Mobile Media Consumption Report:
Larger smartphone screens drive greater user activity

A research study into the impact of smartphone screen size and resolution on social, chat, game and video smartphone apps engagement and data consumption

technology.ihs.com

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Key questions

- Can hardware explain the differences in app downloads and monetization between Android smartphones and the iPhone?
- Do larger smartphone screens increase smartphone usage? Or, are other device characteristics such as processing power, price, release year responsible for differences in usage patterns?
- Are the impacts the same on minutes of usage, session length and data consumption? If not, how do they differ?
- Now there are larger screen iPhone models with the iPhone 6 and iPhone 6 Plus, what will be the impact on Apple users' app and services usage compared with Android users?
- How do device characteristics affect usage of different genres of apps such as social apps, chat apps, games and media streaming apps?
- As larger screens become more common at lower Android smartphone price points, will mobile usage of low and mid tier smartphones rise to match usage of flagship models?

Key findings

- In Q2 2014, 80 percent of smartphone models launched had screens over 4.5 inches, larger than any iPhone then on sale. And 17% of new smartphones had screen sizes of 5.5 inches or greater.
- Larger smartphone screen sizes strongly correlate with increased minutes of app usage.
- Higher resolution screen smartphones have higher data consumption, but resolution is less important than physical screen size as an indicator of higher data use.
- Mobile app revenue generated per active iPhone is over four times as much as for Android, despite historically smaller iPhone screen sizes than Android flagship competitors.
- Streaming video and social networking apps have a stronger link between increased data consumption and screen size than do chat apps (e.g. WhatsApp, WeChat) or mobile games.
- High-end application processors, graphics and chipsets do not affect usage as much as screen size: Sony's high powered Xperia Z1 Compact delivered similar usage patterns to Samsung's Galaxy S4 Mini which has a more modest chipset.
- Smartphone screen sizes have increased dramatically in recent years, but until late 2014 Apple lagged its Android competition.
- While the iPhone 6 has a screen of 4.7 inches, the study shows there is a tipping point for screens around 5 inches.
- Although many apps are not yet optimized for the larger iPhone 6 and 6 Plus screen sizes, early indications are users of the iPhone 6 generation are consuming more data than users of older smaller screen iPhone models.
- Operators wishing to drive up data consumption should aim to range more large screen smartphone models, and pair them with larger data tariffs.
- Mobile video providers should tune their picture quality services to the physical size of smartphone screens and not their pixel resolution to maximize engagement.
- Advertisers will benefit from the growing adoption of large screen smartphones which leads to more minutes of app use and hence more advertising views, clicks, and higher mobile advertising revenues.

Dramatic evolution of smartphone screens between 2009-2014 sets foundations for greater mobile media usage

When the original iPhone launched in 2007, it had one of the largest smartphone screens available.

By 2009, when the third iPhone model, the 3GS, arrived, 80% of new smartphone models launched had smaller screens than its 3.5 inches.

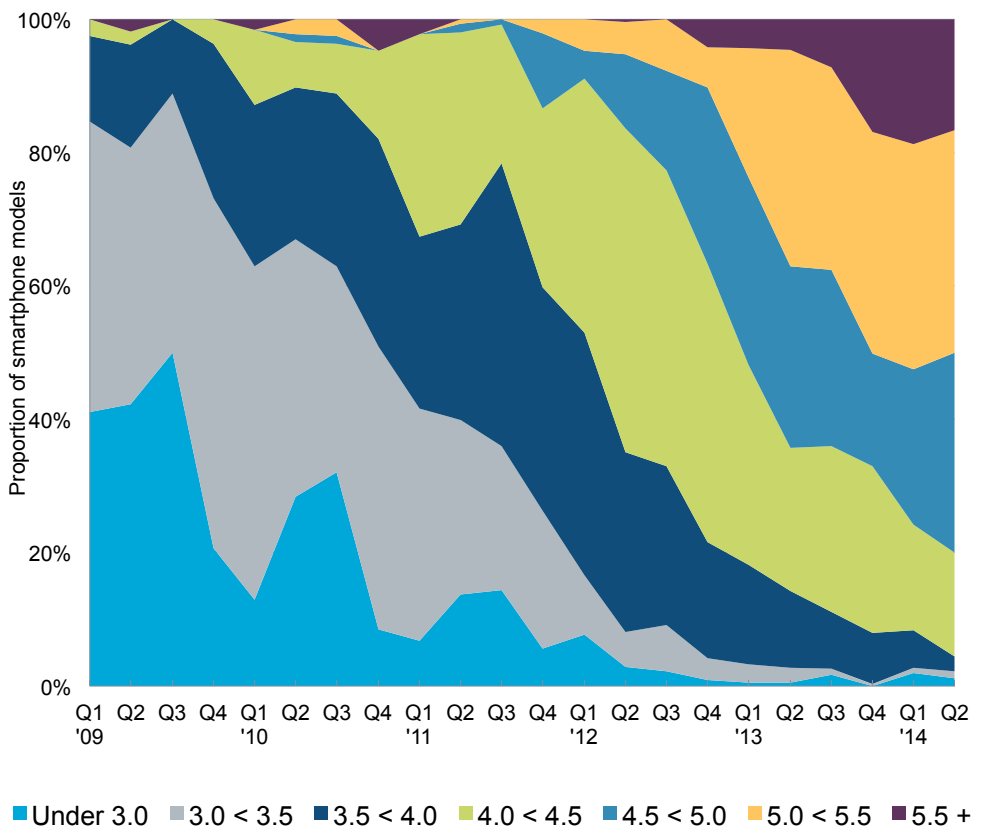
But the mobile market has changed dramatically since then while Apple made little adjustment to the iPhone's screen size until late 2014's iPhone 6.

In the second quarter of 2014, 80% of new smartphones had screens sizes of 4.5 inches or greater, larger than any iPhone then on sale. And 17% of new smartphones had screen sizes of 5.5 inches or greater.

By launching two new models with 4.7 inch and 5.5 inch screens, for the iPhone 6 and 6 Plus respectively, Apple is launching models with similar screen sizes to many previous smartphones launched by other manufacturers.

How consumers use those existing large screen smartphones is an important basis on which to understand the impact on data generated and the time spent on iPhone content and services.

