcounter is not entirely accurate.
[32] Although Google told us that it does not verify or endorse the accuracy of App Annie data.
[33] We have assessed shares of supply using two different metrics: (i) page views (ie the total number of pages loaded or reloaded in a browser); and (ii) usage, measured in minutes.
[34] Statcounter, Mobile browser share of supply UK 2012-2021. Share of supply calculated based on usage minutes data submitted by Google confirm that Chrome and Safari have been holding a joint share of supply of over 80% in the last few years, and that Samsung Internet is the largest competitor in the mobile browser market. App Annie browser usage data.

Figure C.28: UK mobile browser share of supply
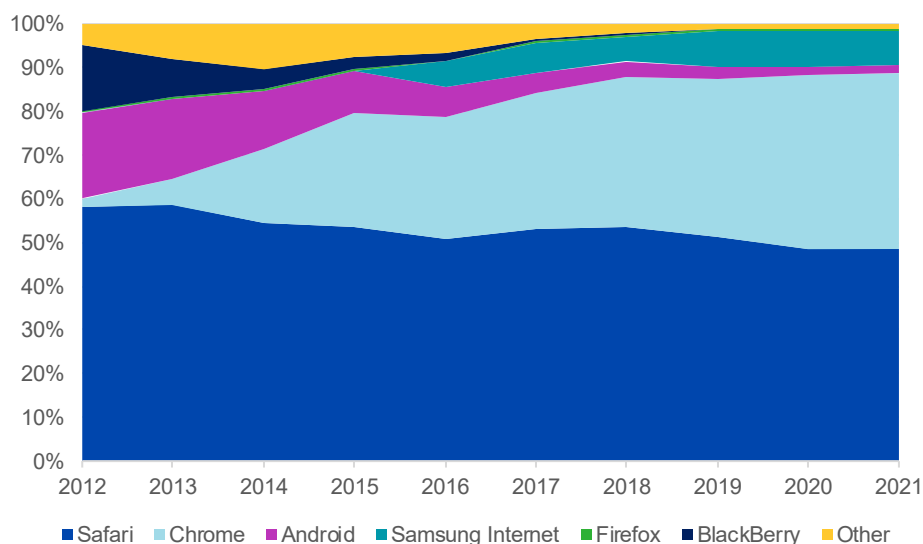
Source: Statcounter, Mobile browser share of supply UK 2012-2021.
Note: Mobile refers to smartphones and tablets. The figure was calculated based on page views data from Statcounter. Android refers to AOSP-based browsers developed on top of the web browser apps made available through the Android Open Source Project. European Commission, Google Android decision, footnote 1034.

Browser engines: shares of supply

70.   Apple and Google also have the largest browser engines. Their browser engines had a combined share of almost 100% on mobile devices in the UK, with WebKit accounting for just over 50% and Blink just under 50%.[35]

71.   As set out in Chapter 5, each browser has an underlying browser engine. However, since the browser engine can differ by operating system, we have assessed shares of supply for browsers and browser engines by operating system. Given that Apple and Google hold a de facto duopoly over mobile operating systems (as set out in Chapter 3), we limit our assessment to iOS and Android.

72.   For iOS, Table C.10 below shows the following:

- Safari is the main mobile browser on iOS in the UK, with a share of supply of 92.6% in 2020. The only other sizable browser is Chrome, with 6.4%.

- Given Apple imposes the restriction that browsers on iOS have to use Apple's WebKit browser engine, WebKit on iOS has a share of supply of 100%.

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[35] See Table C.10 and Statcounter, Mobile operating system share of supply UK 2020 WebKit's share is calculated based on the share of iOS in 2020. Blink's share is calculated based on the share of Android in 2020 by excluding Gecko and the other/unknown category on Android.

Table C.10: 2020 UK mobile browser engine share of supply by operating system

%

	iOS			Android	
Browser	*Browser Engine*	*Mobile*	*Browser*	*Browser Engine*	*Mobile*
Safari	WebKit	92.6	Chrome	Blink	75.2
Chrome	WebKit	6.4	Samsung Internet	Blink	15.3
Firefox	WebKit	0.3	Firefox	Gecko	3.8
Other	WebKit	0.7	Smaller browsers	Blink	5
			Other	Other/unknown	0.8

Source: App Annie browser usage data provided by a browser vendor.
Note: Calculated based on usage minutes data from App Annie. DuckDuckGo's browser engine (OS's WebView) is counted as Blink (1.6%); The browser Jetpack (0.3%) is counted as Other/unknown uses a WebKit fork.

73.   For Android, Table C.10 shows the following:

- Chrome is the main browser on Android in the UK, with a share of supply of 75.2% in 2020. Samsung Internet is the largest competitor, with a share of 15.3%, while the next largest competitor, Firefox, has a share below 5%.

- While browsers on Android are free to choose their browser engine, almost all browsers use Google's Blink browser engine, resulting in Blink holding a share of at least 95%. The key exception is Firefox, which uses Mozilla's Gecko browser engine.