

State of the smart

Consumer and business usage patterns

Global Mobile Consumer Survey 2017: UK Cut

Contents

Foreword	03
The smartphone: A blessing or a curse?	04
Smartphone usage: A generational view	10
Smartphone adoption: Stable and strengthening	12
Enterprise and the smartphone: On the cusp of a lucrative relationship	19
Machine learning: Making smartphones smarter	26
Smartphones: The short form video star	32
The mobile operator store: More for more	41
Endnotes	46
About the research	52
Contacts	53
Relevant thought leadership	54



Foreword

The smartphone is a mere decade old, and with every year has become ever more integral to people's lives. It has become more versatile and has absorbed a growing range of functions, from communication to navigation, from breaking global news to memorising personal stories. If the first 10 years has been about changing our social lives, the next 10 years will be about changing our working lives.

The smartphone's success has been global. It dominates consumer device sales, with 1.5 billion annual sales, or over four million per day. Yet the majority of the world's population is yet to own a smartphone.

In the UK, smartphone penetration is now 85 per cent of adults; we would expect this to reach 90 per cent by 2020, if not earlier. Every day, 91 per cent of the 41 million 16-75 year olds who have a smartphone in the UK use their device. It is by far the most used device.

Usage is likely to become even more intensive over the coming years, as its capability and utility continue to increase, and as the smartphone enters a decade of invisible innovation.

Over the next ten years we are likely to witness the arrival of Gigabit/s connectivity speeds, ever faster processing power, clever applications bolstered by artificial intelligence, a proliferation in transactional capabilities and the emergence of augmented reality. The smartphone is likely to become increasingly fundamental to workforce productivity, to authentication, and even to identity.

The smartphone's growing capability and ubiquity strengthens its strategic importance to the private and public sector. It will likely increasingly become regarded as the primary way to communicate, interact and transact with customers and citizens. While 2017 is an exciting milestone for the smartphone, the best is yet to come.



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The smartphone: A blessing or a curse?

With every year the smartphone is becoming ever easier and more enticing to use.

Content for smartphones is created to compel. Mobile games are engineered to tantalise.¹ Networks become ever faster, enabling content to flow ever faster. Messaging inboxes refill relentlessly. Newsfeeds tirelessly deliver bottomless feeds of text, images and auto-playing video. Phones ping, vibrate and flash their screens to herald the arrival of new news and messages. Smartphones enable us to be perpetually excited, should we choose to succumb.²

Researchers at the University of Texas at Austin have found that proximity to a smartphone, even when turned off, can diminish cognitive capacity.³ In another study, the vast majority of respondents reported experiencing phantom vibration syndrome – the illusion that their phone has vibrated, signifying that they have been contacted.⁴

According to this year's survey, more than a third (34 per cent) of UK adults look at their smartphones within five minutes of waking and over half (55 per cent) do so within a quarter of an hour. At the end of the day, more than three quarters (78 per cent) of adults check their phones within an hour prior of going to sleep, potentially exposing themselves to bright blue light that can impact sleep quality.⁵

Seventeen per cent of 16-24 year olds look at their smartphones at least 100 times daily; 12 per cent of 16-19 year olds claim 200 views or more daily. More than a third (34 per cent) of 16-75 year olds 'almost always', 'very often' or 'sometimes' use their smartphones when eating with family and friends at home. Among 16-24 year olds, 49 per cent do so.

Eleven per cent of 16-75 year olds use their phones while crossing the road; more than half (53 per cent) do so while walking. In response, a number of cities have started evolving their environments to accommodate changing behaviours. One approach has been to place a set of traffic lights into the edge of the pavement to direct pedestrians who are constantly looking down at their screens as they walk, and not looking up at road signs.⁶ Another approach has been to segregate stretches of pavement, with one side reserved for those gazing at their devices.⁷

The city of Honolulu has opted to discourage some aspects of smartphone behaviour and will start fining those crossing the road while looking at their phone as of October 2017.⁸

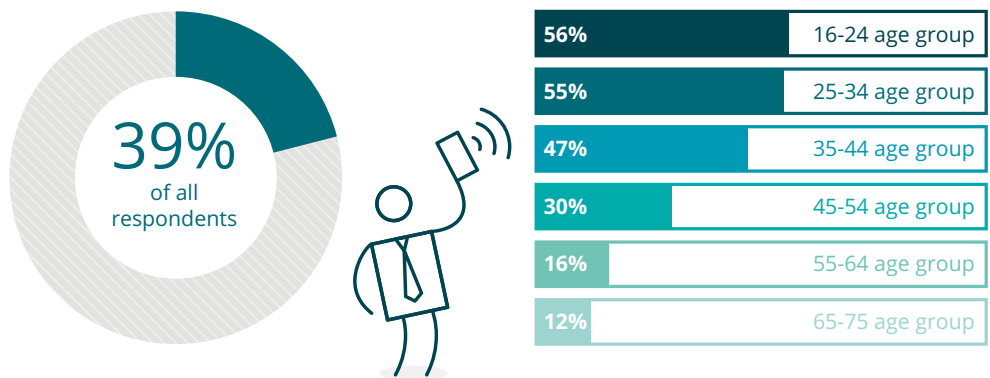
Among 16-19 year olds, two-thirds check their phones after they have gone to sleep, and over a quarter respond to their messages. Medical advice recommends that 16-18 year olds sleep nine hours a night, as their bodies are still growing and need ample rest.⁹ Insufficient sleep has been linked to obesity,¹⁰ and can affect concentration in classrooms.

Are we at the point at which smartphones have become too good for people to cope with, and if so what remedies might be required?

Among smartphone owners aged 16-75, almost two-fifths (38 per cent) perceive that they are using their phone too much. Among 16-34 year olds, over half believe they are using their phone too much (see Figure 1). While older age groups have a much lower incidence of over-usage, about one in eight 65-75 year olds believe they use their smartphone excessively.

Figure 1. Respondents who think they use their phone too much, by age group

Question: Overall, do you think you use your mobile phone too much, or not?



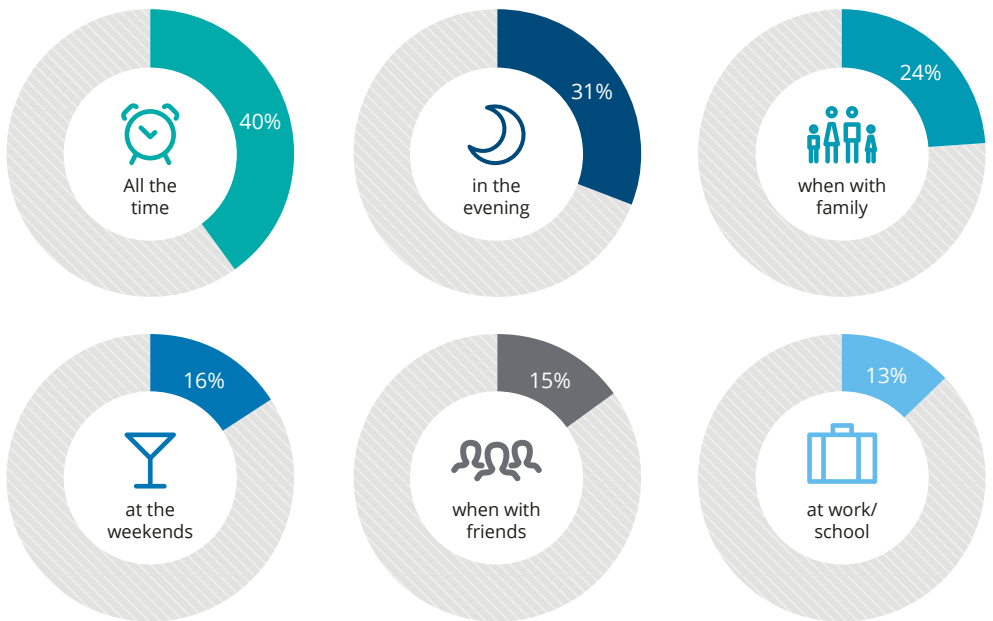
Weighted base: All smartphone owners aged 16-75 years (3,525), 16-24 (601), 25-34 (699), 35-44 (656), 45-54 (686), 55-64 (484), 65-75 (400).

Source: UK edition, Deloitte Global Mobile Consumer Survey, May-Jun 2017

Worryingly, the most common time when smartphones are over-used is 'all the time'. Two-fifths of those who think they over-use their phone report doing so 'all the time'. The second most common time was in the evening. See Figure 2 for more detail.

Figure 2. Time or location when phones are used too much

Question: In which situations do you think you use your mobile phone too much?



Weighted base: All smartphone owners aged 16-75 years who check their phone too much (1,361)
Source: UK edition, Deloitte Global Mobile Consumer Survey, May-Jun 2017

Smartphone owners are also considered by immediate family to be over-using their phones: 60 per cent of respondents who have children considered their children 'definitely' or 'probably' over-used their phones; 41 per cent of respondents in a relationship felt their partner used their devices too much.

The good news is that the majority of smartphone over-users recognise that they should moderate their usage and are taking remedial action. The not so good news is that most who self-categorise as over-users are not managing to moderate their behaviours. Of respondents who perceive that they use their phone too much, 14 per cent are making an effort to control their usage, and are usually succeeding; 34 per cent are making an effort, but are not normally succeeding and 26 per cent are not trying to control their usage, but would like to.