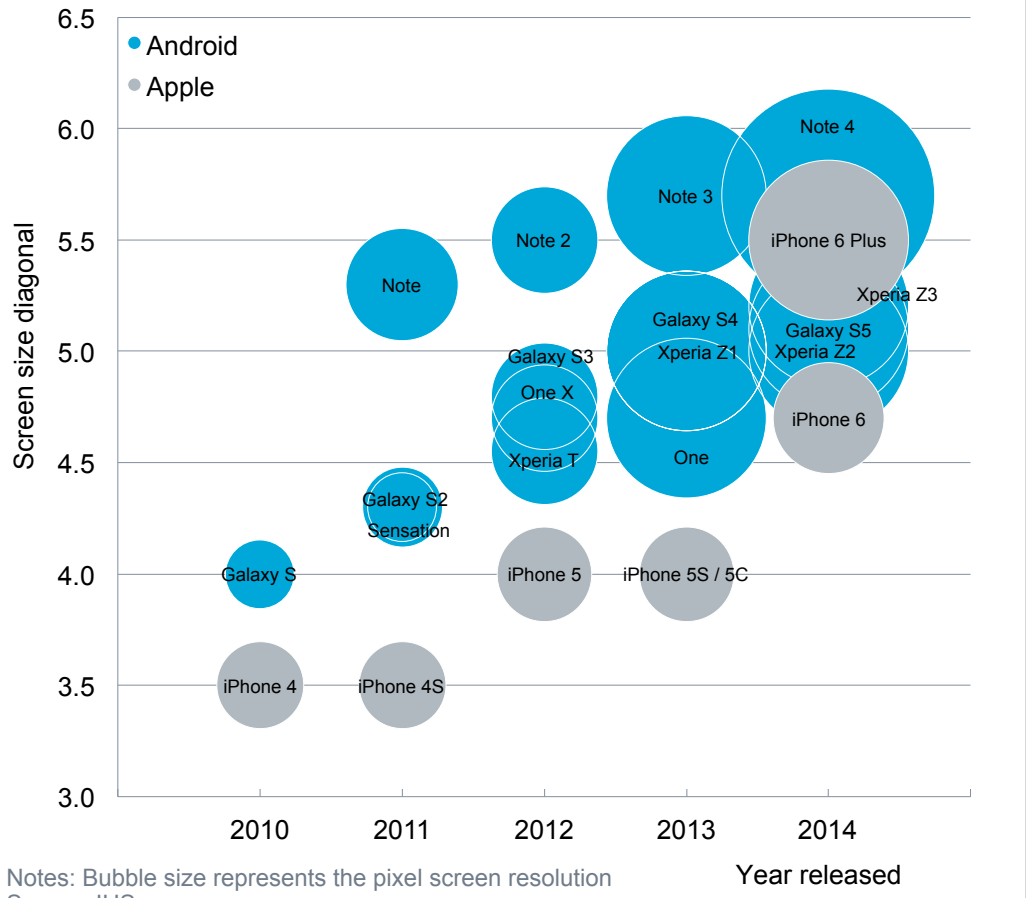
Screen sizes of new smartphone models released



Source: IHS. From Mobile Technology Intelligence (9/2014)

Flagship smartphone screen sizes have ballooned dramatically in the last four years

Evolution of flagship smartphone model screen sizes



Notes: Bubble size represents the pixel screen resolution
Source: IHS

Each handset maker has offered increasingly large screen sizes and display resolutions in their flagship smartphones over the last four years. Apple was the sole exception until 2014's iPhone 6.

In the entry level and mid range smartphone categories there has been a similar trend towards larger screen smartphones:

- HTC's 2014 Desire 310 has a 4.5 inch screen compared with 2013's Desire 300's 4.3 inch screen, and just 3.7 inches for 2011's Desire S.
- Samsung's Galaxy S Mini grew in size from 4 inches for 2012's S3 Mini to 4.3 inches for 2013's S4 Mini.
- Similarly, in the Galaxy Ace 2 to Ace 3, Samsung raised the screen size from 3.8 to 4 inches between the 2012 and 2013 models.

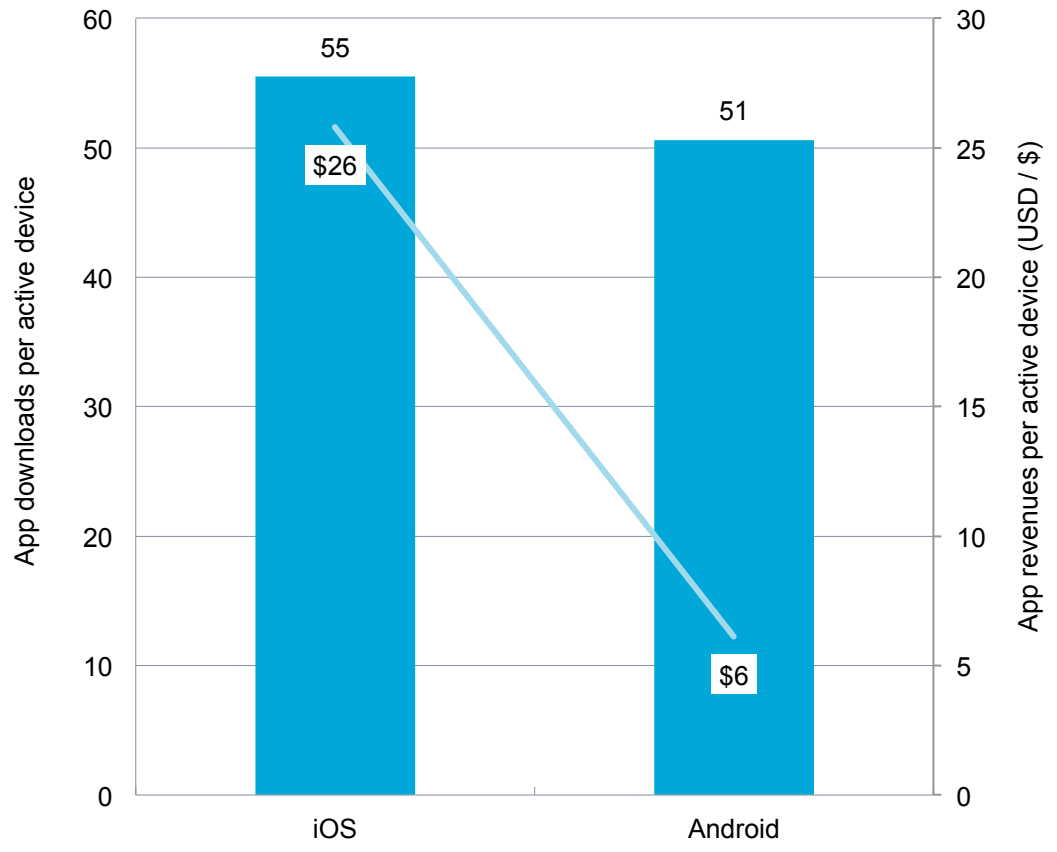
In effect, many entry level smartphones now have larger screens than the flagship smartphones of 2010.

As smartphone displays grow, and flagship features trickle down to mid and low tier smartphones at much lower price points, it's essential for content and services companies to understand to what extent the usage levels will also trickle down.

