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Discover the future
2020 predictions for UK Technology, Media and Telecommunications

Contents

Foreword

As a new decade approaches, the impact of the technology, media and telecommunications sectors on society, business, and consumers' daily lives remains as broad as ever.

The last ten years have delivered multiple, mainstream shifts, from smartphones to subscription video on demand; from cloud computing to biometric authentication; from near-perpetual connectivity to ever broader, deeper data trails. The next ten years are likely to be equally disruptive, with some of the most significant technology advances in our lifetimes having their foundations in 2020.

The next release of the 5G standard has the potential to reinvent enterprise communications, particularly in industrial environments. The last few decades have been about connecting people. The next tranche of 5G standard should enable every machine and every tool to become connected, generating more data, enabling more insights and delivering higher productivity. We forecast 100 companies around the world will have deployed 5G by end 2020; by the end of the decade, 5G could be enabling hundreds of billions of pounds worth of value.

5G enables machines to become more autonomous. This includes service robots, which can be better connected through 5G, more capable due to edge computing, and operate for longer thanks to better battery technology. We forecast 2020 is the year in which half a billion service robots will be sold, generated over £13 billion in revenues.

Better batteries are also a core enabler of the reinvention of commuting, an evolution that will take many years to complete. The lithium ion battery enables bicycles to be reimagined and repurposed. Adding a 2.5 kilogram battery to a bike means it no longer needs to be optimised for weight. A bike with a battery can be reinvented as a compact multi-person vehicle, powered by pedalling, but assisted by battery power, particularly for starts, up-hills and headwinds. It can become a delivery vehicle, an urban taxi or a powered wheelchair. We predict that the proportion of commutes that include a cycle ride could double over the next three years, resulting in tens of billions more cycle rides per year.

Commutes have long been accompanied by radio, and increasingly they will be accompanied by podcasts in 2020. We predict that podcasts will be a £20 million business in the UK in 2020, but $1.1 billion (£850 million) globally.

The podcasts may be listened to on wireless earbuds, which are part of the growing smartphone multiplier market. Sales of hardware, software, content and services related to smartphones should be close to half a trillion dollars in 2020, with mobile advertising being the largest component. The value of smartphone accessories alone, at $77 billion (£60 billion) is multiples of the forecast revenues for tablets, wearables or smart speakers.

As we approach 2020, TV viewers are being spoilt with an ever-widening array of some of the best television content ever made. The surge of the subscription video on demand (SVOD) market should continue in 2020, and this will be complemented by the rise of advertising video on demand (AVOD). TV advertising is a £5 billion market in the UK; AVOD, which is a subset, will be over £500 million. By the end of 2020 there will be many more new names in SVOD, but there will also be a growing number of AVOD providers, including the recently launched Pluto.TV and Plex, as well as smartphone optimised Quibi.

The new decade beckons; the tech, media and telecoms markets are ready.

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Prediction 1

Industrial 5G: Enterprise untethered

In the UK, by end of 2019, all four operators had launched 5G services, but the launch of 5G is far from complete. One of the most substantive elements of 5G will not launch until mid-2020. This phase, the inelegantly named 3GPP release 16,[1] scheduled for finalisation in June 2020, promises to match the reliability of wired Ethernet capability with the flexibility of wireless communications. It is designed to excel in a range of closed, industrial, indoor or outdoor environments.

Release 16 includes three pillars that, in combination, equip 5G for industrial environments:

- **Ultra-reliable low-latency communication (uRLLC).** With uRLLC, 5G should be able to connect controllers, switches, sensors, and actuators at latency and reliability levels equivalent to those of a wired connection.[2]

- **Massive machine-type communications (mMTC).** mMTC supports extremely high connection densities, enabling industrial-scale IoT. With it, 5G will be able to connect up to a million IoT sensors and devices per square kilometre.

- **Enhanced mobile broadband (eMBB).** eMBB, which was included in Release 15, enables 5G to transmit data incredibly fast, at speeds of up to 20 Gbps.[3]

Release 16 also incorporates support for time-sensitive networking (TSN), which permits fixed Ethernet and 5G networks to coexist and converge.[4] TSN will allow 5G networks to be used for applications that are currently usually only carried over Ethernet wireline networks.[5] Additionally, Release 16 should include support for unlicensed networks, which means that private 5G deployments could use spectrum in unlicensed ranges.

In short, 5G will enable industrial environments, from manufacturing plants to sea ports, and from e-commerce logistics centres to hospitals, to become connected and untethered. Production lines will no longer need to be linear, but rather could be reconfigured as needed. In a hospital, all medical instruments could be connected, with measurements automatically captured and saved, rather than written down, and then transcribed.
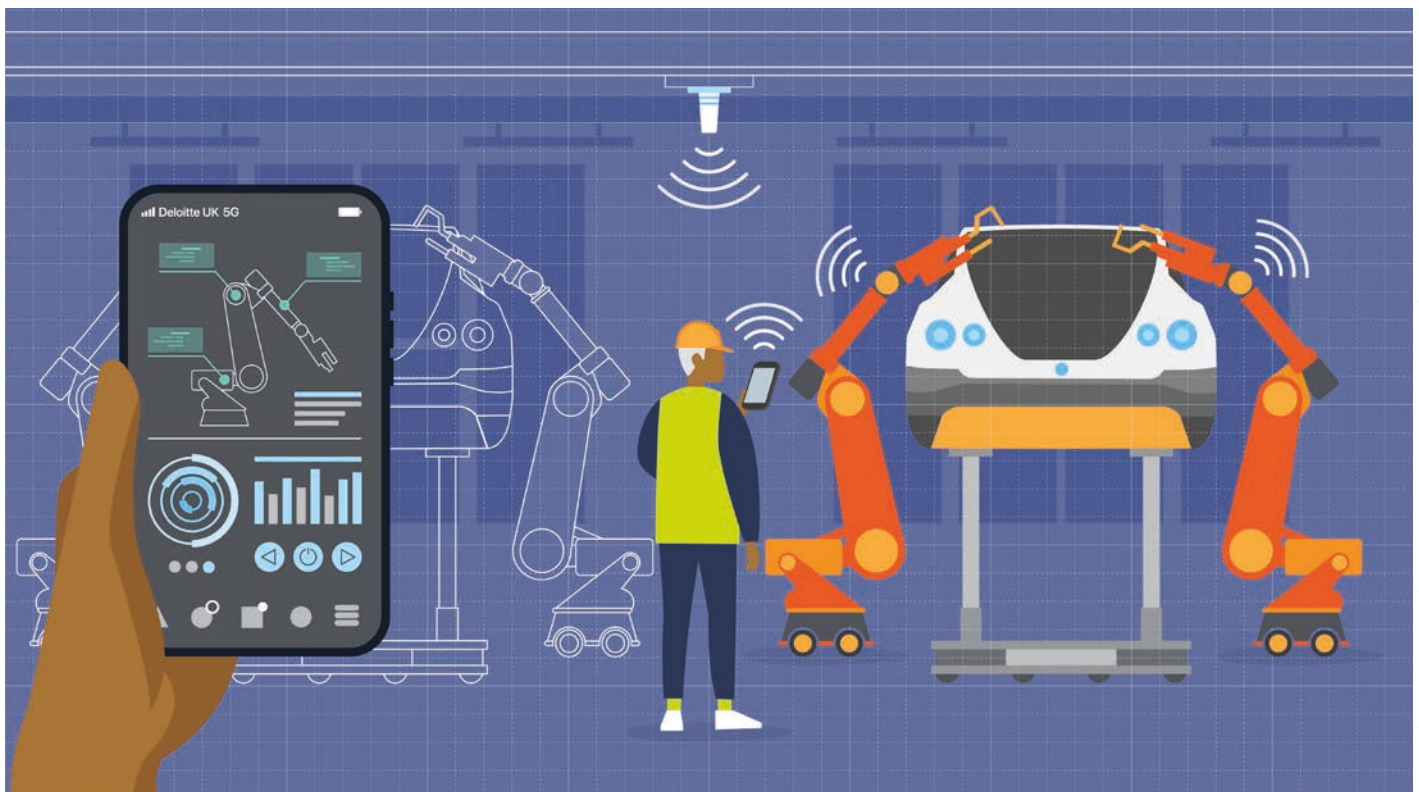
Over the next 10-20 years, 5G Release 16 has the potential to become the predominant LAN and WAN technology, especially in greenfield builds. Not all companies will rip out their old wired infrastructure, but those building a new factory, port or campus may skip the wires entirely.