The steps that people are taking to control smartphone usage have a common theme: removing temptation. The top five approaches to limit usage are keeping their device in a handbag or pocket when meeting people, turning off their phone, deleting apps,¹¹ turning off audio notifications and keeping their phone in their handbag or pocket when on their own.

There are also apps available which constrain usage, but this approach is little used, with just three per cent of those who are trying to reduce usage adopting this method.

Even fewer (a mere one per cent) have taken the more radical step of switching to a feature phone, despite the example set by a few celebrities, such as actor Eddie Redmayne, who temporarily forewent a smartphone.¹²

The most extreme option, taken by Ed Sheeran, of ditching mobile phones altogether, is unlikely to be adopted by many.¹³

Human behaviour has, for millennia, been defined by the opposing urges of the pursuit of pleasure and resistance to temptation: the smartphone satisfies both needs in a readily portable form, which for many people, never leaves their side.

This conflict is unlikely to recede: people will struggle without their smartphones and feel powerless to cap their usage at sensible levels. The more a smartphone is used, the more productive and distractive it may become, and the less in control a user may feel.

The smartphone is a multi-purpose device the likes of which has never existed before. It is a digital Swiss army knife with a set of tools that is millions of apps deep. It can be a powerful productivity tool, which can also goad users into obsessing over inbox size, rather than effective communication. It can be used to work when away from the office, and not to work while in it: the former behaviour pertains to 19 per cent of workers, and the latter to 50 per cent.¹⁴ It is, via social networks, a contemporary reboot of the daily diary, but can also nurture narcissistic traits. It enables us to resume and maintain contact with friends whom, in analogue times, one may have drifted away from, but in doing so, we may end up trading depth for quantity of relationships. It can measure and encourage fitness, but is also a voluminous repository of distraction, causing people to defer exercise.



Outlook: The next five years

The smartphone is likely to continue to offer an ever widening array of benefits and challenges for years to come.

As with many other products and services people consume, third parties may increasingly need to guide as to what sensible usage levels should be.

In future some aspects of smartphone usage might become controlled, by regulators, content providers or device vendors.

Automated usage constraints may be introduced within operating systems, such as the feature in Apple's iOS 11 which senses when a user is driving and restricts calls, messages and notifications.¹⁵

More vendors may introduce controls, too, following the example of Tencent, one of the largest technology companies in China. In mid-2017 it introduced age-based restrictions for its most popular game *Honour of Kings*.¹⁶ Tencent described its controls as the "most serious anti-addiction messages in history". Under 12s were restricted to an hour per day and no play after 9pm; older children aged 12-18 were permitted two hours per day. Age-based controls are more easily enforceable in China, which has set up a central database of users.

One company is creating a smartphone case that locks the phone, controls the quantity of

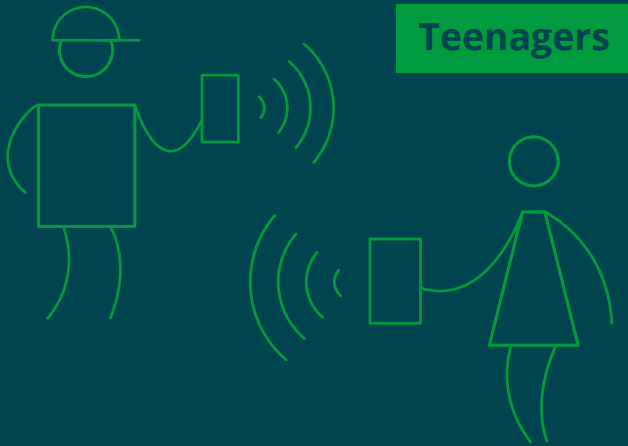
time spent on the device, and can also stop the phone working if used while walking.¹⁷

As smartphone ownership and usage increases, it will be important to have measured, balanced responses to the negative aspects of technology.

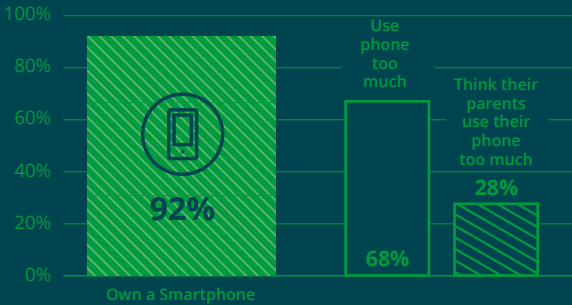
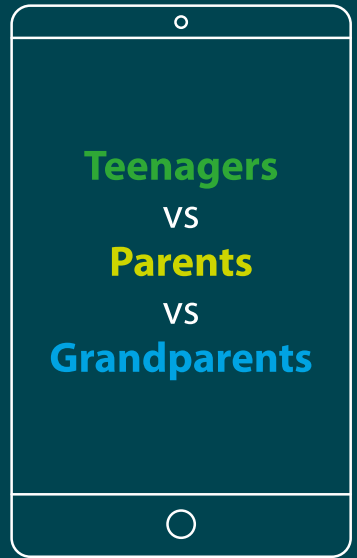
For example, smartphones can have an impact on sleep patterns, and this can be linked to obesity levels. However the degree of causality needs to be understood: managing to get teens to sleep more through removing smartphones from their bedroom may not on its own lead to reduced levels of obesity. Yet using smartphone apps to encourage teens to exercise more frequently would be beneficial.

Smartphones are sometimes accused of causing parents to neglect their children. There are many scientific studies that have clearly identified the detrimental consequences of ignoring children.¹⁸ Every weekend, parents in parks up and down the country may be gazing at the sports results on their phones, rather than watching their kids descend a slide. However arguably the distracted parent predates the smartphone: newspapers and books served this role in the 20th century.

Smartphone usage: A generational view



90 PHONE CHECKS PER DAY



When people check their phone



Within 5 minutes of waking

57% **35%** **12%**



Within 5 minutes of going to sleep

50% **28%** **11%**

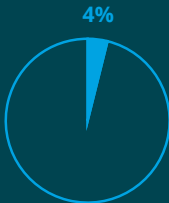
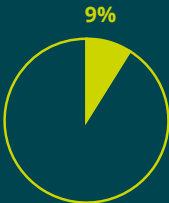
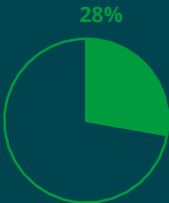
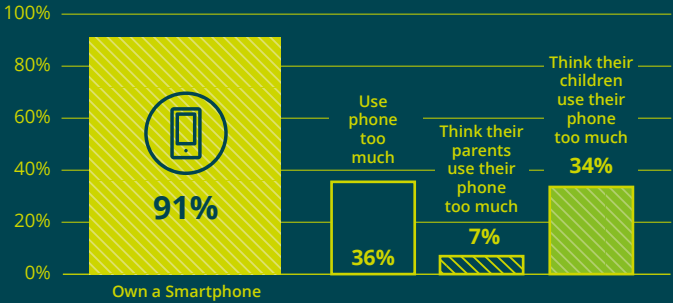


During the night

66% **38%** **12%**

Parents

33

 PHONE CHECKS PER DAY

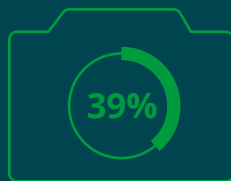
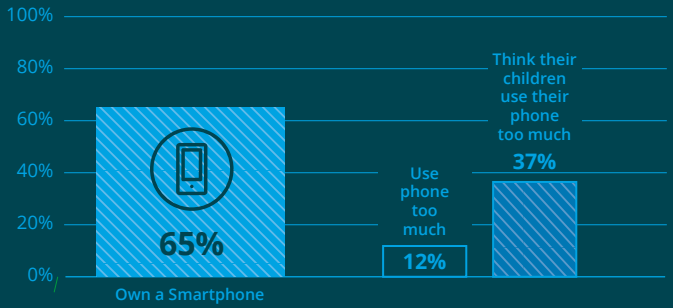
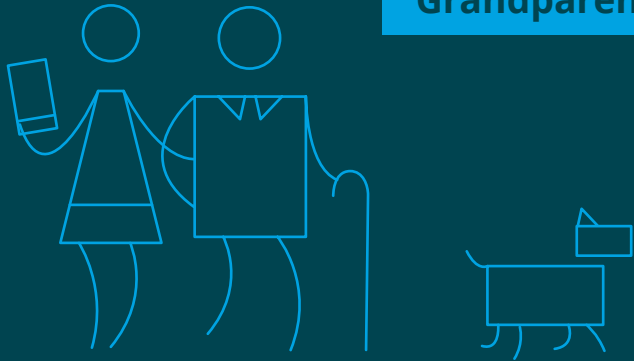
Share and/or post photos and/or videos daily



Note: 'Teenagers' are the respondents in the 16-19 age group; 'Parents' are the respondents in the 40-50 age group; 'Grandparents' are the respondents in the 65-75 age group
Weighted base: All smartphone owners, Teenagers (215), Parents (763), Grandparents (400)
Source: UK edition, Deloitte Global Mobile Consumer Survey, May-Jun 2017

12 PHONE CHECKS PER DAY

Grandparents



Take photos or videos daily



Smartphone adoption: Stable and strengthening

Smartphone adoption among UK adults continues to rise, to 85 per cent as of mid-2017. Penetration increased year on year by four percentage points, which is at the top end of the range we forecast in last year's report. Over a two-year period, penetration is up nine percentage points. Five years ago, adoption was at 52 per cent.