Operators must plan how to design their mobile data tariffs for mid tier smartphone owners as the smartphones on sale at those price points match the capabilities of previous years' flagship models.

iPhone leads Android in app revenues generated, despite lower levels of data consumed

iOS and Android app download and app revenues compared (2014)



Source: IHS (9/2014). From Mobile Media Intelligence

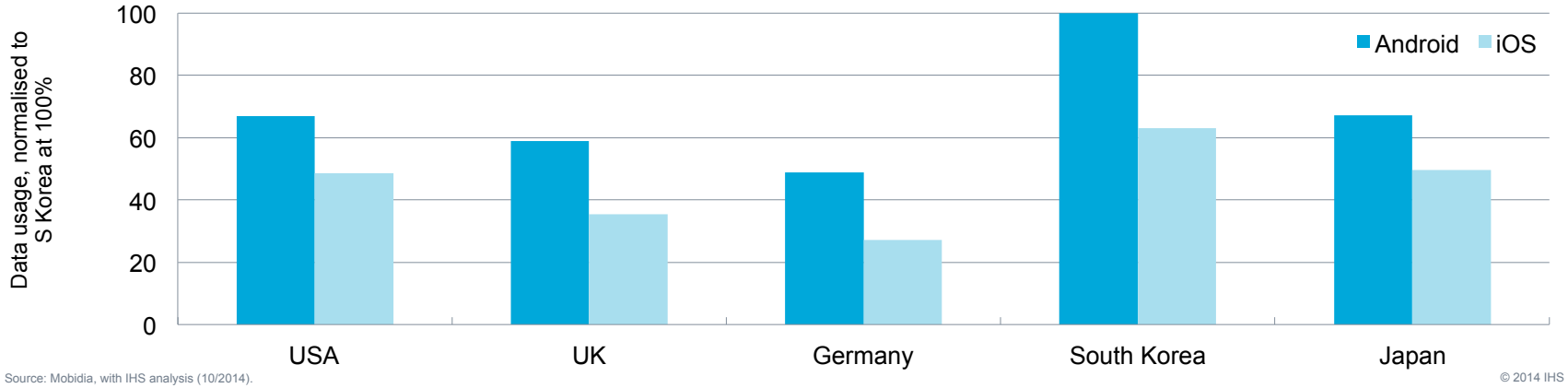
Apple's iPhone is a more successful generator of app revenue than Android, despite the larger screens routinely offered by Android OEMs. Apple generates more revenue per device because:

- **Apple only targets the high end**. The range of models and price points offered by Android OEMs is much greater than from Apple. Samsung, for example, offers smartphones retailing from under $100 without contract or subsidy, right up to flagship models such as the Galaxy S5 with prices five to six times higher which compete head-on with the Phone.
- **The iPhone user experience is more mature**. Apple has complete control over hardware and software making it easier for Apple and app developers to deliver a reliable experience. By contrast, Google and Android smartphone makers must work together which makes innovation slower and harder.

But now Apple is finally increasing both the screen size and resolution of the iPhone, the experience of Android smartphone models provides a critical guide to how iPhone usage will evolve as the new iPhone 6 and 6 Plus models become a larger part of the iPhone installed base.

Android generates more data usage than iOS, across all leading countries

Smartphone data usage by country, Android flagship models vs iOS



Source: Mobidia, with IHS analysis (10/2014).

Android smartphone owners use more data than iPhone owners in each of the five countries analyzed.

Markets where iPhone adoption is strongest - Japan and USA - had the least difference in data usage between the platforms. This is likely due to a relatively stronger set of apps tailored to those country's users than in a market such as South Korea where iPhone is relatively weak.

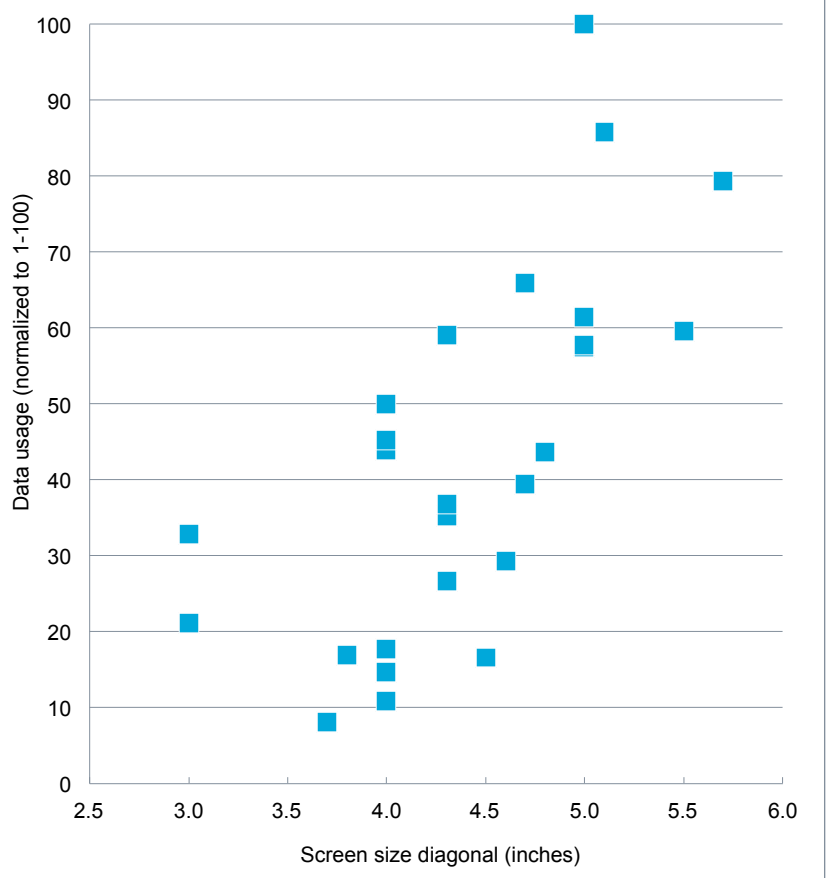
Overall data usage is strongest in markets where LTE is widely adopted such as Japan, South Korea and the USA. But this usage cannot be explained purely by faster mobile network performance because this comparison includes both Wi-Fi and cellular network data consumption. Instead, other factors such as smartphone specifications must be significant.

There are four key areas which may explain these different levels of data usage between iOS and Android:

1. **Physical screen size**. Do larger screens result in greater smartphone usage and data consumed?
2. **Screen resolution**. Are the number of pixels more or less significant than overall screen size? And, what does this mean with the arrival of Quad HD displays?
3. **Smartphone tier & price**. Do smartphones marketed in the flagship segment generate more or the same usage compared with similar specified more recent mid or low tier models?
4. **Overall processing power**. Most "mini" smartphone models combine a smaller screen with a less powerful processor and chipset. Is the processor and chipset the key determinant of differences, or is it actual screen size?

Larger smartphone screen sizes strongly correlate with increased data consumption

Smartphone data used by screen size of device



Source: Mobidia, with IHS analysis (10/2014).

- IHS and Mobidia analyzed the performance of 26 smartphone models from five OEMs to test the importance of screen size in determining smartphone data usage and minutes of use. We ensured the sample included a representative range of smartphones in order to test:
  - The impact of smartphone's age and generation affects usage.
  - The difference between flagship smartphones across OEMs and between the same OEM over time.
  - Low versus high tier smartphone usage.
  - The impact of different chipset and CPU performance.
  - The importance of screen resolution, as well as size.