Deloitte global predicts that by 2023, the value of cellular mobile equipment and services for use in industrial deployments will be worth tens of billions of pounds annually. In 2020 the market will be nascent, worth a few hundred million pounds from a small number of companies.[6]

Enterprises may have multiple, co-existing motivations for deploying 5G, including: access to 5G's superior performance relative to other wireless standards, enabling new ways of working, greater control and a lower cost of operation.

5G as cable replacement

In some cases, an entity may deploy 5G on its campus simply because it is cheaper than adding additional fixed connections. This was the case for Rush University Medical Hospital in Chicago.[7] One of its buildings is 100 years old and its architecture was not designed for the computing age. Adding wires into the building is costly – millions of pounds more. Its false ceilings are already full. There is no space for additional cables.

5G, which is being installed in 2019, is expected to offer equivalent connectivity as wired connections, but at a lower cost (savings are in the millions of pounds) and with greater flexibility. Rush University Medical Hospital will deploy 5G as a foundation for process improvement – it is also designing a new 11 storey facility with 5G connectivity at its heart.

5G for productivity improvements

5G may also be used to enable an existing process, such as maintenance, to work more efficiently. At one manufacturing plant in Helsinki, a 5G connected camera is used to provide real-time feedback to staff assembling low voltage drives. Video sent via the camera is analysed using machine vision.[8] Any assembly errors are alerted instantly. A lack of alerts reassures workers that the assembly is perfect. The machine vision application also guides the worker on the ergonomically correct body and hand positions for assembly.

Ericsson is using 5G to automate the maintenance of about 1,000 high-precision screwdrivers, which require periodic calibration and lubrication, based on utilisation levels. Previously this process was manual, and paper-based. Adding motion sensors, to quantify usage, and narrowband Internet of Things (NB-IoT) modules for connectivity has enabled the process to be automated. The migration to a 5G-based solution has cut annual work by 50 percent.[9]

Initial trials of using 5G to improve processes have already shown positive results. One trial, by Worcester Bosch in the UK, found that private 5G, enabled a two percent improvement in productivity for some applications, double what was expected. The two percent improvement is equivalent to the average productivity improvement within UK industries over the entirety of the last decade.[10]

5G for new operating models: remote control

5G can also be used to control facilities remotely. A small farm in the UK plans to use 5G in its "hands free hectare" – a fully automated farm.[11] Remote controlled machines (tractors and drones) connected by 5G may be used to sow, maintain and harvest the crop. Extra sensors at ground level provided additional information.

In Japan, 5G has been trialled to connect drivers, based in an office in Tokyo, to a mechanical digger at a construction site located tens of kilometres away.[12] 5G is used to relay the video streams from multiple 4K video cameras. The remote driver is able to control the digger without the discomfort of being in a cab in possibly arduous weather conditions, and without having to commute to a remote site. In a country with an aging population, remotely operated machinery enables workers of all ages remain economically active.

Some ports are looking at using cellular mobile to monitor autonomous guided vehicles, to control cranes remotely as well as for video surveillance. In Rotterdam, 5G has been used to enable remote visual inspection of a network of 160,000 km of pipelines via UHD cameras placed on top of vans.[13] In Tianjin, China, 5G connected drones have been used to inspect electric power lines.[14]

5G for new operating models: process reinvention

The most compelling aspect of 5G will be its ability to contribute to the fundamental re-design of processes, particularly in manufacturing.

Vehicle manufacturers offer an ever-widening range of car models and sub-categories. Customers expect, and will pay for, personalisation. To meet this demand, assembly lines need to be more flexible.

In response, Mercedes has created a template for a new factory based on a flexible production line, called "TecLine". This facility, equipped with 5G, that houses a flexible assembly line, is composed of 300 driverless systems. Rather than builds-in-progress travelling linearly down a production line, autonomous transport systems carry builds-in-progress between different parts of the factory. Parts will be brought to each station by intelligent picking systems.[15]

Bosch Rexroth is building a factory in Xi'an, China, in which only the walls, floors and ceiling are fixed. Everything else is mobile. Assembly lines are modular, with their constituent machines autonomously moving and reassembling themselves into new production lines. Machines will communicate with each other via 5G.[16]

5G will also enable process reinvention in other sectors. In a hospital, 5G enables far more devices to be connected, and for the connections to remain even if the devices are moved around. Medical instruments, from scales to blood pressure cuffs, can become connected without the need for them to be in a fixed location.[17] Doctors will be able to access remote imaging and remote radiology diagnosis from their devices.

The rationale for making 5G networks private

To access 5G's capabilities, a company has two basic options. It can connect to an operator's public 5G network. Or it can opt for a private 5G network, either by purchasing its own infrastructure while contracting for operational support from a mobile operator, or by building and maintaining its own 5G network using its own spectrum.