We predict smartphone adoption will rise by between 1-3 percentage points over the coming year, which would mean up to 88 per cent of UK adults would have one as of mid-2018. Among younger age groups (18-45 year olds) smartphone adoption has been at over 90 per cent for several years.

Among older age groups, ownership levels have grown strongly in recent years, proving that smartphones are not just for the young. In the last year, smartphone penetration among 55-75 year olds increased by six percentage points to 71 per cent. In 2012, adoption was at 29 per cent.

The smartphone has now established a clear lead as the most popular consumer electronics device, with a seven percentage point lead over the laptop, and 17 percentage points over the tablet (see Figure 3).

The smartphone's clear gap over other devices should lead to more content, content creation tools and processes being designed for them, leading to yet greater usage of and reliance on these devices. In turn this should spur continued investment in enhancing smartphone capability and underlying networks.

Furthermore, a growing number of applications are likely to become optimised for smartphones. Currently, there are a few discreet, mundane but common processes, such as checking the weather and the news, getting bus times, killing time via trivial games or simply searching for information for which the smartphone is the preferred device, as these tasks have become optimised for smartphones.

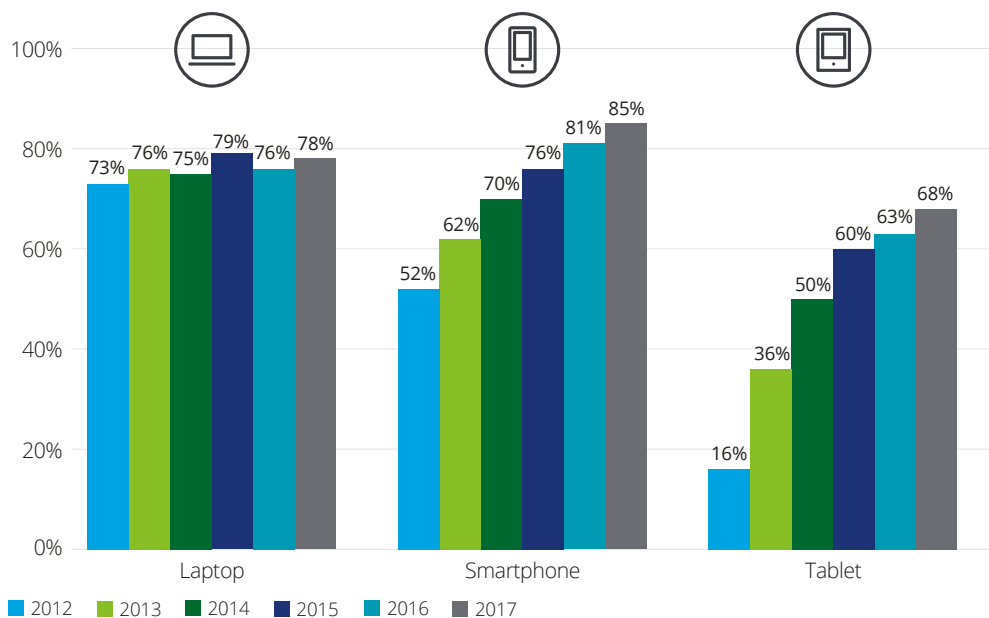
There is also, at present, a widening array of every day or common applications that are being built for smartphone usage, from paying for street parking, planning the best options for the journey home, booking a haircut, communicating with teachers (or other parents) or renewing a library book.

As this set of smartphone optimised applications grows, the rationale for owning a smartphone should accordingly edge higher, as it may become ever harder to live without one.

The more applications a smartphone supports, the greater its utility. A device's usefulness can be inferred from the frequency of its usage. Among UK adults, the smartphone is, by a fair distance, the most intensively used device. Just over 77 per cent of all adults aged 18-75 now use a smartphone daily: 85 per cent own one, among these, 91 use their device daily.

Figure 3. Smartphone, laptop and tablet penetration among UK adults, 2012-17

Question: Which, if any, of the following connected devices do you personally own or have ready access to?



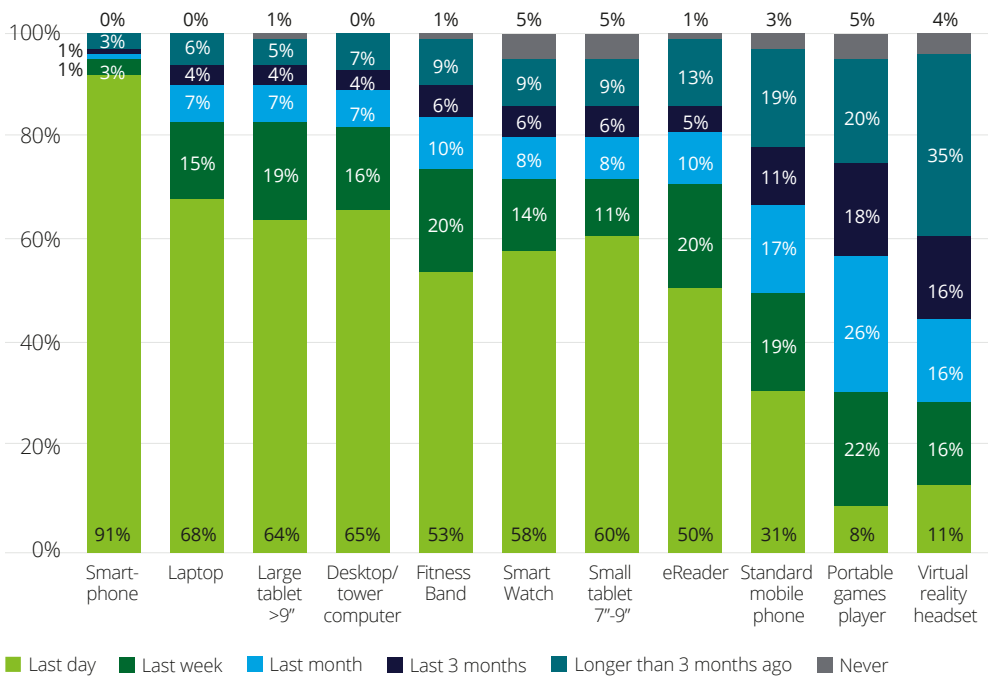
Weighted base (2012/2013/2014/2015/2016/2017): All respondents aged 18-75 years (2,060/4,020/4,000/4,000/4,003/4,002). Source: UK edition, Deloitte Global Mobile Consumer Survey, May-Jun 2012, May-Jun 2013, May-Jun 2014, May-Jun 2015, May-Jun 2016, May-Jun 2017

In second place is the laptop, used by just over half of adults daily (78 per cent have one, 68 per cent are used on a daily basis). Figure 4 provides more information on usage intensities.

Daily smartphone usage is now multiples that of other devices. For example, 10 per cent of UK adults use an eReader daily (31 per cent of 18-75 year olds own one, among these daily usage averages 31 per cent).

Figure 4. Frequency of usage, by device

Question: Thinking of when you last used each device. Was it within the...?



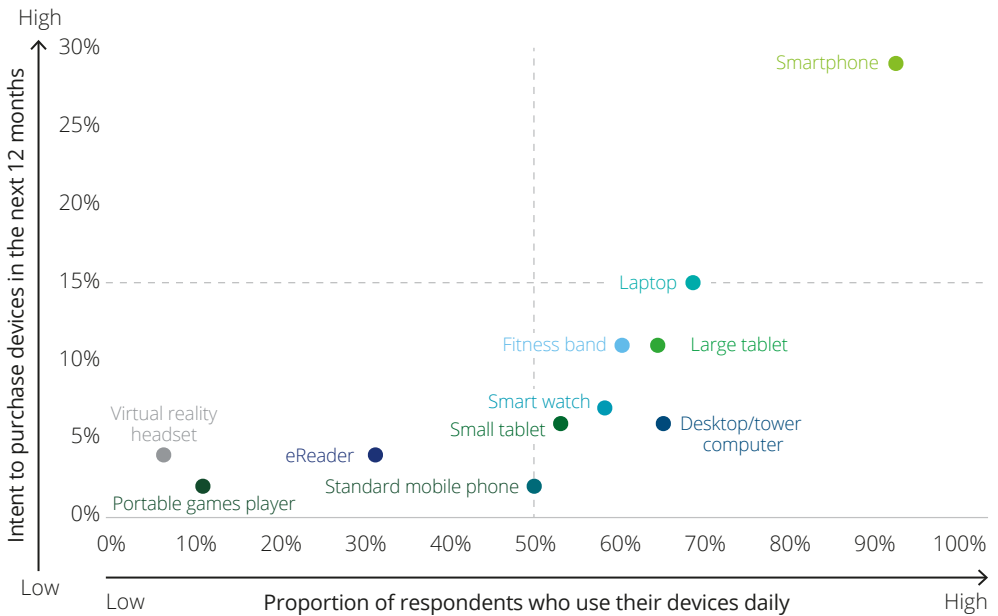
Weighted base: All respondents aged 18-75 years and have access to Desktop/tower computer (1,902), eReader (1,232), Fitness band (628), Laptop computer (3,129), Large tablet over 9 inches (1,524), Portable games player (784), Small tablet 7-9 inch (1,567), Smartphone (3,393), Smart watch (243), Standard mobile phone (732), VR headset (245)
 Source: UK edition, Deloitte Global Mobile Consumer Survey, May-Jun 2017

The greater a device's utility, the more it is used, and the more likely it will be replaced, and arguably, the more that will be spent on it.