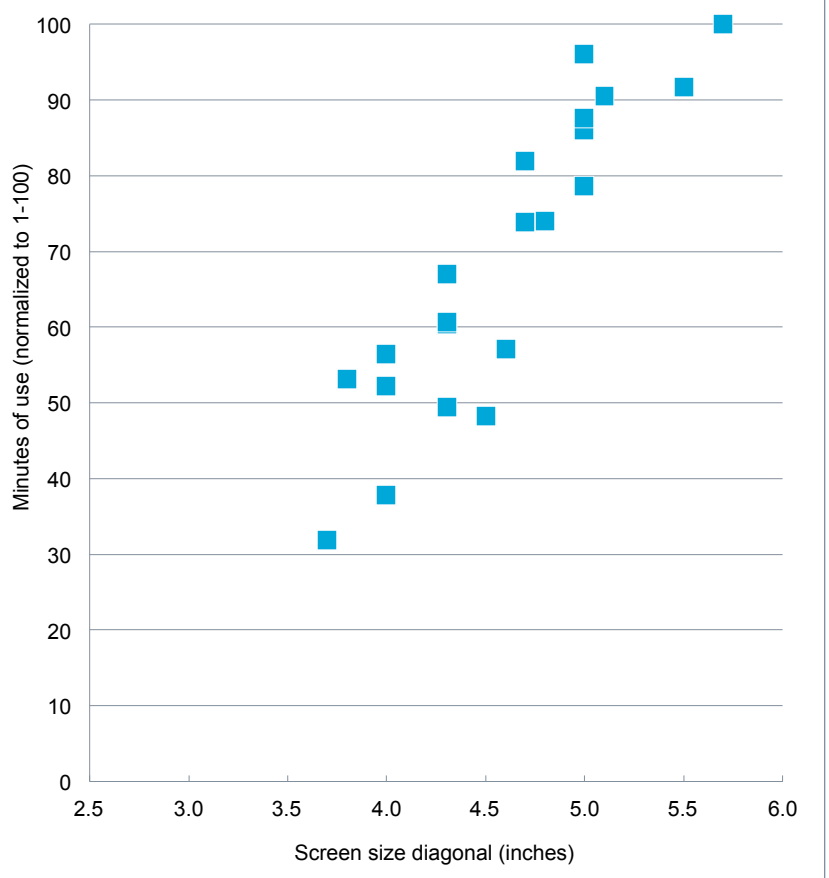
  There is a significant correlation between increasing physical screen sizes, measured by the screen diagonal, and greater data consumption.
  - Across all smartphones we evaluated, the Pearson correlation* is 0.69 indicating a positive correlation.
  - For Android models alone, the correlation is 0.81, which is a very strong positive correlation. Given Apple has not altered screen size between 2012 and 2014, it is more useful to consider just Android OEMs where there has been a steady pace of change, rather than occasional large jumps.

  However, we must consider other possible characteristics before concluding screen size is the sole or even the main reason for increased data use.

** The Pearson correlation is a statistical metric that measures the linear correlation between two variables and a result of 0 indicates no correlation and 1 represents total correlation.*

For marketers and media companies, minutes of use is an even more important correlation than data usage

Minutes of smartphone use by screen size of device



Source: Mobidia, with IHS analysis (10/2014).

Higher data usage is an important factor for mobile operators in designing data tariffs, planning network capacity, acquiring new spectrum. And, similarly, understanding data usage is critical for the mobile equipment vendors who enable mobile operators to manage their networks.

For those marketing mobile apps, the time spent engaged with smartphone apps is more relevant than data consumption. Time spent will drive advertising views and, even more importantly, will translate over time into in-app purchases for freemium apps. Consumers who do not spend time within an app are highly unlikely to make regular ongoing in-app purchases.

There is an even stronger and more significant correlation between the average minutes of use and the physical screen size of a smartphone (0.9). This has a number of implications:

- **Mid tier, large screen smartphones will see higher engagement**. Examples of such very large screen models include the Samsung Galaxy Mega or the Windows Phone-based Lumia 1320, but this will have wider implications because all recent mid tier smartphones have larger screens than models from 2010 - 2012.
- **Mobile display advertising will become more important**. To date, most advertising has been search or messaging-based. In 2014, 51% of global mobile advertising revenues are from search compared with 41% for display. The rise of larger screen smartphones increases the potential for display adverts because of both greater space to show those adverts and greater engagement.
- **Mobile video stream creators must assess screen size and resolution.** If not, they risk over supplying smartphones with better video stream quality than consumers need, and placing an unnecessary strain on consumers' mobile data caps.

Age of smartphone hardware is less important than screen resolution or size to understand device usage

There's no evidence faster, modern hardware alone drives increased user engagement with smartphones or data consumption. By analyzing handset data on characteristics and usage, it is clear screen size and total pixel resolution, or pixels per inch (PPI), has a much stronger correlation with usage than the year in which a smartphone launched.

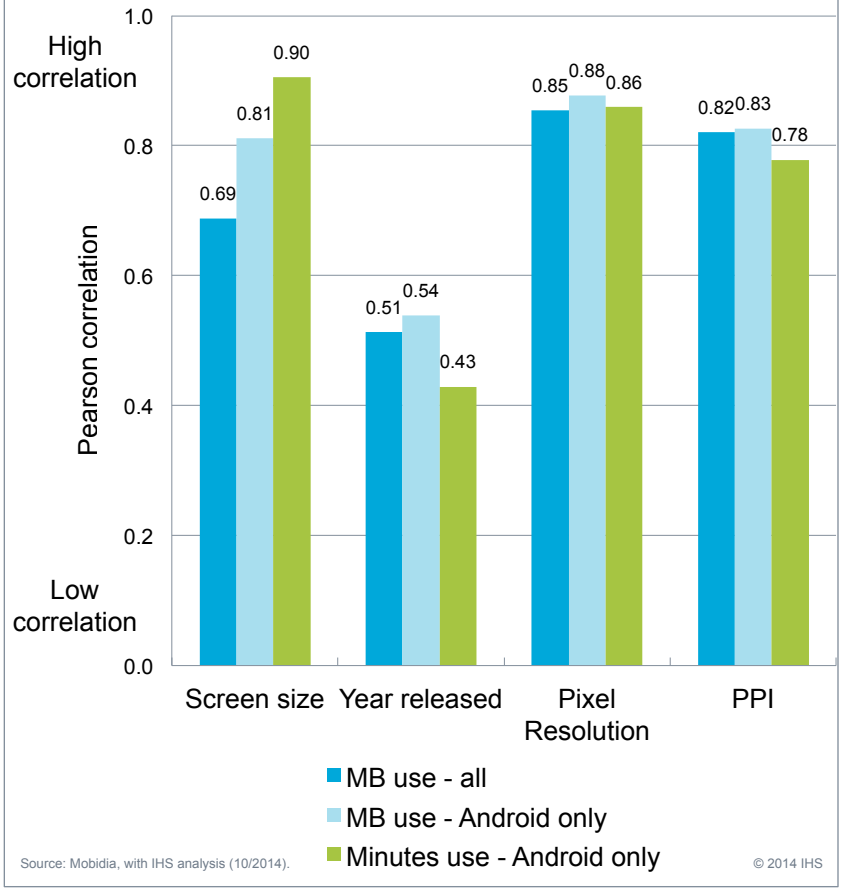
As a result, smartphone makers are correct to focus on offering better screens on mid tier smartphones, rather than making other trade-offs, such as including a more modest screen paired with a higher end application processor. Our data indicates Samsung and HTC's "Mini" models are better aligned to consumer usage patterns because they are cheaper yet offer good screen sizes than Sony's high end Xperia Z1 Compact and Z3 Compact models which include a premium chipset.