Making an enterprise's 5G network private enables it to be customised to the location's specific needs, and bolsters security. It provides a degree of control, in terms of reliability and security that may not be possible on a public network. A geo-fenced private network would not have its performance affected by other people's usage in the same area.

Private 5G installations may be single site or spread across multiple locations, similar to a private LAN or telephone network.

There are multiple approaches to deploying a private 5G network. The very largest companies may want to install private 5G networks with owned network infrastructure, dedicated spectrum (in markets where this is permitted) on their campus, and with management undertaken by an in-house team or outsourced to a mobile operator.

Medium sized and smaller companies may, for budgetary reasons, opt to lease network equipment, outsource network management, and sub-lease spectrum (geo-fenced to their location) from a public mobile operator, or, in some cases, use unlicensed spectrum. A mobile operator, systems integrator, or equipment vendor may provide management of the network, and all the elements it attaches to.

Bottom line

Businesses have always been disrupted by successive generations of communications technology improvement. 5G's Release 16, however, could be the most disruptive mobile technology yet. Its broader adoption for private networks has implications for many types of companies.

For mobile operators, the growth of private 5G networking can mean additional revenue. Operators supporting private 5G deployments have an opportunity to bring their network management skills to individual companies, especially small and medium businesses to establish and operate the private networks. To effectively tap into these opportunities, mobile operators will need to build vertical sector capabilities or partner with companies with sector-specific knowledge.

For network equipment vendors, the private 5G prize is a much-expanded market into which to sell cellular mobile equipment. One estimate projects that private wireless networks could eventually account for up to 14 million cellular base stations, which would be more than double the 7 million base stations currently operated by the world's public mobile operators (the price per site for enterprise cellular is likely to be lower than for public).[18]

Regulators will need to determine how much, if any, spectrum to make available to companies' private networks. In some markets, regulators may need to decide whether to allocate spectrum directly to companies or to distribute it through mobile operators. In the UK, Ofcom has made localised licenses available across multiple spectrum ranges, including those best suited to 5G. The ranges are: 3.8-4.2 GHz, 1800 MHz, 2300 MHz, and, for internal use only, 24.25 – 26.5Ghz.[19]

Prediction 2

Cycling's digital transformation: Making cycling faster, easier, and safer

Globally, more and more cyclists are taking to the roads, assisted partially by an array of technological advances. We predict that tens of billions of additional bicycle trips per year will take place globally in 2022 over 2019 levels. This means fewer car trips and lower emissions, with spill-over benefits for traffic congestion, urban air quality and improvements in public health.

Underlying this growth in bike-riding is a diverse array of technologies, including predictive analytics, product and application design, wireless connectivity, digital urban planning tools, 3D-printed parts, and electrification. These innovations are making cycling safer, faster, more convenient, and easier to track and measure.

The need for more effective transportation is particularly acute in cities where congestion is most severe. Bikes can pick up some of the slack for shorter journeys: More than half of car trips in England are less than 5 miles and a third of trips in urban areas such as London are less than 1.2 miles.[20] However, as of 2019, only around 5 percent of journeys in London are taken by bike.[21]

Electrification: My other car is an electric bike

Of the slew of bicycle-related technologies, the development and spread of electric bike, which use batteries to assist pedalling, stands out for its potential to boost cycling's growth.

Electrifying a bike is not a new idea: The first patent for an electrically powered bicycle was registered in 1895.[22]

Now, thanks largely to recent improvements in lithium ion battery technology, pricing, and power, the electric bike market is seeing a surge in interest globally, particularly for high-end models. Between 2020 and 2023, more than 130 million electric bike (using all battery technologies) are expected to be sold globally,[23] and in 2023, electric bike sales are expected to top 40 million units worldwide,[24] generating about £16 billion in revenue.[25] To put these numbers into context, only 12 million electric vehicles are expected to sell in 2025; at the end of 2018, just 5.1 million electric vehicles were in circulation.[26]
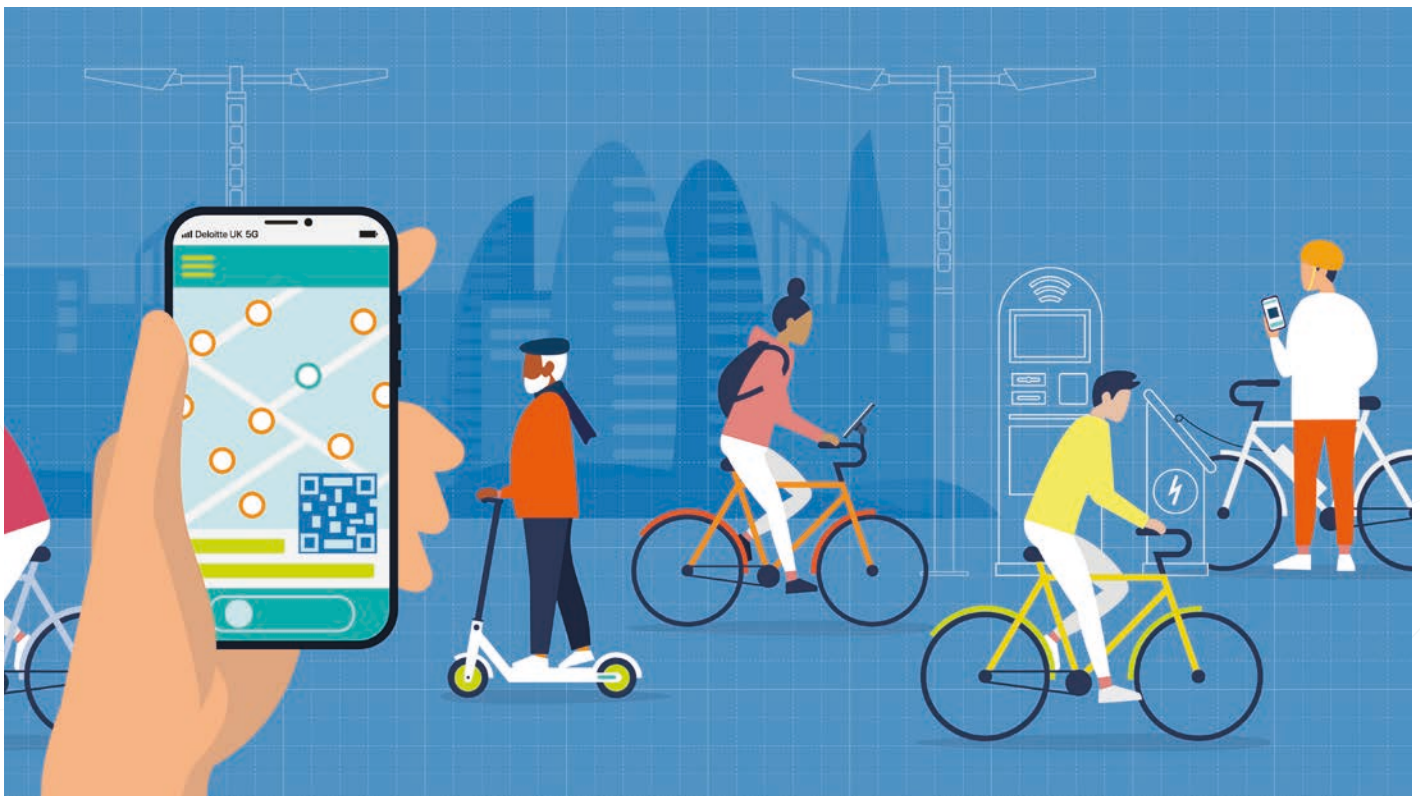
Some European countries have fully embraced electric bike. In Germany, electric bike sales in 2018 rose by 36 percent to nearly one million units, representing 23.5 percent of all bikes sold;[27] almost a million more were sold in Germany in just the first half of 2019.[28] More than half of all adult bikes sold in the Netherlands in 2018 were electric.[29]