There is a clear correlation between a device's frequency of usage, and purchase intent, as shown in Figure 5.

Figure 5. Intent to purchase devices in the next 12 months, by those who use devices daily

Questions: Which of the following devices (new or pre-owned), if any, are you likely to buy or get in the next 12 months?/Thinking of when you last used each device. Was it within the...?



Weighted base: For 'Intent to purchase devices in the next 12 months', all respondents aged 18-75 years (4,002); For 'Proportion of respondents who use their devices daily', respondents who have access to Desktop/tower computer (1,902), eReader (1,232), Fitness band (628), Laptop (3,129), Large tablet (1,524), Portable games player (784), Small tablet (1,567), Smartphone (3,393), Smart watch (243), Standard mobile phone (732), Virtual reality headset (245).
 Source: UK edition, Deloitte Global Mobile Consumer Survey, May-Jun 2017



Outlook: The next five years

We expect smartphone penetration among UK adults to continue growing, albeit at a slowing pace, over the medium term. By 2022, we would expect smartphone penetration to be between 90 and 95 per cent.

We would also expect that with every year, a greater proportion of smartphone users use their devices on a daily basis. As of mid-2018, we would expect about 80 per cent of UK adults to be using a smartphone daily, and for the proportion to be between 88 and 90 per cent by 2022.¹⁹

Daily usage is unlikely ever to reach 100 per cent, however, due to a combination of those refusing to use a smartphone, unable to use one and temporarily unusable smartphones (for example due to a smashed cracked screen).

Utility is likely to increase as each core smartphone application becomes more sophisticated. Consider, for example, how music as a smartphone application has evolved over the past decade, and may change over the medium term.

The first touchscreen smartphones, launched ten years ago, were predominantly portable, static facsimiles of a user's existing CD collections. Over time, audio

recognition as an app enabled smartphones to identify songs, thanks to applications such as Shazam.²⁰ The emergence of music streaming services, such as Spotify, evolved smartphones into portable jukeboxes, with a capacity of tens of millions of tracks. The many playlists available offered the 21st century update to the '80s phenomenon of the mixtape. 4G networks extended the smartphone's jukebox capability beyond Wi-Fi covered areas into cars, buses, the beach or wherever the user might be.

Music as a smartphone application should continue evolving in the medium term, contributing to an increase in utility. For example, location sensors in each phone could note a person's location, the time of day, the pace at which the person was moving (and therefore their likely mode of transport), whenever a track was played, and then use this information to curate new playlists based on this historical data. Facial recognition could be added in to identify who was with the user when each track was played. Tracks that were played multiple times could be sent automatically to friends.

The photography application on a smartphone is also likely to undergo significant, value-adding iteration over the medium term. A decade ago, the lens in a smartphone was modest in capability; in



Enterprise and the smartphone: On the cusp of a lucrative relationship

The UK workforce currently numbers 33.5 million people, of which about 32 million are in work. According to our research, just over half of all respondents that were currently in employment used their smartphones for at least one work related business activity: arguably the proportion could and should be much higher.

The most common usages of smartphones among workers were, as of mid-2017: email (44 per cent), voice calls (34 per cent) and calendar management (23 per cent). Most workers would likely have been using email, voice calling and calendar applications that were optimised for smartphone, and therefore easier to use. Applications that are difficult to use within the confines of a smartphone – such as legacy information and reporting systems – are likely to have lower usage.

Our view is that there are also unofficial smartphone applications which are widely used in the enterprise such as instant messaging, mobile browsers, navigation and the photo application (used to capture everything from outputs from collaborative sessions to the state of a roofer's client's roof). Forty three per cent of workers use WhatsApp at least once a day. All of these have been optimised for smartphone usage.

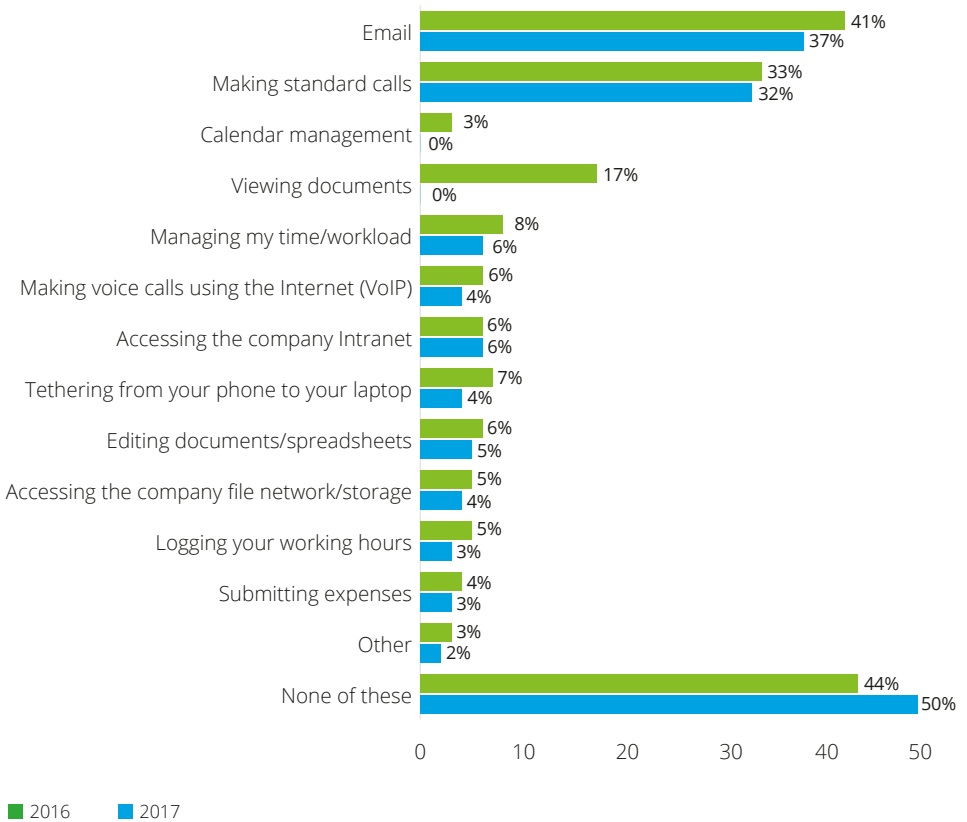
However, there was only modest smartphone usage for other work related applications, especially those focused on work flow, rather than communications. Only five per cent of workers used their smartphones to submit a timesheet, four per cent did so to submit expenses, and six per cent did so to access an intranet. Adoption of work flow applications has changed little year on year, as shown in Figure 6.

The paucity of smartphone usage for work purposes is, arguably, not due to lack of need. The UK workforce includes millions of people for whom the smartphone may well be the ideal information device, and for which the PC and often the tablet would be overkill.

Workers whose job requires them to walk a lot, or do not require them to be tethered to a desk – from retail sales staff to traffic wardens – would be encumbered by a PC or a tablet, and would probably not need a full keyboard or a PC's processing power.²⁴ Many millions of workers do not need to process or analyse information, but they do need to receive contextual information on a timely basis, so that they can respond to it rapidly, based on better information – the smartphone is the ideal device for this.

Figure 6. Usage of smartphones for work related activities, 2016-17

Question: Do you use your smartphone for any of the following work related business activities?



Note: The options 'Calendar management' and 'Viewing documents' were introduced in the 2017 survey
 Weighted base (2016/2017): All smartphone owners aged 18-75 years and are in work (2,126/1,969)
 Source: UK edition, Deloitte Global Mobile Consumer Survey, May-Jun 2016, May-Jun 2017

There are millions of workers in the UK who could, for example, be submitting timesheets via a smartphone. However they may not be, as they are not yet equipped with appropriate mobile-optimised task-specific software. There are 1,457,000 people that work as sales assistants or retail cashiers, 945,000 road transport drivers, 515,000 kitchen and catering assistants, 276,000 waiters and waitresses and 285,000 chefs. All of these could be submitting timesheets via smartphones, rather than paper-based or PC-centric forms. Timesheet submission via smartphone would also be useful for office workers uploading hours worked data while commuting home – which would be one less work related task to do when arriving home.

There are also millions of people who could receive scheduling information via smartphones, if they were issued with appropriate software. The UK workforce includes 837,000 people in building or construction, 565,000 cleaners and domestics, 473,000 working in electrical and electronic trades, 186,000 security guards as well as the aforementioned road transport drivers and waiting staff.

There are also many workers who could use smartphones to submit or log expenses, but are not yet doing so as they are not being issued with the appropriate apps. There are currently 232,000 carpenters and joiners, 165,000 hairdressers and 117,000 beauticians in the UK workforce.

The enterprise app or mobile optimised website would appear to be a massive opportunity that may have been overshadowed by the allure of developing consumer smartphone apps or websites. Yet there are significant dividends in making the UK's workforce (and those in other markets) more productive by making relevant business processes available via a smartphone than by, say, redesigning a word-tile board game that is playable within the much smaller dimensions of a smartphone screen.

The smartphone's success as a business tool across multiple processes requires mobile-optimised design – just as with consumer apps. Existing PC-based applications that are crudely dragged and dropped into a smartphone environment are likely to fail, as they will be too hard to use. Failure to incorporate functionality that is becoming more commonplace on consumer smartphone applications, such as fingerprint authentication, is also likely to restrict take up. Slowness in updating applications, in response to consumer feedback, is also likely to lead to disappointing usage.