There is also a notable difference in the correlation between screen size and data used based on whether iPhone models are included (lower correlation) or excluded (higher). There is no equivalent difference for the link between display resolution or PPI. This indicated media companies and app creators are offering relatively higher video and graphics on the physically smaller iPhone screens to match screen resolution.

Media companies should test optimizing their services more for screen size than resolution, slightly lowering the video and graphic quality for smaller screen devices even if they have the same resolution as larger models. This would save costs, speed download times or reduce buffering, yet should offer an extremely similar end user experience.

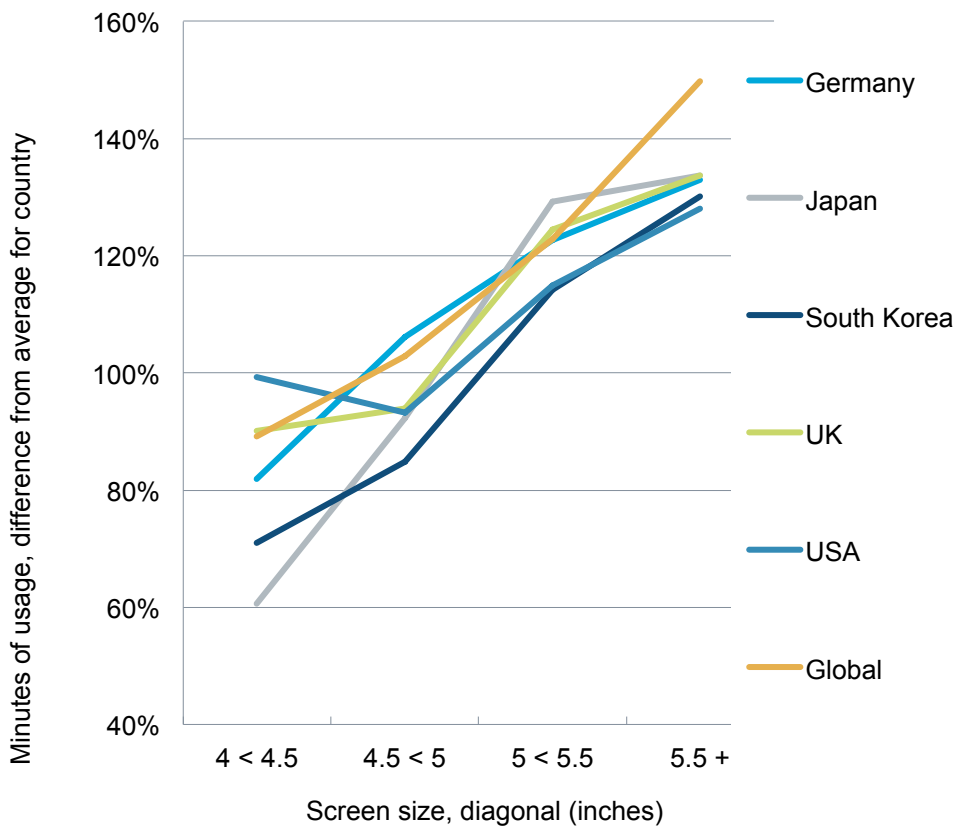
Chipset and application processor vendors should focus their marketing towards handset makers and operators on the quality of experience their improved processing capabilities deliver and the better screens they support. They should market improved network capabilities as an enabler for other handset hardware, rather than to directly drive consumers to spend more time, or consume more data, on smartphones.

Relationship between smartphone usage and device characteristics



Five inch smartphone screens are the tipping point, after which usage rises

How minutes of use differs by smartphone screen size



Source: Mobidia, with IHS analysis (10/2014). Note data represents Android smartphones only.

Across the five countries that were researched, there are extremely similar trends when assessing screen size and time spent in apps.

Differences in the impact of screen sizes are most pronounced in Asian markets with high data consumption such as Japan and South Korea.

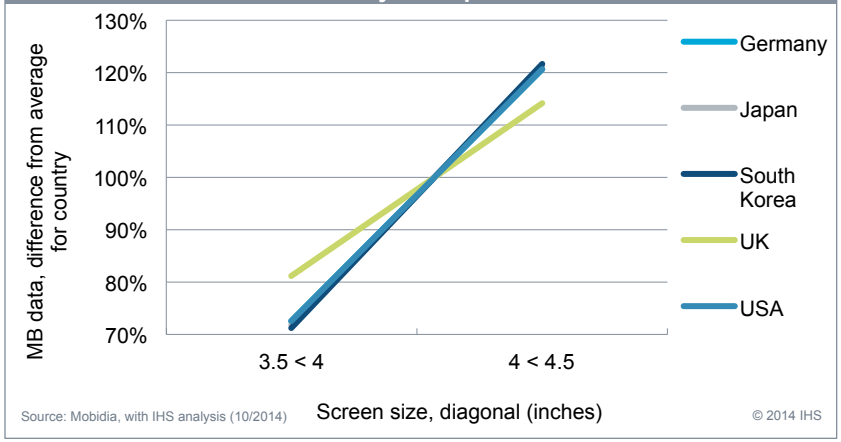
Overall, smartphones with screens five inches or greater resulted in greater than average minutes of use than those with smaller screens.

This is especially striking because with the new iPhones, Apple has chosen to make one of its new models slightly smaller than this five inch tipping point: The iPhone 6 has a 4.7 inch screen.

We expect the overall strength of Apple's ecosystem to compensate for this fractionally smaller screen and do not expect this choice of size to damage the iPhone 6's prospect in either shipment volumes nor in delivering a strong platform for successful apps and other content and services.

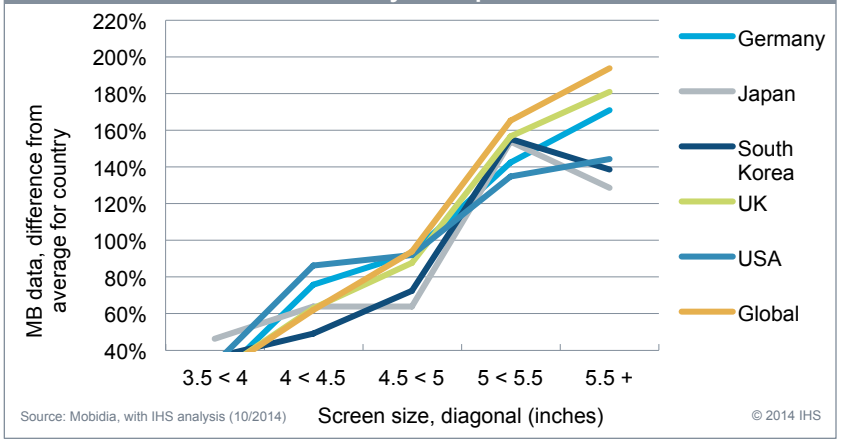
US, UK, Germany, Japan & South Korea show near identical trends in higher data consumption and large screens