Sales in the UK however are far weaker: in 2018 only 70,000 e-bikes were sold, a paltry two percent of all cycles sold.[30] A key reason for the significantly lower numbers is linked to the purpose of cycling. In Germany and Netherlands, cycling is considered a commuting option, while in the UK it is regarded more as a sport. Over half of trips on the Dutch transit system start with a bike ride.[31a] In the UK just 6 percent of the population (3.1 million) cycles as part or all of their commute. Nearly double that number (6.1 million people) cycle for sport or leisure.[31b]

An increase in dedicated bike lanes, electric bike hire, subsidy and cycle-to-work schemes should help boost sales in 2020 and beyond.[31]

What's the appeal of e-bikes?

One big plus is that battery assist makes cycling less of a physical effort: you do not need to be an athlete to travel by e-bike. This translates into faster average speeds (about 50 percent faster than on a standard bike);[32] easier acceleration after a stop, such as at a traffic light; and a power boost when going uphill, facing headwinds, carrying heavy loads, or some combination of the above.[33] As it requires less effort than a standard bike, e-bikers sweat two-thirds less than regular cyclists which matters to commuters.[34] E-bikes make cycling less daunting to many who might otherwise hesitate.

Yet electrifying a bicycle does more than making it easier to pedal. E-bikes can be secured, unlocked and tracked via apps. Electrification can also improve safety. Most high-end e-bikes incorporate large, bright, battery-powered front and rear LED lights.

Technologies beyond electrification

Apps can quantify the cycling experience in many ways as well. They can calculate the number of calories burned or measure the amount of greenhouse gas saved by cycling instead of driving. Using an app, cyclists can not only easily log and share their journey times, but also receive time estimates down to the minute based on aggregated user data.

Apps also exist for bikesharing. As of July 2019, Google Maps displays bikesharing stations' locations, as well as how many bikes are available at each station, in 24 cities.[35]

A major reason that people do not ride bikes—of any type—is because of safety concerns. Here, too, technology can offer multiple solutions through the accelerometers and gyroscopes available on most smartphones, tablets, action cameras, or embedded onto helmets.

Beyond hardware: Cycling and analytics

Data and analytics technologies can aid urban planners' efforts to devise bicycle-friendly solutions. The amount of data available to planners is growing, while advances in analytics are making this data ever more useful.

London's transport authority is using a digital tool called Cynemon to help inform investments in the city's bike lanes.[36] This tool applies algorithms to data synthesized from multiple sources to determine what routes cyclists are most likely to take along Greater London's network of streets and urban paths. Strava, whose consumer app collects data from millions of cyclists and runners around the world, aggregates and anonymises this data through its Metro product and makes it available to departments of transportation and city planning groups to use in improving bicycle and pedestrian infrastructure.[37] Depersonalised, aggregated data from mobile network operators could also be used to understand commuter journeys.[38]

Bicycles and bike accessories themselves can be fitted with location and motion sensors to yield useful data. In the UK, Manchester's city council subsidised a program that equipped bikers with See.Sense lights to capture data on routes, journey times, problem spots such as potholes, and key pinch points or stoppages.[39] The council used the aggregated and anonymised data to understand what routes cyclists were using and where safety concerns were highest due to factors such as lack of infrastructure, adverse road conditions, or overexposure to traffic.

Bottom line

The technology industry has a large role to play in encouraging greater bicycle use—a goal that can help society address many challenges arising from continuing global urbanisation. Improving the technology itself—better data analytics to support urban planning, or faster battery recharge times, or apps that help people integrate cycling into their commutes—is only part of the picture. The other, equally important part is to support policies and programs that promote cycling.

The tech industry can't do it alone, however. Many vertical sectors should be involved for cycling to make a dent in certain entrenched challenges. For example, consider public health and the related issue of health care costs. Instead of prescribing pills, doctors could offer programs designed to change behaviour, such as encouraging exercise.

This is actually already happening to a limited extent: In the UK, some doctors are referring patients to a 12-week cycling course with the aim of making them more confident about being on a bike—and, hopefully, to make cycling a habit.[40]

Prediction 3

The ears have it: The rise of podcasting

The global podcast market is expected to surpass $1.1 billion (approximately £850 million) in 2020, a 30 percent year-on-year increase. UK revenues may pale by comparison: we forecast about £20 million in 2020.[41] This is a fraction of UK commercial radio revenue at £713.3 million in advertising in 2018, a £34 million increase on 2017.[42]

While revenues are modest, usage is growing. Over 10 million UK consumers are expected to listen to podcasts in 2020, with around 8.5 million average weekly users.[43] The proportion of the population listening to podcasts weekly nearly doubled from 7 percent in 2013 to 12.6 percent in 2019.[44] Podcasts' share of all audio listening doubled from a low base of 2 percent in 2016 to 4 percent in 2019, according to Rajar.[45] Podcast listening has now overtaken CDs and vinyl but is miniscule in comparison to radio, which continues to grow audiences making up over 74 percent of total audio listening.[46]

Podcasts are more popular among the younger age groups and most listened to on smartphones: 8 percent of 25-34 year-olds' listening time goes to podcasts in the UK. Across all age groups, more than two thirds (68 percent) of consumption happens on a smartphone, and thus podcasts account for 18 percent of all listening on this device.[47]

Podcast consumption patterns are similar to radio: they are consumed while driving/travelling (26 percent), while working/studying (25 percent), and while relaxing/not doing anything particular (16 percent).[48] Podcast genres also largely reflect radio's. Entertainment is the most popular podcast genre, followed by comedy, then discussion and talk shows.[48]

These stats may prompt the question: are podcasts at all new? Podcast hits are often radio programmes made available on demand, with BBC radio programmes often among the most popular on podcast charts. But podcasts can also be brand new content and the podcast offers a lower cost route into broadcasting.