The applications used most frequently by business users have been designed for use by hundreds of millions, or even billions of people. This has enabled significant budgets, ample user testing and a low spend per active user. A large proportion of enterprise apps, particularly those used in large organisations, are created bespoke for a company or, on occasions, for an individual event. So while the investment per active user may be significant, the total spend is low relative to a consumer smartphone website or app, which may have an audience of between millions and billions in mind.

Enterprise IT departments have had several decades of being PC centric, and this has made sense as long as workers have had PCs. Yet today the device that workers are most likely to have with them while working is the smartphone.

IT departments need to shift or spread their focus to be more inclusive of the smartphone worker, and of desk workers that would like to be able to be productive when away from their desks. They should also focus more on customising off-the-shelf applications, rather than building applications from scratch.



Outlook: The next five years

2017 is in some regards reminiscent of the early days of the Internet era, when enterprises started shifting to browser solutions that transformed how employees work, changed how they engaged with core enterprise applications and enhancing substantively the speed and quality of their access to data. The same shift is currently happening with mobile.

In the past five years, smartphones have redefined how people live and interact with each other – all day, every day: the consumer revolution is well advanced.

It is now enterprise's time to use mobile to transform the way work gets done, from retail store operations, healthcare, restaurants, sales, field maintenance, to dozens of other services and processes.

There is likely to be a marked focus on improving the productivity of workforces over the coming years: mobile is likely to be a large part of the answer to delivering on this objective. The focus will be on using technology to make all workers more productive.

As the underlying nature of work is unlikely to change over the medium term – roofers will continue predominantly to fix roofs, and chefs will continue to cook – technology's

role is likely to be largely about improving existing processes. For a roofer, one benefit of a well-designed mobile app would be being able to submit invoices faster and with more information (such as photos showing work done), rather than waiting until the end of the week when back at the PC-equipped office. In a small restaurant, one of the most common needs for a chef may simply be to order materials: again this could be done via a well-designed website or app, and does not need a PC.

But there are even deeper opportunities for mobile. There are hundreds of businesses and processes that are operating under old models, with some employees unnecessarily tethered to workstations, point-of-sale devices, or disconnected from real-time information. In most cases mobile should, through better efficiency, make companies more competitive, but in a few cases mobile will enable entire business models to be reinvented and industries to be disrupted fundamentally.

At a more prosaic level IT security will remain a critical concern – but the move to mobile does not necessarily diminish this. IT teams will, over the coming years, increasingly focus on understanding the additional capabilities as well as the additional risks of mobile workers.

IT security teams are likely to develop a strong understanding of the biometric security capabilities built into smartphones.

IT departments are increasingly likely to be tasked with sourcing the best off-the-shelf smartphone applications available for all their workers. Even in larger companies the focus will be on light customisation of

existing platforms, rather than building apps from scratch: this is the approach that IT departments have been using for decades in procuring PC software. One of the main focuses for IT departments will be to assess the ease of use of all applications issued.

IT teams will, over the coming years, increasingly focus on understanding the additional capabilities as well as the additional risks of mobile workers.



Machine learning: Making smartphones smarter

Machine learning is an application of artificial intelligence which enables automated improvements without explicit programming, enabling much faster iteration. It has accompanied every evolution of computing, since the first room-based computers built in the 1950s. Now that the smartphone is the most ubiquitous computing platform, machine learning is likely to play an increasingly important – albeit often invisible – role in the evolution of smartphone application and handset design over the coming years.²⁵

For smartphone owners, machine learning can be done remotely, or on the phone. With regard to the latter, this can be effected by general or graphics processors (CPUs or GPUs), or, for devices that have this, by a specialised chip called a field-programmable gate array (FPGA).²⁶ The benefit of on-device processing is speed; the advantage to remote processing is access to processing power.

Machine learning uses a range of inputs to customise applications to the user. For example it could help train a voice recognition app, by helping it recognise the user's voice. Machine learning can also use an array of other data points, including location history, app usage history, common words used when typing, common numbers called and photographs taken.

There are already multiple smartphone applications that incorporate machine learning, but most users may be unaware that their smartphone usage is being enhanced by machine learning. In some cases a lack of awareness may be a positive – some users may not want to feel as if they are being second-guessed by a machine and others might feel that their privacy is being intruded upon.

The most common machine learning applications, as of 2017 are:

- **Predictive text:** the smartphone predicts the remainder of the current word, or next words, to be typed. It may also correct grammar or accents.
- **Automated calendar entries:** the smartphone suggests events to add to a device's calendar based on the content of emails or other messages received.
- **Suggested apps:** your phone suggests which of the apps on a device a user may wish to open or use based on time of day. For example, weather and radio apps may be suggested first thing in the morning. This removes the chore of finding the app.
- **Automated news or information updates:** your phone shows you news, weather, financial updates, etc. based on previous articles read or searches made.
- **Translations apps:** your phone translates via an app, such as Google Translate. Inputs can be spoken, typed or photographed.
- **Automated photo classification:** photos on a phone can be sorted by type (such as people, selfies, animals) or by theme (food, scenery, flowers).
- **Email classification:** emails are automatically sorted by theme such as retail promotions, social, retail, personal, financial, etc.
- **Voice search:** speaking a search, rather than typing.
- **Voice-to-text:** dictation, in lieu of typing.
- **Voice assistant:** a more sophisticated variant of voice search; the best known services include Apple's Siri voice recognition software, Google's OK, Google and Microsoft's Cortana.
- **Route suggestions:** your phone suggests the quickest route for you to get to your destination and updates this dynamically during your journey.
- **Location-based app suggestions:** your phone suggests useful apps when in a location where they can be used, e.g. Apple Pay mobile payments solution/Android Pay when in a shop that allows you to pay with them, an airline app pops up when at the airport, Starbucks app pops up when near a Starbucks, etc.

Our research polled awareness and usage for each application (see Figure 7). Overall awareness was high: over 81 per cent of smartphone owners were aware of at least one application that incorporates machine learning. Usage, of at least a single application, was also strong, with about two-thirds of UK adults using one.²⁷ That said, we are still at an early stage with regard to machine learning and smartphones.

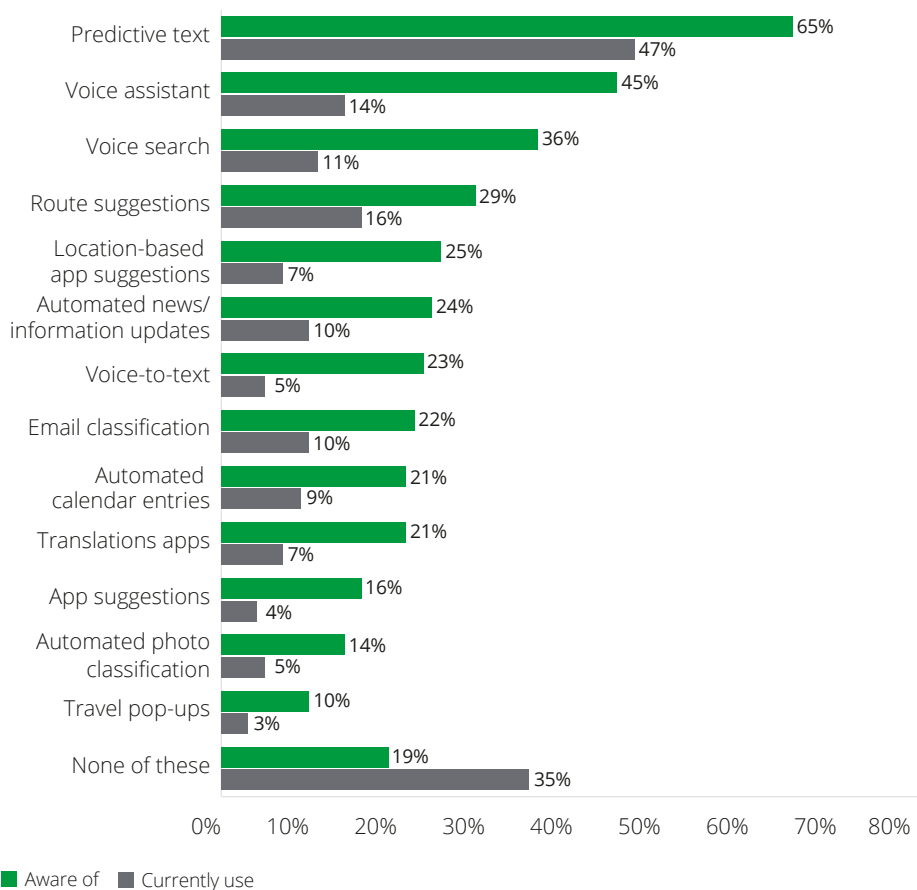
The best known and most used machine learning-based application was predictive text.²⁸ Two-thirds of respondents were aware of this application, and almost half used it. Predictive text's leading position is understandable, as text entry is a core smartphone application. Two-thirds of smartphone owners use instant messaging (IM), social networks, email and text messaging at least weekly and a seventh of smartphone owners use email or social networks hourly.²⁹

The second best known was the voice assistant. Forty-five per cent of respondents were aware of voice assistants but only 14 per cent used them. There was a large gap between awareness and usage for this application and the two other voice recognition apps: 36 per cent were aware of voice search, and 11 per cent of all smartphone owners used it; nearly a quarter were aware of voice-to-text transcription, but a mere five per cent used this. Low usage of voice recognition applications may reflect the challenge of accurate voice recognition in the environments in which smartphones are used. A smartphone can understand typed, pressed or swiped instructions regardless of the background noise. Voice recognition may not work in a crowded space, and accented voices may further confuse. Furthermore, some people may feel uncomfortable issuing instructions to their devices in a public space.