How iPhone data used differs by smartphone screen size



Source: Mobidia, with IHS analysis (10/2014)

How Android data used differs by smartphone screen size



Source: Mobidia, with IHS analysis (10/2014)

iPhone models show modest differences in data consumption:

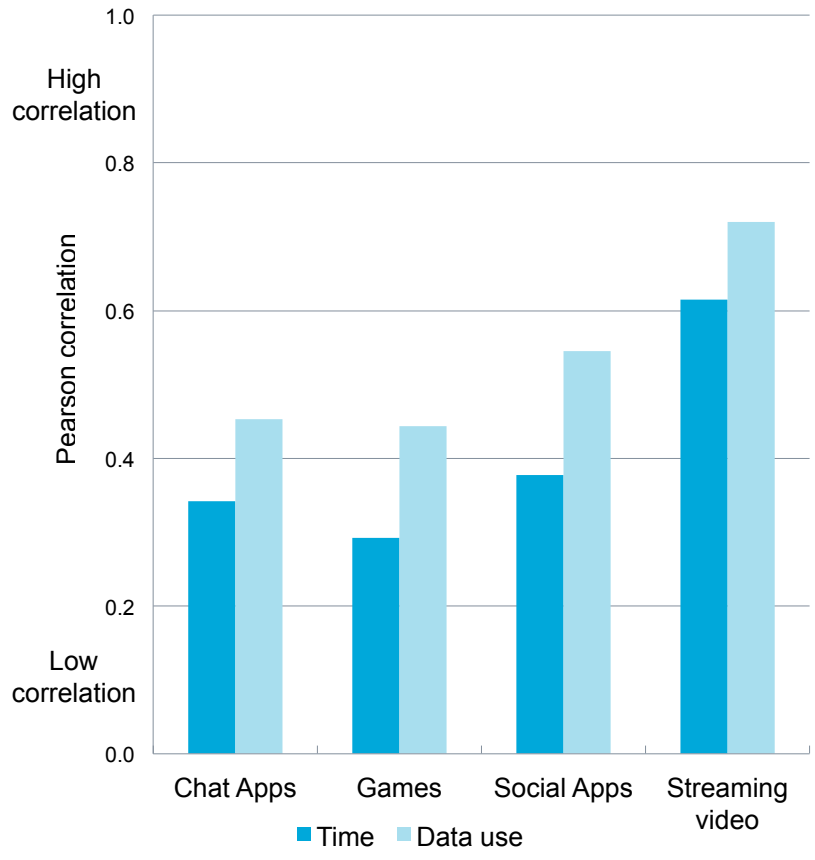
- Four inch iPhone 5 series have higher data consumption across all five countries. There is effectively no difference in the trend between US, Germany, Japan and South Korea. The UK has slightly less variation than the other countries.
- Because older iPhone models have remained on sale for longer than similar age Android smartphones, and continue to receive iOS updates for longer, there is no software difference between the models which could account for differences in data used.
- This difference cannot be explained by usage of 4G LTE because we are including both WiFi data and cellular data.

Android smartphones demonstrate greater variation:

- There is an inflection point for Android smartphones around five inches, above which data consumption increases dramatically.
- There is a much greater range of data consumption across Android smartphone models than the iPhone. Large screen Android models consume 50-90% more data than average, while the larger iPhone models consume just 20% more. This reflects both a much greater overall range in Android screen sizes and Android's ability to serve a wider range of consumer segments and price points.

Chat and social apps see little impact from larger screens, despite the better on-screen keyboards

Relationship between screen size and smartphone app usage by app category



Source: Mobidia, with IHS analysis (10/2014)

With the shift to exclusively touch screen keyboards, larger smartphone screens aid consumer typing as well as media consumption. These larger keyboards make it easier for consumers to send messages with chat or social apps as well as improve their media consumption experience.

Similarly, larger screens make touch screen game controls easier to use because a users' fingers obstruct the screen to a lesser extent.

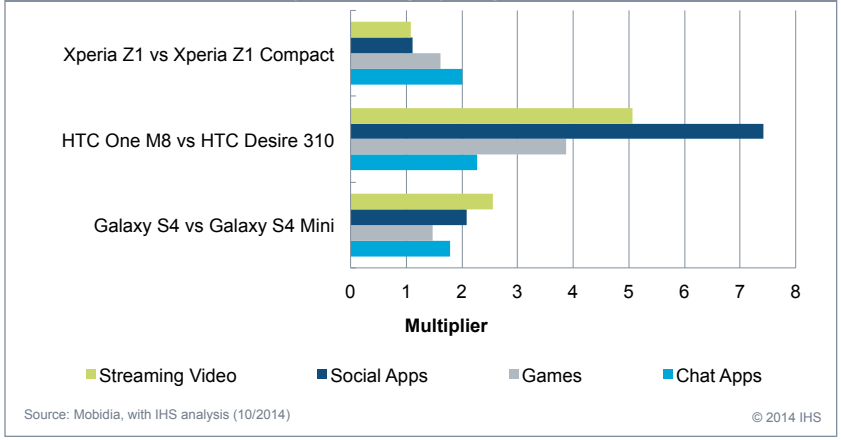
However, despite the seductiveness of these ideas, our analysis does not support a strong correlation between the time spent in chat apps, games or social apps and screen size. Each has a Pearson correlation of below 0.4 which is not significant for this sample.

For data consumption, there is a stronger correlation between screen size and data generated by chat, games and social apps. However, with the increased use of photos in chat apps and video playback within social apps – for example videos auto play when a user scrolls down a Facebook timeline – this correlation is more likely due to media activity within these apps than other factors.

Unsurprisingly, streaming video apps, such as those from broadcasters, TV networks, and over-the-top (OTT) video services have the greatest correlation and one which is significant.

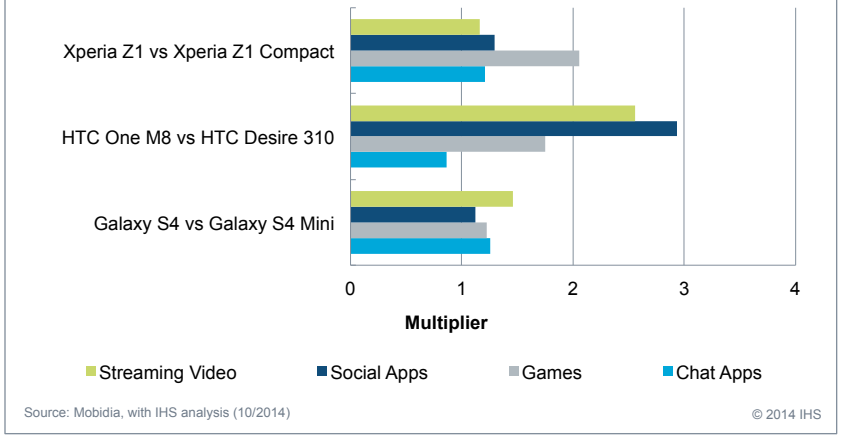
There's no evidence high-end application processors impact usage

Difference in time spent by app category, flagship vs mid tier smartphone



Source: Mobidia, with IHS analysis (10/2014)

Difference in data use by app category, flagship vs mid tier smartphone



Source: Mobidia, with IHS analysis (10/2014)

We compared how app usage differed across flagship and mid tier smartphones from different OEMs, with some interesting findings:

- There is a greater difference in minutes of use than with data usage between flagship smartphones and mid tier models from the same OEM.
- Chipsets and processors do not appear to make much difference.