Podcasts and the monetisation challenge

While the number of podcast listeners is rising, the industry needs to improve monetisation of its large and growing listener base. In the UK in 2017, commercial radio generated 2.8 pence of ad spend per hour of listening through ads, while podcasts generated just 0.5 pence (see Figure 1).[49]

Figure 1. UK ad spend per hour of listening, 2017 (£)
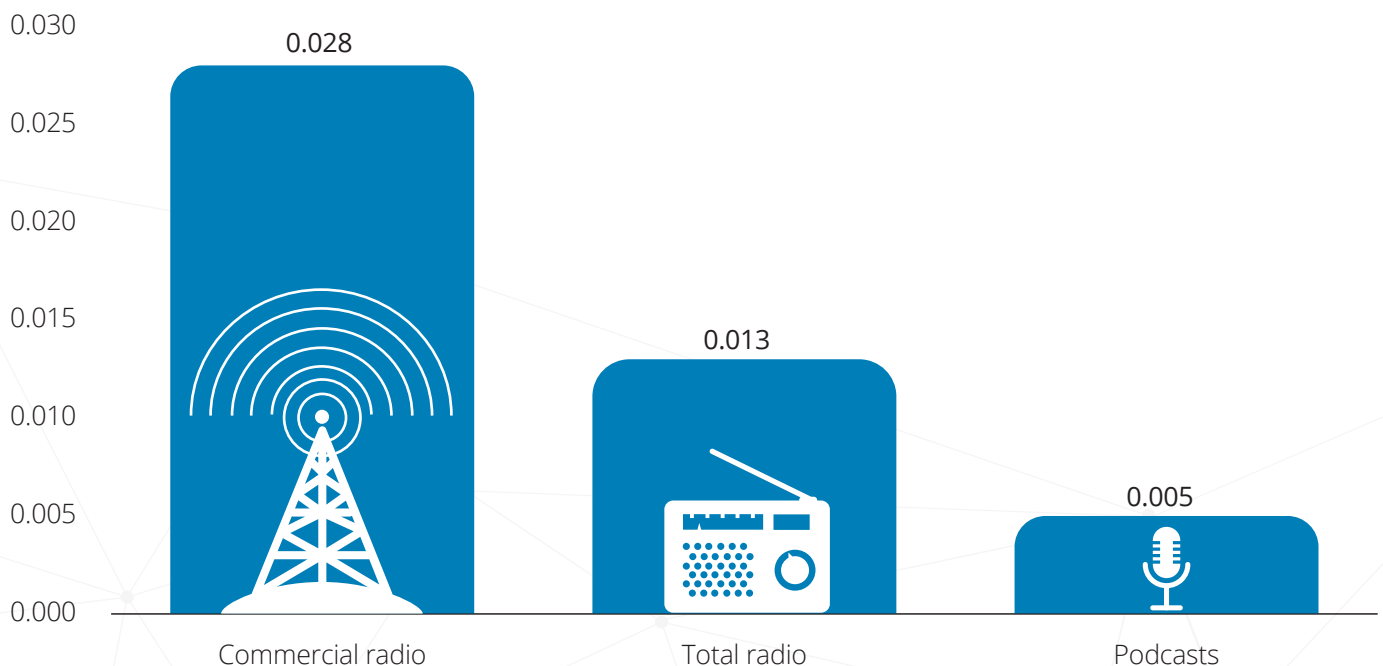
Source: Enders Analysis, Spotify's podcast play, September 11, 2019

There are multiple revenue sources for podcasts: advertising and sponsorships, subscriptions, events, merchandise, content marketing, contracts for branded podcasts, and listener donations.[50] Of these, advertising and sponsorships are likely to be the largest in 2020.

Sponsors' ads, typically read out by the host, are the most common formats. Listeners have embraced this. Most don't skip ads perhaps as it is difficult to know when the ad ends and content begins, but also as listeners are more receptive to ads on podcasts than other mediums.[51]

Payment-based formats are also being used. The Guardian asks for donations in its daily podcast. Luminary, a subscription-based service for podcasts costing $8/month has been launched in recent months. Himalaya, a new podcasting player linked to Ximalaya, the Chinese podcasting service, allow users to "tip" podcasts via small payments.

Other companies use podcasts to increase loyalty. Subscribers to The New York Times hear podcasts first.[52] The Economist considers podcasts as effective marketing funnel for magazine subscriptions.[53]

Broadcast radio uses podcasts to increase reach and to allow listeners to catch-up on missed episodes. Broadcasters can readily re-purpose a broadcast radio episode as a podcast. BBC has rebranded its on-demand radio app as BBC Sounds to reflect the growing preference for on-demand consumption and interest in podcasts.[54]

Enterprise podcasts generate no (direct) revenue, but are vehicles for marketing, brand-building, training, and recruitment. As of 2019, enterprise podcasting is already mainstream. Of the 25 largest Fortune 500 companies, 17 (68 percent) hosted their own podcasts on their corporate websites.[55]

The oversupply challenge

Most podcasts will struggle to monetise listeners. An initial obstacle is awareness. Low barriers to entry have enabled and encouraged the volume of podcasts to surge. As of 2019, over 750,000 podcast series encompassing 29 million episodes were available across the major podcasting services.[56]

As in other content industries, a small percentage of creators will generate most interactions. In music, the top 10 percent of artists dominate 99 percent of streams.[57] On YouTube, a study shows that the top 3 percent of channels got 90 percent of the viewership.[58] One analysis shows that 99 percent of all podcasts make no money.[59] Even if a show makes some money, they may not cover the cost of time to make the show, hosting and equipment.

Bottom line

In 2020, the biggest challenge for the UK's podcasters will be monetisation. Making a podcast that makes money may require new business models.

Mobile games took off with freemium and are now pivoting to ad funded (driven by the urge to advance in a game). There is also the donation model. There may also be the swipe to buy model.