While the voice assistant was the second best known application, the second most widely used was route suggestions. Sixteen per cent used this, although 29 per cent were aware of it. Location-based app suggestions were less popular, with only seven per cent using the application and a quarter aware of it.

Figure 7. Awareness and usage of applications featuring machine learning among respondents aged 16-75

Questions: Which, if any, you are aware of?/And which, if any, do you use?



Weighted base: All smartphone owners aged 16-75 years (3,525)
 Source: UK edition, Deloitte Global Mobile Consumer Survey, May-Jun 2017

Outlook: The next five years

Over the coming years we would expect machine learning to become an increasingly important enabler and accelerant of smartphone usage, and a core differentiator of operating systems, specific phone models and smartphone applications.

There should be a growing number of smartphones that have dedicated on-device machine learning chips, rather than relying on the general smartphone processor, or sending information to the cloud to be processed. About a quarter of all smartphones sold in the UK this year are likely to have dedicated machine learning chips, and this proportion should rise with every subsequent year.³⁰

Usage of machine learning enhanced apps should increase as algorithms improve, and also as need rises. For example app suggestions, which offer a carousel of up to eight apps you may want to use matters little when you have downloaded twenty or less apps (the quantity that the majority of smartphone owners have) in addition to the preloaded ones. However as smartphone capacity increases, users may start accumulating hundreds of apps, and assistance should become more beneficial.

As photo collections on phones stretch into the thousands, automated photo tagging is likely to become increasingly used.

The dividends of better machine learning will manifest in many different ways. Much of the impact of machine learning is likely to be iterative. For example:

- commuters that take the train – most of whom do the same route daily – can get notifications of the platform to wait on, and preload the ticket on their phone. On the return journey, your phone can suggest items to purchase, with treats added in when close to pay day. The phone could also pull up the loyalty app when about to pay
- those driving could be offered a playlist customised to the time of day, the weather and the degree of traffic
- predictive text should become even more precise, by recognising language, or through better suggestions of emoji, photos or GIFs as substitutes for words
- for enterprise users, machine learning could be used to remind someone to leave at the appropriate time for a meeting, with the timing calculated based on that person's walking speed, the business of lifts at that time of day or preferred route to the next meeting.



Smartphones: The short form video star

The proportion of UK adults watching video on their smartphones has risen five fold over the last five years – albeit from a low base. Overall, consumption of video via a smartphone remains relatively infrequent, particularly for long-form content such as television programmes and movies.

As of mid-2017, 57 per cent of smartphone owners aged 18-75 watched at least one form of video content on their smartphones weekly. Five years earlier, just 18 per cent of a considerably smaller base did so.³¹ Currently, over 85 per cent of UK adults have a smartphone; in 2012, just 52 per cent had one. This implies about half of UK adults watched video on their smartphone in 2017 compared to about a tenth in 2012.

The predominant format consumed is short form video: 17 per cent of smartphone owners watch 'short videos or live posts or stories' at least once a day, and a further 23 per cent do so at least once a week. Short form video viewing skews much higher among younger age groups: 54 per cent of 16-19 year olds watch short form on smartphones at least once a day, and a further 25 per cent do so at least once a week (Figure 8). About a fifth of 16-19 year old smartphone owners do not watch video on a smartphone in a typical week.

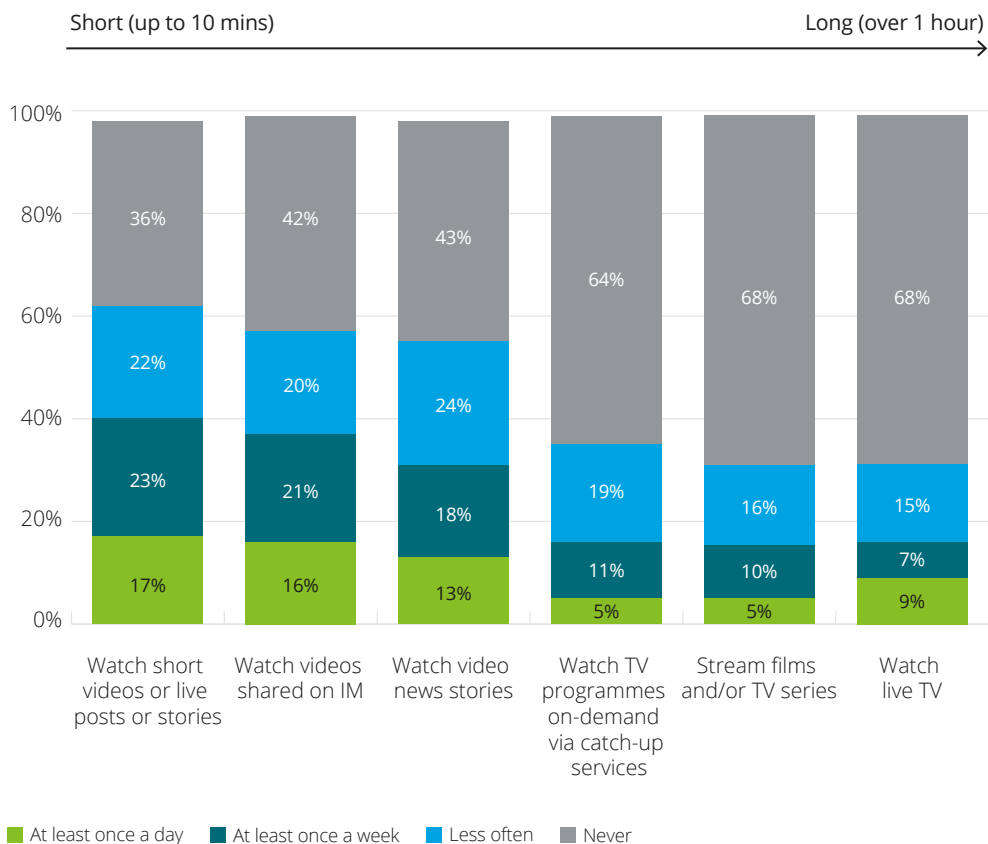
Long form video consumption (TV programmes and films) is growing strongly, but still far less frequent. For example, as of mid-2017, about five per cent of smartphone owners aged 16-75 watched catch-up TV at least daily on their smartphones: this implies that 95 per cent did not. Among 16-19 year olds usage was higher: 13 per cent did so, but still the vast majority did not.

The most significant growth among long form formats was for live TV: daily viewing of live TV on smartphones leapt from three per cent in mid-2016 to nine per cent a year later. If we look at consumption on a weekly or more regular basis, the usage looks healthier: 16 per cent of all smartphone owners aged 16-75 watched live TV at least once a week, but this is modest compared to live TV viewing in general.³² In the last week of May, the period this survey was fielded, 92 per cent of the population aged two and older watched traditional TV programmes.³³

The smartphone is becoming more important for video, but its role is likely to remain as a fall-back screen, and not the screen of choice. Among all age groups, the TV remains the preferred device for consuming long form TV and video content. This holds across all age groups, and all genders.

Figure 8. Frequency of video consumption on smartphones, by format type

Question: Below is a list of activities that you may do on your mobile phone. Please state how often you do any of these.



Note: The option 'At least once a week' excludes those who watch 'At least once a day'

Weighted base: All smartphone owners aged 16-75 years (3,525)

Source: UK edition, Deloitte Global Mobile Consumer Survey, May-Jun 2017

For short form video, the smartphone is preferred among 16-44 year olds and the laptop among 45-75 year olds.

Video consumption on smartphones is growing, but there is still a large base of smartphone owners who have never watched TV programmes on their smartphone. Across all smartphone owners aged 16-75:

- for long form content, 68 per cent have never watched live TV on their smartphones, 68 per cent have never streamed a film or TV series, 64 per cent have never watched catch-up
- for short form content, 42 per cent have never watched a video shared via IM on their smartphones, 36 per cent have never watched a short video or live posts or stories.

The proportion of those who have never consumed video via a phone should fall over time. Only 15 per cent of 16-24 year olds have never watched a short video or live posts or stories on their phone. Among 16-19 year olds the proportion is a mere nine per cent.

There are multiple, complementary drivers of increased video activity on smartphones, most of which should be sustained over the coming years.

One of the core catalysts is a better viewing experience. Over the past five years, smartphone owners have acquired smartphones with ever better screens in terms of size, colour range and pixel density. The latest television technology is rapidly becoming incorporated: for example HDR (contrast levels) and 4K (very high resolution) are now available together in a smartphone.³⁴ Larger screens have become possible thanks to physically larger smartphones, as well as reductions and, for some models, removal of the bezel.