While most smaller screen smartphones have a slower, less capable, application processor and graphics, Sony's Xperia Z1 Compact is unusual because it has an identical chipset to the much larger screen Xperia Z1. Where there is a difference, it's greatest for games and chat apps and not for video.

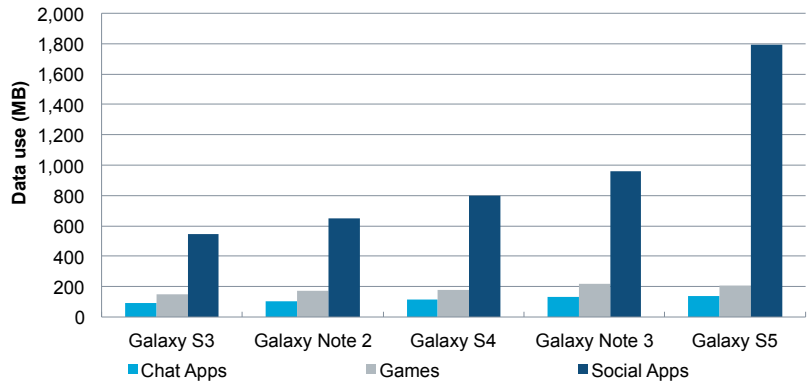
The HTC Desire 310 and Galaxy S4 Mini have slower chipsets as well as smaller screens than their flagship equivalents, despite Samsung's use of its flagship "Galaxy S" model branding on these mid tier models.

The difference between Z1 and Z1 Compact in time spent or data used is very similar to the difference between Samsung's S4 and S4 Mini indicating the screen is more significant than the chipset in determining consumer smartphone usage.

HTC's One M8 has much greater minutes of use and data consumed than its mid tier stable mate, especially with video streaming and social apps. This is most likely because of other characteristics such as the presence of twin front facing stereo speakers, or the enhanced Blinkfeed social app HTC includes on its high tier devices.

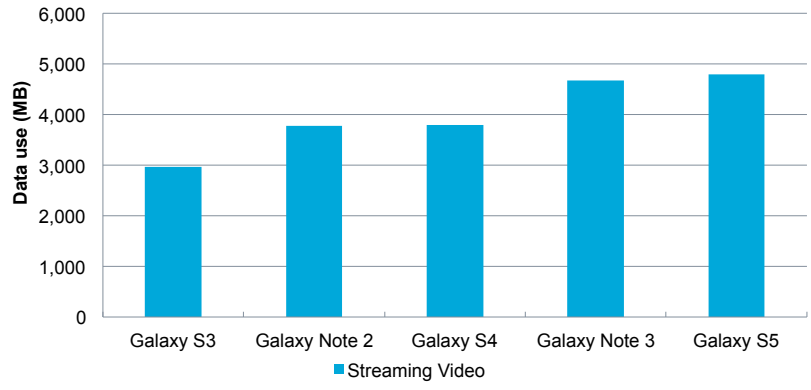
All of Samsung's large screen flagship smartphones drive high data usage, across all app categories

Comparison of data usage for Samsung flagship smartphones



Source: Mobidia, with IHS analysis (10/2014)

Comparison of video app data usage for Samsung flagship smartphones



Source: Mobidia, with IHS analysis (10/2014)

Samsung's flagship smartphones all use large amounts of data across all major app categories.

While video stream dwarfs other kinds of app in the data generated, social apps are now using approximately three to seven times as much data as games or chat apps. Video is increasingly becoming a feature of others apps as smartphones become more capable and screen sizes increase.

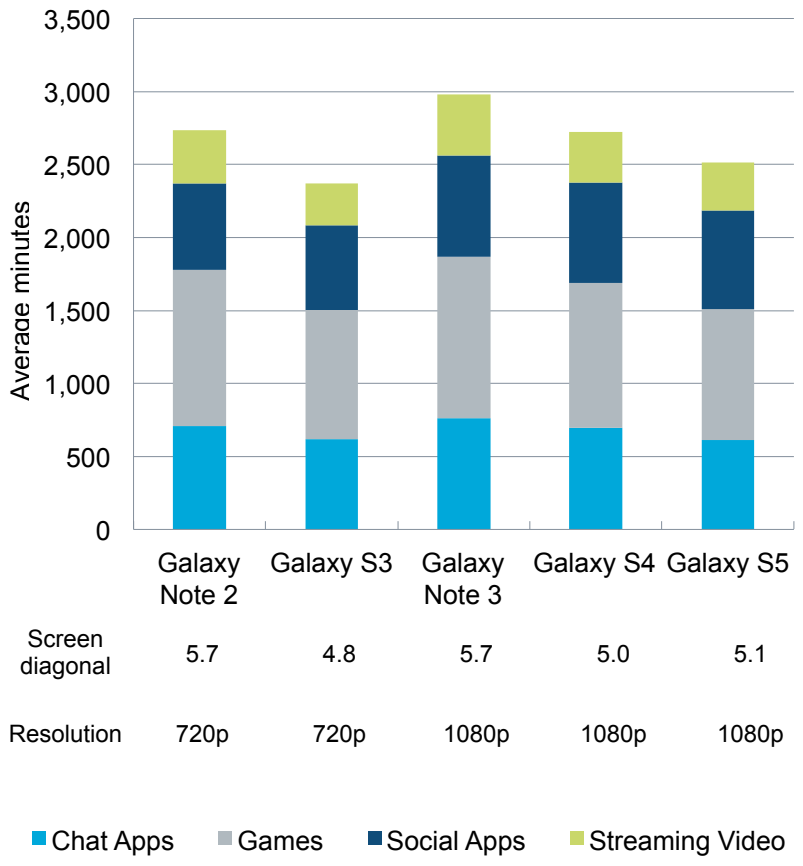
Games are becoming richer, more media-centric, experiences but their use of video lags social apps. New apps, such as Facebook-owned Instagram's Hyperlapse app, and the new super slow motion video recording capabilities of the iPhone 6, and improved cameras such as the one on Sony's new Xperia Z3, will kindle the trend of rising mobile video sharing as well as mobile consumption of social videos.

Samsung's recent flagship smartphones have extremely similar levels of data consumed by streaming video apps although they were released at different times (2012-2014) and have a range of screen resolutions (from 720p to 1080p).

Strikingly, the Note 2 and Note 3 have similar levels to the Galaxy S4 and S5 models respectively, even though the Galaxy Note models launched six months earlier. Both Note models have larger screens than the S4 and S5.