A second challenge is discovery. Oversupply makes discoverability increasingly problematic. Brands that create podcasts should focus on quality and pare back the quantity. News UK halved the number of podcasts it makes and saw downloads double while ad revenue tripled.[60]

Higher-profile podcast producers may start curating their podcasts more thoughtfully, resulting in fewer but higher-quality podcasts on the market overall. Signs also point to a possible decline in user-generated podcasts. Many newer podcasts are interview-style podcasts (aka "bantercasts") that are insufficiently differentiated to compete in an already overcrowded market. These having failed to attract audiences or advertisers, will simply stop being updated, a phenomenon known as "podfade."[61]

Higher production values may also help: moving closer to the recording techniques used for audiobooks may allow for higher pricing.[62]

The niche audiences gained by some specialist podcasts could be a virtue. Their audiences are very likely to be those most interested in a topic – be this sci-fi from the fifties, or travellers to Transylvania. One podcasting platform in Sweden generates a fifty percent premium for advertising on podcasts versus broadcast radio.[63]

Should the rest of the audio industry be worried? For many radio broadcasters, the podcasts are a new way to deliver existing content: major cannibalisation is unlikely.

While most podcasts will struggle to gain revenues, the indirect benefits of podcasts, for example as an incentive to invest in another subscription, or to drive loyalty and engagement for content, may be far greater. We expect an increasing number of media outlets such as radio channels, newspapers, magazines, and TV shows will use podcasts to deliver content to those who prefer to consume it on-demand, in an audio format, and particularly on smartphones.

Prediction 4
AVOD arises: Half a billion pounds in 2020

Deloitte predicts that revenues from advertising video on demand (AVOD) will reach half a billion pounds in the UK in 2020.[64] This milestone will signal the continuing importance of advertising to the television industry and will also reflect the importance of the TV viewer to the largest advertisers.

The AVOD model has existed on the fringes for many years but is now becoming significant. At £500 million in value in 2020, this will be about 10 percent of all television advertising revenues. The forecast for 2020 equates to a 17 percent year-on-year increase, and is treble the 5 percent growth forecast for the UK ad market in general.[65] Forecast AVOD revenues would be lower than for subscription video on demand (SVOD), but still important. Direct SVOD revenues (as opposed to revenues as part of a general bundle) are forecast to be over £1 billion in 2020.[66]

Deloitte further predicts that by 2025 the majority of streamed services, both mainstream and niche, will rely on advertising as a significant or sole revenue source. SVOD's revenues will remain important, but few services will be able to rely on subscriptions alone.

We define AVOD as television or movie programming, delivered via the Internet, funded wholly or principally from advertising. AVOD content may be free, or at a lower price than if the service excluded advertising. AVOD will typically be watched on a TV set, or failing that, the largest screen available. Content may be requested from a video library, or a stream of a live television channel.

It will represent a vital revenue stream for all TV businesses, from traditional broadcasters to online-only providers, which are seeking every source of funding available to maintain spend on hit shows and major rights.

And, as on-demand content from all sources tends to be viewed by younger viewers, it should give advertisers a means to reach audiences that have eschewed mainstream TV genres like soaps and news.
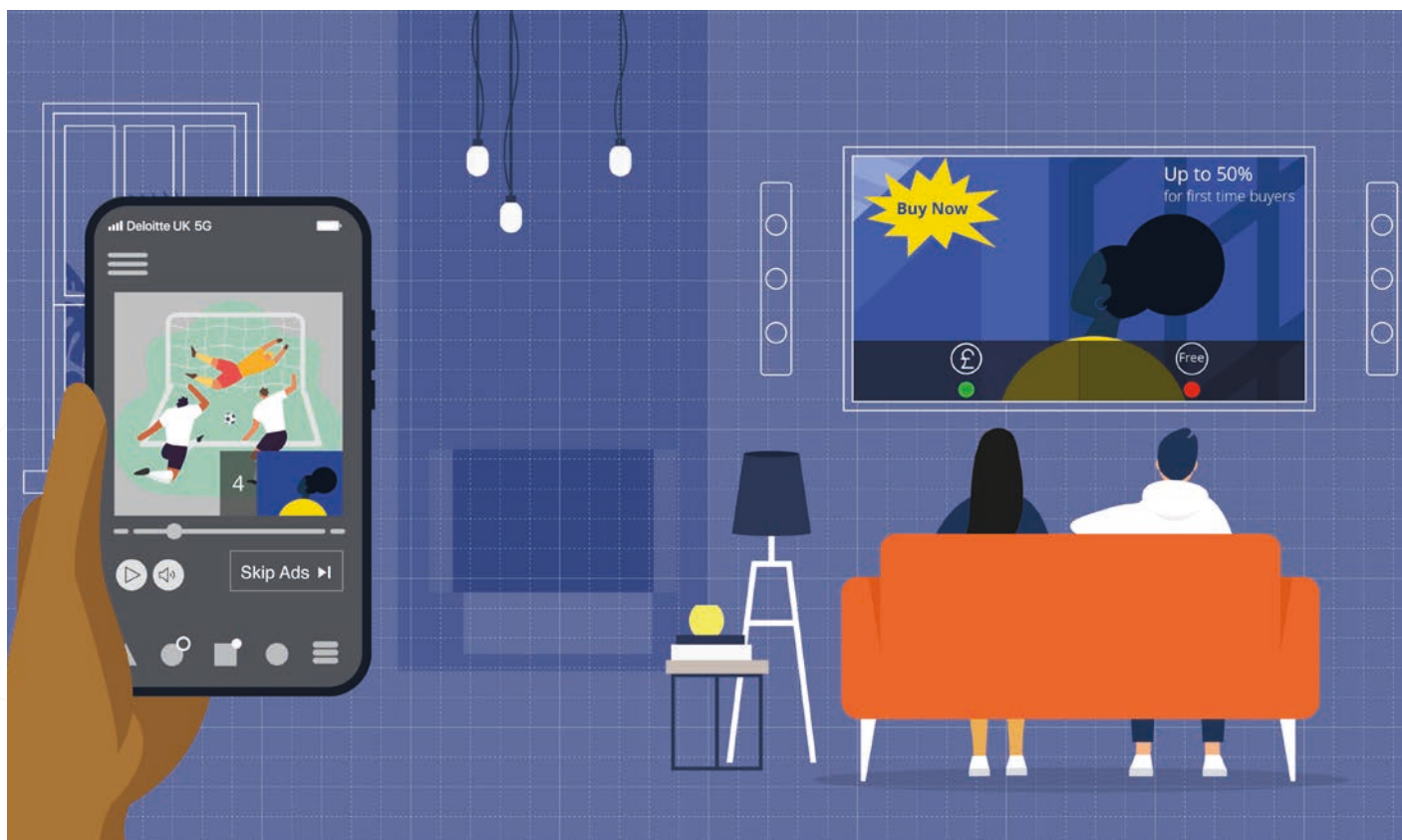
Traditional, live TV has been losing attention for almost a decade, with the youngest age groups having the greatest decline. In 2010 the average UK viewer watched 4 hours of traditional TV daily (live TV and catch-up on a TV set). By 2018 traditional TV viewing was 3 hours and 22 minutes per day, 11 minutes down on 2017.[67] Viewing trends for younger age groups are more concerning: in 2018, 16-34 year olds watched 83 minutes of live TV daily (versus the nationwide average of 202 minutes)[68]