The iPhone 5 mobile device, which launched in 2012, has a screen area of 42 cm². The iPhone 6 and iPhone 6 Plus mobile devices, which are physically larger phones, have screen areas of 61 cm² and 83 cm² respectively. Screen dimensions can also increase by removing the bezel: the Samsung Galaxy S5, which launched in 2014, measures 72.5 x 8.1 mm and has a 5.1 inch (129.5 mm) screen, as measured at the diagonal. The Galaxy S8, launched in 2017, is a little taller and thinner at 148.9 x 68.1 mm, but packs a 5.8 inch (147.3 mm) screen, thanks to its edge-to-edge display.³⁵

Connectivity over fixed and mobile networks has become better, faster and, over mobile networks, is available at a lower cost per gigabyte, making it possible to peruse an hour's worth of video during a lunch break for a pound – for those with a large enough bundle.³⁶

As price per gigabyte has fallen, monthly data packages have increased in size. In August 2015, O2's largest packages was for 4GB of data, priced at £25 per month on SIM-only.³⁷ Two years later, the largest package was 30GB for £30 (on sale from £42).

UK consumers have taken up offers of larger data bundles. According to our research, in 2012, only a third of smartphone owners had an allowance of over 1 GB; this year, 54 per cent did.³⁸ That said, almost half of respondents with a data package report having a 3 GB bundle or smaller.

Mobile data consumption has leapt over the past few years: Ofcom's research observes that average monthly mobile data usage per connection increased from 0.1 GB in May 2011 to 1.3 GB in June 2016.³⁹ Data consumption has been particularly strong in recent years. Cisco estimates that the average smartphone in the UK generated 1.7 GB of mobile data traffic per month in 2016, 41 per cent higher than in 2015.⁴⁰

For the majority of smartphone owners, their devices connect predominantly to fixed networks via Wi-Fi. Speeds over home broadband networks have ramped up significantly over the last five years. According to Ofcom, home broadband speeds trebled between 2012 and 2016 from 12 Mbit/s to 36.2 Mbit/s.⁴¹

A further major driver is the growing availability of video content for smartphones. This includes high production value created for streaming platforms, such as Netflix, Amazon and broadcasters. Increasingly this content is available to download to view later, rather than just as a stream.⁴² As of Q1 2017, BARB estimated that about 8.9 million households subscribed to one or more video on demand (VOD) services.⁴³ A large number of these subscribers are also likely to purchase traditional pay TV services, some of which incorporate VOD features that can be accessed on portable devices, as well as on TV sets.

Social networks and instant messaging platforms, enticed by the high CPMs (cost per mille) for video, are offering an ever widening range of video content. The fastest growing ad format in 2016 in the UK was video, for which revenues doubled to £693 million, equivalent to 29 per cent of all digital ad spend.⁴⁴

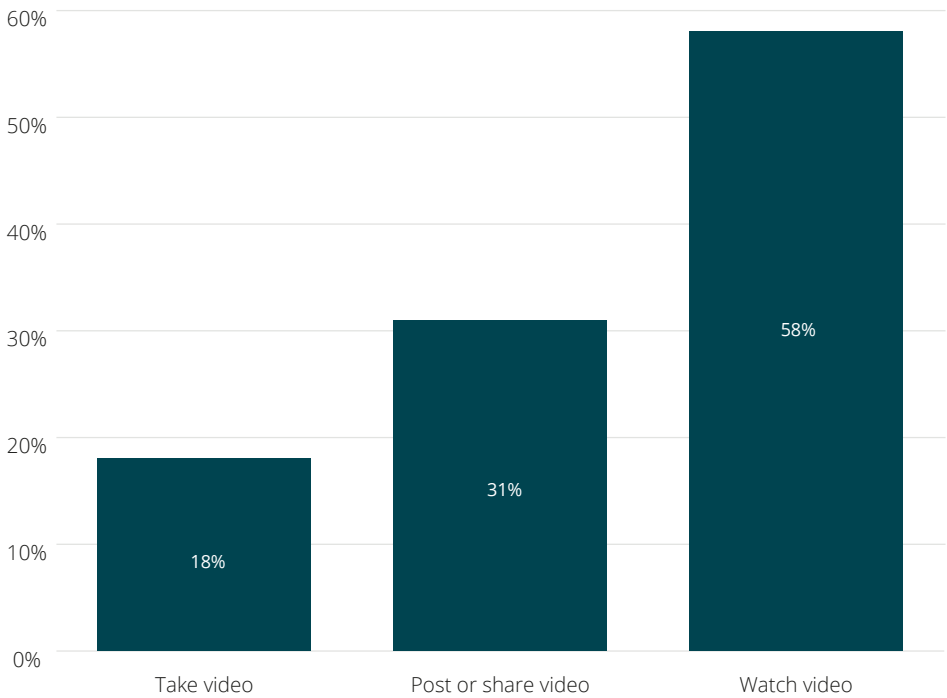
These vary in length (from mere seconds to hours), quality (from expensive TV productions to five-second Instagram stories costing nothing to make), format/content (from tutorials to cat videos, from live streams to stories that only exist for 24 hours) and complexity. Demand for this content appears healthy, but consumption rates, averaged per user, are currently modest. WhatsApp users were sharing a billion videos per day in July 2017 – averaging about one video per user.⁴⁵ In February 2017 the instant messaging service introduced the new 'Status' feature which allows users to share photos or videos that expire after 24 hours. By July 2017, this feature had a quarter of a billion daily users.⁴⁶ On Snapchat, as of April 2016, 10 billion videos were viewed each day, at which point the service had about 166 million daily users.⁴⁷ Instagram Stories had 250 million daily active users as of April 2017, at which point it had about 700 million users.⁴⁸ As of August 2017, Facebook hosted over four billion video views daily, and had about two billion users worldwide.⁴⁹

Consumption remains the predominant video related activity on smartphones, but a sizeable proportion of owners are also sharing, posting and taking video, as shown in Figure 9. The availability of ever better cameras, which can capture in more light conditions, and at ever higher frame rates, also encourage video capture.

The percentage of younger smartphone owners who take video at least weekly is markedly higher. Almost a third of 16-24 year olds take video weekly or daily; among 16-19 year olds 46 per cent claim to do so.

Figure 9. Respondents who take, post, share or watch video ‘at least once a week’

Question: Below is a list of activities that you may do on your mobile phone. Please state how often you do any of these.



Weighted base: All smartphone owners aged 16-75 years (3,525)
Source: UK edition, Deloitte Global Mobile Consumer Survey, May-Jun 2017

Outlook: The next five years

Over the next few years mobile networks are likely to be increasingly used to transmit video content, including to television screens.

Consumption of long form video on smartphones is likely to remain infrequent and of lower duration relative to TV sets. For most people, spending extended periods of time watching TV content on a small screen, is likely to be remain a fall-back option.

The growth in the use of mobile networks to deliver video that is watched on a TV screen will depend on the availability of bundles that make this affordable. In some markets very large bundles of 100 GB or bigger are on the market – if these become common in the UK market, some households may replace their fixed broadband access with mobile. The deployment of 5G networks may enable this; in some markets 5G may be a lower cost option for providing very high speed connections to homes versus fibre to the home.⁵⁰

Mobile and fixed operators will need to ensure that their networks are configured to be able to cope with the expected demands that higher video consumptions will place. Cisco has forecast that video will be over 80 per cent of traffic flowing over mobile networks by 2021. This compares to 61 per

cent at the end of 2016.⁵¹ Some operators may have to throttle network speeds (reduce them to a lower bit rate, and therefore degrading the quality per stream) to be able to cope with demand.

Video is increasingly likely to be streamed into cars, buses and trains for passengers' consumption. This may be watched on smartphones, or tethered tablets or a vehicle's integrated screens. The growth in video streaming into vehicles will mirror the recent rise in audio streaming over cellular mobile into cars.

There is likely to be a growth in the quantity of content available via digital platforms, which is easily accessible via any connected device, including smartphones. Many large digital platforms are investing in content rights and commissioning content:

- Amazon has launched Amazon Channels, a suite of live TV channels, featuring content from Discovery, ITV, Eurosport, MGM and others. This programming is additional (and charged additionally) to the on-demand content included within Amazon Prime.⁵² In the US, Amazon has also purchased the rights to stream ten Thursday Night NFL games.⁵³ These will be available to Prime subscribers and also broadcast on TV.

- Twitter, which live streamed ten NFL games in 2016,⁵⁴ announced in May 2017 that it had signed 16 live streaming deals, spanning concerts, sport and drama.⁵⁵ Twitter also partnered with the BBC to live stream five election specials.⁵⁶
- YouTube has offered, in conjunction with BT Sport, several Champions League matches, including the final.⁵⁷
- Facebook will, for the coming season, broadcast 20 live baseball games, and 46 live Mexican football matches to US audiences, via the Facebook Live platform.⁵⁸ Facebook has recently launched a redesigned tab for video which includes original programming financed by the social network.⁵⁹

Video is increasingly likely to be streamed into cars, buses and trains for passengers' consumption.