Across flagship models, screen size is more important than resolution in driving minutes of use of apps

Comparison of time spent for Samsung flagship smartphones



Source: Mobidia, with IHS analysis (10/2014)

While the more recent Samsung flagship smartphones consume more data, there is no similar trend for minutes of use in any of the app categories we researched.

Chat, social, games and video streaming apps deliver similar time spent across the recent Note and Galaxy S models.

For social, chat and game apps, the recent higher resolution models do generate greater data volumes.

Content companies delivering richer media to higher resolution screens will not see greater usage of their apps. For those using advertising-led monetization, this means their costs will rise without an associated rise in revenue, leading to lower profitability.

Instead, companies should benchmark physical screen size as a more useful metric and serve richer media for larger sized smartphone screens, but not focus so tightly on resolution alone.

Initial owners of the iPhone 6 follow the trend, despite the small number of large screen iOS apps available now

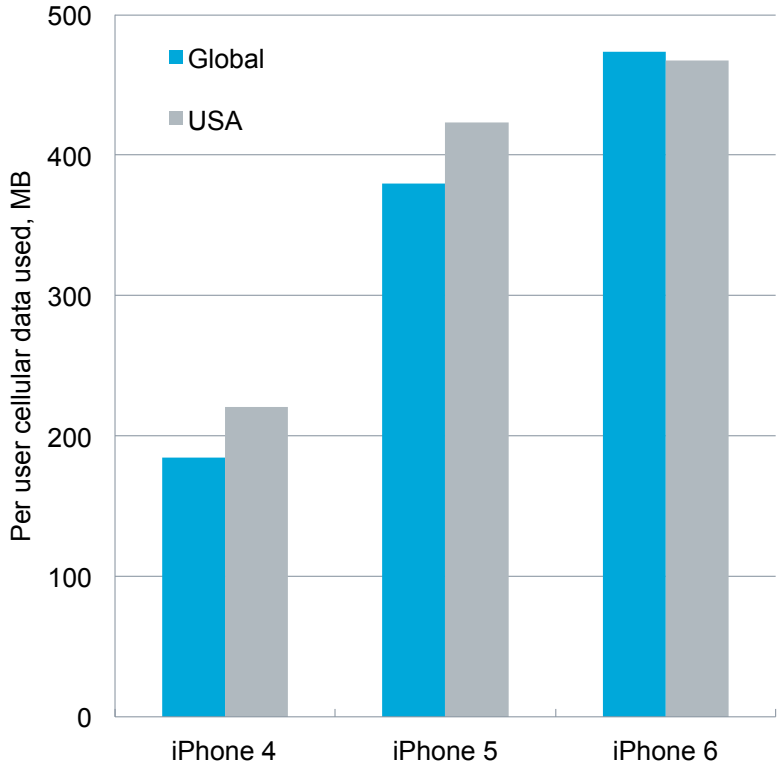
Early indications are users of the new generation of larger screen iPhones are consuming more data than users of smaller screen iPhone models, such as the iPhone 4 and iPhone 5.

However, caution must be used in assessing this data, because:

- It represents just one week, rather than many months of consumption.
- Many apps were not updated to take advantage of the larger screen iPhone models during the week covered by this data, including highly popular apps such as: YouTube, Facebook, WhatsApp, Netflix and Candy Crush Saga. This means consumers are not yet experiencing the full benefit of larger iPhone screens.
- Consumers which have just bought a new iPhone may have different consumption patterns to those who have owned a particular model for some time.
- Within the global sample, the iPhone 6 was on sale in a much smaller number of countries than older models. However, the increase in data consumption in the US compared with older models suggests this is not a major factor.

For Apple to maximize the benefits of higher levels of consumer engagement with the iPhone 6 and 6 Plus enabled by the larger screens, Apple must work harder to persuade app creators to optimize their apps for the iPhone 6 generation screens.

Cellular data usage by iPhone generation



Notes: This contains one week of data, to show early findings for the iPhone 6 and iPhone 6 Plus.

Source: Mobidia, with IHS analysis (10/2014).

Questions?

About IHS

IHS is a global information company with world-class experts in the pivotal areas shaping today's business landscape: energy, technology, economics, geopolitical risk, sustainability and supply chain management. We employ more than 8,000 people in more than 31 countries around the world.

IHS is the world's leading source for research, analysis, and strategic guidance in the technology, media, and telecommunications industries.

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About Mobidia

Mobidia is a leading mobile analytics provider with the largest global sample of smartphone and tablet users. Mobidia's mobile analytics and metrics platform provides unique insights into mobile usage trends on mobile applications and mobile networks. Real usage from real users on both cellular and Wi-Fi networks provides a comprehensive and unique understanding of what people do and value in the mobile world. Mobidia is headquartered in Vancouver, British Columbia with local presence in the U.S. and Europe.

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Methodology

IHS and Mobidia evaluated many sources of information to create this report, including:

- IHS' market forecasts for smartphones, apps, mobile app stores and the IHS handset database of the specifications of hundreds of smartphones. IHS develops forecasts based on interviews with key industry players, data supplied by content providers, billing vendors, industry bodies, ad networks, consumer surveys as well as other analytics tools.
- Mobidia's mobile data and metrics, containing data from real usage of smartphone users around the world. For this report, we focused our analysis on usage data for 26 smartphone models in five countries across a seven month period. Additionally, we examined early data on iPhone 6 and iPhone 6 Plus usage.

We selected a sample of smartphone models which reflect different screen sizes and capabilities. We included models from a selection of leading OEMs and considered both Android and iOS devices as well.

Often, smaller screen smartphone models also have less powerful application processors and graphics capabilities. For this reason, we ensured we considered smaller screen handsets with identical capabilities to larger screen models, for example the Xperia Z1 Compact and Xperia Z1. Also, we assessed both Samsung's flagship models, the large screen Galaxy S and the equally powerful but even larger screened Galaxy Note series.

The top 20 chat, social, and video streaming apps were analyzed within the countries and smartphone model segmentations referenced in this report. For the gaming segment, data on all games within Mobidia's data set of millions of applications were used to drive the report's conclusions.

To ensure the data was not impacted by one-off short term events, we analyzed usage data for all the smartphone model sample across seven months of 2014.

However, because the iPhone 6 and iPhone 6 Plus are so new, the data on page 17 reflects one week in September 2014, just after these new smartphone models launched.

Handset models we analyzed for data consumption and minutes of use included:-

Samsung Galaxy Ace 2;
Samsung Galaxy Ace 3;
Samsung Galaxy Note 2;
Samsung Galaxy Note 3;
Samsung Galaxy S3;
Samsung Galaxy S3 Mini;
Samsung Galaxy S4;
Samsung Galaxy S4 Mini;
Samsung Galaxy S5;
HTC Desire 300;
HTC Desire 310;
HTC DESIRE S;
HTC DESIRE X;
HTC One [M7];
HTC One M8;
HTC One Mini;
LG/Google Nexus 4;
LG/Google Nexus 5;
Sony Xperia SP;
Sony Xperia Z1;
Sony Xperia Z1 Compact;
Apple iPhone 4;
Apple iPhone 4S;
Apple iPhone 5;
Apple iPhone 5C;
Apple iPhone 5S.

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