The main beneficiaries have been subscription services (SVOD) like Netflix and Amazon, as well as platforms such as YouTube. Ofcom estimates that we now spend around 26 minutes per day on SVOD services, with a further eight minutes on similar services from existing broadcasters. Among 16-34 year olds, average daily viewing of YouTube was 64 minutes in 2018, with a further 52 minutes of SVOD.[69] The absolute number of viewers is falling too: the number of 16-17s watching TV today fell 55 percent from 2013 to 2018.[70]

The growth of SVOD services has made it harder and more expensive for advertisers to launch national marketing campaigns aimed at all age groups. There is very little, or in some cases no advertising on the largest SVOD services available in the UK: Netflix, Prime Video and Now TV.

AVOD may be a solution. One AVOD service, Pluto TV, which recently launched in the UK, reported that half of all its viewers on its US service, where it has 20 million monthly active users,[71] are 18-34 year olds:[72] this is considerably younger than for mainstream TV services in the US and the UK.

Indeed, the growth of AVOD in the UK trails the US market, where ad-funded, Internet-delivered TV programming has been growing fast in the last few years, with major players including Hulu, Pluto TV and Roku. Hulu offers an ad-supported option that halves the monthly fee from $11.99 (£9.40) to $5.99 (£4.70). Of its 82 million viewers, about 58 million, are on the ad-funded tier. Advertising generated about £1.2 billion in 2018.[73] Amazon is investing in its ad based IMDB service, which offers free content, funded by ads, in the US.[74]

In Asia Pacific, AVOD has long been the predominant model for offering multiple genres of content, including television, movies, music and video games. AVOD revenues for the region were estimated to be £8.4 billion in 2018.[75]

AVOD will grow, complementing SVOD as it does so, and perhaps persuading some ad-free SVOD services to start selling advertising as a means to fund rising content costs.

Bottom line

The UK TV market has long been a heterogeneous market for television. The rise of AVOD reflects that:

- Viewers have variable budgets and willingness to pay;[76]

- The TV industry faces rising costs, and needs multiple sources of funding, of which advertising is a core component.

AVOD is a shift in the delivery of content, including ads, however its capability to deliver marketing messages has not yet been determined. One thing that we do know for certain is that it does not - and cannot - deflect the underlying economics of the TV market: every penny counts. Every consumer would love less ads; every TV company would like viewers to pay more. For consumers that cannot afford to or do not wish to go ad free, the pragmatic compromise is TV with ads, delivered via any distribution network.

For over a decade, the ratio of pay TV and free-to-air homes has been largely unchanged. While the number of free-to-air homes that top up content with SVOD is growing, the majority of SVOD subscribers are also traditional pay TV subscribers. Between 2016 and 2018 the proportion of traditional pay TV homes barely changed;[77] over this period SVOD households increased over 50 percent from 7.7 million to 11.6 million.[78] There is a significant, stable swathe of consumers who can only afford or wish to spend under a tenner a month on TV content.

For the TV industry AVOD – in any format – offers an additional route to monetise expensively acquired content. Advertising offers crucial incremental revenues to pay for talent in all its forms: actors and presenters, writers and photographers, sports and serialisation rights, set and costume designers and more. Broadcasters should note that moving into paid-for AVOD (similar to Hulu's lower priced tier) will require setting up a customer management capability.

For advertisers, AVOD is a route to reconnect with TV audiences, particularly younger ones. TV advertising may be a little past its peak, but it remains a powerful, possibly unique medium, for building brands.[79] Thirty second stories with taut scripts and high production values, shown on a large screen with the volume on, remain far more persuasive than most advertising alternatives, as of 2020.

For consumers, AVOD provides access to a wider portfolio of programming than they may otherwise be able to afford. Households are likely to end up with a basket of multiple ad-free subscription services, ad-subsidised services, and entirely free content.[80]

For TV set vendors, AVOD is a means of monetisation post the sale of the TV set. 50-inch connected TVs are the 4K shelving for content providers' apps, with prime positions that should attract increasingly attractive premiums.[81]

Prediction 5

Robots on the move: Professional service robots set for double-digit growth

Deloitte predicts that almost one million robots will be sold for enterprise use in 2020, up 18 percent from 2019, generating £27 billion in revenues for the year.

There are two distinct enterprise robot markets: industrial and service. They do different tasks and cost different amounts. They have had, and will continue to have, distinct growth trajectories.

Of the almost one million enterprise robots forecast to be sold in 2020, just over half will likely be professional service robots, generating more than £13 billion in revenue. This is 30 percent up on 2019, a much steeper growth rate than for industrial robots, which are expected to account for £14 billion in 2020, a nine percent year-on-year increase.

Industrial robots will remain important for years to come but it is the professional service robot market that should grow fastest in the near term, catalysed by the launch of 5G and advances in artificial intelligence (AI) chips.

A well-known type of industrial robot, found in factories around the world, is the mechanical arm. The global installed base of industrial robots, which have been around since the 1970s, is significant: between 2.5 and 3.0 million industrial robots were operational in 2019. By 2021, this global installed base is likely to be 93 percent larger than in 2016, but still a small fraction of the human workforce. Once installed, industrial robots last a long time: A decade of useful life (80,000–100,000 hours of work) is common.[82]

The biggest users of industrial robots are in manufacturing, principally for automotive and electrical or electronics goods. Robots on assembly lines build cars; in the electrical/electronics industry robots place chips on circuit boards. In 2018, these two industries represented 60 percent of all global demand for industrial robots, with 120,000 units for automotive and 110,000 for electrical/electronics.

The market for professional service robots has only taken off in the last decade. These robots are mainly used outside of manufacturing and vary significantly in form, purpose and application area. The majority are designed to automate time-consuming, repetitive, or dangerous tasks.[83] Most are mobile or semi-mobile and wheeled. For example, for a medical technology company in Denmark, used mobile robots for internal goods transport within its premises. This saved employees an average 7.5 kilometres a day in walking goods on a cart between departments.[84]

Thus far, professional service robots have been most popular in the logistics (warehouse or fulfillment), retail, hospitality, and health care industries.[85] Just under half (49 percent) of the roughly 360,000 professional service robots sold to enterprises in 2019 went to logistics companies. Second and third place go to inspection and defence, which accounted for another 33 percent and 4 percent, respectively, of 2019's professional service robot unit sales.