The mobile operator store: More for more

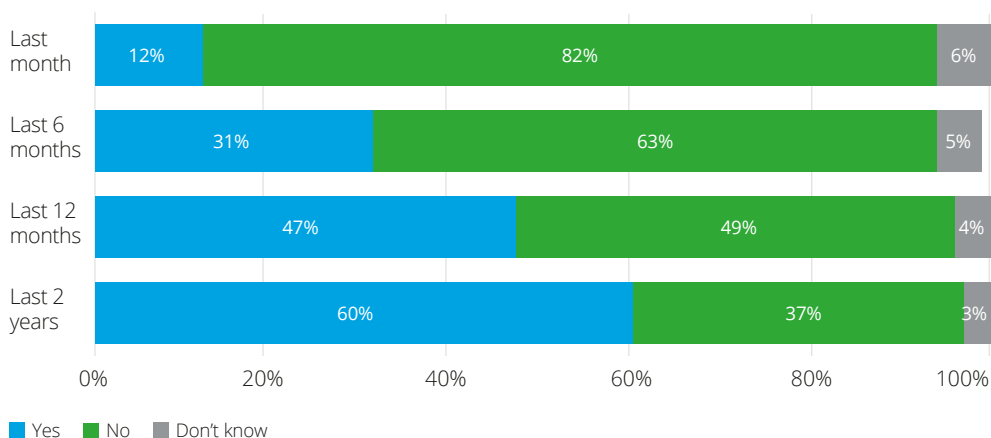
Currently, there are about 1,900 mobile operator stores in the UK.⁶⁰

At a national level, e-commerce sales are growing, and, at a rapid pace. Revenues grew 16 per cent in 2016, to reach £133 billion for the year.⁶¹ A growing number of retailers with a high street heritage are accentuating online or downsizing their high street presence: John Lewis expects online sales to generate the majority of revenues by 2019, and has invested £500 million in its e-commerce capability.⁶² Mothercare announced in May 2017 that it would close up to 70 stores, down from 152, and significantly lower than the 400 it started the decade with.⁶³

Over the last year, slightly under half of UK respondents aged 16-75 visited a mobile operator's store; 12 per cent visited in the prior month (Figure 10). Is this a healthy percentage, or does this demonstrate indifference?

Figure 10. Respondents who have visited an operator store, by last time they visited

Question: When, if at all, was the last time that you went into a mobile operator's store for each of the following? Was this within the...?



Note: The results refer to respondents who have been into an operator store for any of the following reasons: 'To get information about mobile phones', 'To renew my contract or purchase a mobile phone', 'To obtain help or advice with technical issues', 'To get information about contract/tariffs or query my bill'. Weighted base: All respondents aged 16-75 years (4,153). Source: UK edition, Deloitte Global Mobile Consumer Survey, May-Jun 2017

In this year's survey, 40 per cent of respondents aged 18-75 stated that they had purchased their phone online, and 34 per cent in store. Last year the corresponding proportions were 38 per cent and 35 per cent.

Given the UK public's tendency towards buying online, is there still a need for nearly 2,000 mobile operator stores? One could argue that as mobile telephony has been a mainstream offering now for over 20 years, consumers should be familiar with it.

However, while mobile is firmly mainstream, it has been in a state of constant evolution over the last two decades in terms of networks, handsets and applications. In the 1990s, the mobile proposition was simple. Voice predominated; text messaging did not emerge till the end of the decade; mobile data was virtually non-existent. Last decade, mobile networks started to become more complex. New data services emerged. GPRS, EDGE and HSPA – an array of acronyms that may have bewildered many users – were launched on cellular networks.⁶⁴ Public Wi-Fi hotspots became available, too, enabling the growing numbers of smartphone owners to access data services in public areas over operator-owned and third party Wi-Fi hotspots. In 2007, when the iPhone mobile device launched, connecting the device while out and about may have been best served via a trip to McDonalds, which offered a Wi-Fi hotspot, as the device only connected to 2G networks.⁶⁵

Making sense of this complexity is challenging. Stores may be needed simply to explain the units by which mobile data – the fuel for smartphones – is sold, that is in blocks of bytes. Every application consumes bytes at a different rate, with video using most, and usage rates (the amount of data being used) vary by context. A commuter on an empty bus at the start of his or her journey may initially be receiving the highest quality stream of 2 Mbit/s, but as the bus progresses into town, and the seats fill up with other commuters also streaming content, the network capacity would be divided between the passengers, and the bit rate may fall to a fifth of the original quality. This may cause the video to become pixelated, but it would also mean the commuter would be using less of their data allowance.

Mobile's evolution is likely to continue over the next few years. As of 2017, there are three generations of mobile network (2G, 3G and 4G), operating concurrently. By 2020, 5G should have launched. Between now and 2020, iterations of 4G networks are likely to launch.⁶⁶

Given this, there is definitely a need for mobile operators to maintain a physical retail presence, to be able to explain mobile networks' rising capabilities.

Over the years, mobile phones have become more similar on the outside and more differentiated on the inside. Choosing a smartphone is, and is likely to remain, daunting. The wrong decision, for example, with regard to operating system, memory size or colour can lead to two years and thirty thousand glances of regret.⁶⁷

The smartphone is, and is likely to remain, inherently tactile and is also, for many, an expensive purchase. Consumers are likely to want to go into a shop and see, touch and play with an intended purchase, often to convince themselves that they are making the right (and expensive) decision. While many may transact online, they may also wish to hold and interact with the product along their purchase journey. The materials used, the weight of the handset, the positioning of the fingerprint reader and the reflectiveness of the screen are all aspects of a smartphone that are hard to comprehend solely via looking at a website.

Visual differentiation has narrowed. For example the iPhone 6, 6s and 7 mobile devices all have largely the same design, with only minor variances, such as the size of the camera lens. However models vary significantly in terms of unseen capabilities. There are major differences, for example, in terms of processors, memory and sensors.⁶⁸

There is a growing range of options for acquiring the handset including leasing and finance. Some customers may prefer to purchase a refurbished second-hand phone and spend the savings realised on more airtime, while others may wish to purchase in-store simply to have a seamless route to trade in their old handset.

Outlook: The next five years

Our view is that, at this stage of the market and over the medium term, there will continue to be a need for operator stores – possibly with increasing capillarity.

There is likely to be a growing variety of formats, including store-in-store (EE has recently announced it would open 100 stores in Sainsbury's and Argos stores),⁶⁹ and an increased use of pop-up stores, with the latter deployed seasonally to dispense product and advice.

While the number of outlets may increase, full-time staff numbers might be able to remain broadly constant, with some pop-up stores requiring just a few staff on a seasonal basis.

When optimally deployed – and there is more and more data available on spending patterns, population distribution and footfall – operator stores should be able to drive airtime sales, improve brand loyalty and diminish churn.⁷⁰ They should also be able to cross-sell additional products, such as pay television, home broadband and connected home services.

A smartphone is likely to connect with multiple fixed and mobile network technologies daily, both now and for the coming years. A core role for operator stores

will be to explain the evolving state of both types of connectivity.

Over the coming years, smartphones and the range of services of support will become more sophisticated than ever before. For example, Voice over LTE (VoLTE), whereby voice services are carried over a 4G network and offer instant set-up and higher audio quality, is likely to become increasingly available over the coming years. Communicating the benefits of VoLTE may be best done in stores.

Smartphone owners – particularly those being handed used, advanced smartphones – may require assistance in making the best use of new functionality. Even experienced users may need guidance on how to use relatively established features, such as fingerprint readers to make an in-store payment.

Store staff can help explain how to use some of this functionality, and may be particularly helpful for the growing number of older smartphone users.

While the number of outlets may increase, full-time staff numbers might be able to remain broadly constant, with some pop-up stores requiring just a few staff on a seasonal basis.

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27. We have obtained this estimate by asking respondents about their awareness and usage of a range of applications, all of which are improved by or rely on machine learning. We did not ask explicitly whether respondents were using machine learning.
28. Predictive text also mitigates some of the limitations of the smartphone user interface. For example toggling between upper and lower case or adding accents can be cumbersome when typing on a small screen: predictive text can suggest the correct capitalisation and accents, speeding up composition. The accuracy of grammatical changes, including accents, varies by language.
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32. To be able to compare the two years, we have filtered the 2017 data on those aged 18-75. Source: Deloitte Global Mobile Consumer Survey, UK cut, May-June 2016, base: smartphone owners, 3,251 respondents aged 18-75; May-June 2017, base: smartphone owners, 3,393 respondents aged 18-75.
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About the research

The UK data cut is part of Deloitte's Global Mobile Consumer Survey, a multi-country study of mobile phone users around the world. The 2017 study comprises approximately 53,000 respondents across 33 countries and six continents.

Data cited in this report are based on a nationally representative sample of 4,150 UK consumers aged 16-75. The sample follows a country specific quota on age, gender, region and socio-economic status. Fieldwork took place during May to June 2017 and was carried out online by Ipsos MORI, an independent research firm, based on a question set provided by Deloitte.

This brief report provides a snapshot of some of the insights that the survey has revealed. Additional analyses such as: ownership of IoT devices smartphone usage for online and in-store payments, smartphone purchase channel, reasons for joining/leaving mobile operators, attitudes towards triple/quad play, usage forms of communication such as IM, SMS and social networks, attitudes towards data security and refurbished phones are available upon request.

Results for other countries are also available on request.

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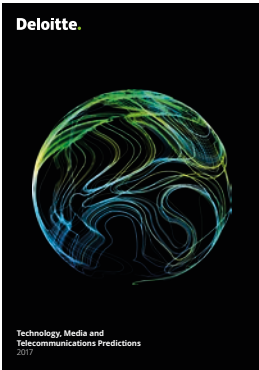
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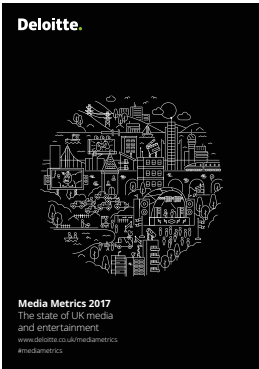
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