What exactly is a robot? Shifting categories and blurring lines

As time goes on, the distinction between various types of robots—industrial and service, enterprise and consumer—is becoming less clear. Is an automated dolly that carries partially built automobiles from place to place in a smart factory a professional service robot or an industrial robot? Even the definition of what we consider to be a robot is in flux, as companies start to put more advanced capabilities into new form factors such as speakers.

The US is suffering from a nursing shortage that is likely to get even worse in the near future, as more than a million retire by 2030 and the population ages.[86] Several Texas hospitals are turning to robots to fill the gap. But instead of automating nursing tasks such as taking vitals or changing bedpans, the robots instead augment existing nursing staff by performing non-patient-facing work.

Meet Moxi (figure 1), a mobile service robot with a light-duty industrial arm manufactured by a Texas company called Diligent.[87] Connected to the hospital network and patients' electronic health records, Moxi executes simple tasks such as dropping off specimens or placing an admission bucket—fresh supplies for a new patient—in cleaned rooms ready to receive patients.

These are not particularly difficult tasks, but for overworked nurses who have patients to care for, not having to do them can make all the difference.

But Moxi doesn't just slink from room to room executing menial tasks. It also has, perhaps surprisingly, a social element, with nurses greeting it, patients taking selfies with it, and children writing to the robot's creators asking where it lived.[88] The robot wanders around the hospitals once per hour, flashing hearts (where its eyes are) at passersby.

Figure 1. Moxi is challenging old ideas about what robots are

Still more confounding is the prototype of Alice (figure 2), a robot originally designed to alleviate loneliness in the elderly and now being explored to help those with dementia as well.[89] Without arms and without wheels, Alice can have a conversation, move her head, and show simple facial expressions. One can imagine Alice 2.0 having wheels, or even arms, for simple tasks such as fetching things or helping with feeding. But even in her current configuration, she is forcing us to broaden our definitions of what a robot is.

Figure 2. Alice can help alleviate loneliness among the elderly and those with dementia

It's convenient today to categorise robots by their primary use: industrial, service, entertainment. But robots like Moxi and Alice show that such categories are by no means carved in stone. Perhaps the broader lesson is that it's not what one calls a machine that's important—it's what the machine can do.

The professional service robots' growth in 2020 and in the medium term should be driven by the launch of 5G, and the falling prices and rising power of edge AI chips. The combination of 5G and edge AI chips can solve many challenges that limit professional service robots' practicality today.

Connectivity is one such challenge. Maintaining reliable connectivity for professional service robots, which usually need to be moving around factories or warehouses, has historically been very challenging, principally because of metallic obstructions from shelving, conveyor belts and indoor vehicles. The next release of 5G, Release 16, which is being finalised in June 2020, should address these challenges.

5G Release 16 is designed to offer a 99.9999 percent reliability rate, which means an expected downtime of just 5 minutes per year – which in a manufacturing environment is critical.[90] Network slicing, which allocates network performance to different tasks based on their priority, can further enhance reliability for top-priority tasks (for more information, see the Prediction "Industrial 5G: Enterprise untethered"). Latency can be one millisecond, for applications that require this.

Edge AI chips can perform processor-intensive AI tasks on the actual robot, rather than via cloud-based processing.

Advances in chip design also mean better performance and power consumption. Chips designed specifically for AI computations draw much less power, and fewer are needed for a given amount of processing than the traditional chips such as graphics processing units (GPUs).

In addition to the robots used by enterprises, there are two large and growing consumer robot markets. Consumer service robots, designed for tasks such as vacuuming, mowing the lawn, and washing windows, sold 17.6 million units in 2019, up 44 percent from 2018. And entertainment robots—mainly toys made in Asia, some of which are fairly sophisticated—sold 4.5 million units in 2019, 10 percent more than in 2018. Although 97 percent of all of the robots sold each year are consumer robots, they are responsible for just one out of every seven dollars of robotics industry revenue.

Robots in the UK

Robots have been less enthusiastically adopted in the UK. The country ranked 22nd in terms of robot density, with 85 machines per 10,000 employees in the manufacturing industry. This is significantly lower than the European average of 106.[91] In 2015, there were just 10 robots for every million hours worked, significantly lower than Japan with 167.[92] New installations of industrial robots fell 3 percent in 2018 to 2,306 units. This followed 31 percent growth in 2017.[93] About half of all robots are used in car manufacturing, with the food industry only now starting to use robots in their processing.[94]

There are two main reasons for the lower adoption rates. First, the UK's economy is manufacturing-light, but services-strong. Manufacturing is 9 percent of GDP, and services is approximately 70 percent.[95] The use case for robots in a manufacturing-light market such as the UK is weaker than in other European markets, such as Germany where manufacturing generates 21 percent of GDP.[96]

Secondly, the UK has benefited from access to affordable labour, predominantly from Eastern Europe. Many businesses may have opted to use reasonably priced labour rather than to invest heavily in robots. However, recent political developments have had and are likely to continue to have an impact on workforce availability predominantly in the agriculture and logistics industries. This may result in significant shortages for jobs such as seasonal fruit pickers,[97] or warehouse workers. Robots could provide a viable solution to these sectors.[98]

Britain's current low robot density levels, makes it ripe for investment and could provide an answer to its productivity issues. According to the Office for National Statistics, there are 1.5 million jobs at high risk of having some tasks automated,[99] making this market a fertile soil for robots adoption, but also development. British start-ups currently account for 6 percent of the global robotics market.[100] The government has recently, as of October 2019, launched "the UK's biggest research programme" dedicated to designing safe and trustworthy autonomous systems which can care for the elderly.[101]

Bottom line

What will be challenging is for companies to assess if and when professional service robots are the right tool for the job. Their price, power, and flexibility—driven by advances in 5G and in edge AI chips – will be very different in 2025 than in 2020. Increasingly, robots are no longer just about making goods better, cheaper, or faster. A new generation of more capable and flexible robots will increasingly impact decisions about where to manufacture goods, which goods to manufacture, and how to cope with the challenges of scarce or high-cost labour.[102] Correctly anticipating use cases and ROI will be an important task for strategists going forward— both for those who make and sell robots, and for those who use them.

Prediction 6

The smartphone multiplier: Towards a trillion-dollar economy

Smartphone sales, to state the obvious, are big business, globally and in the UK. But that market may soon be emulated by total revenue from products and services that are sustained by, and depend on, smartphone ownership— also known as the "smartphone multiplier". From selfie sticks and screen protectors to mobile ads and apps, smartphone multiplier revenues are likely to forecast smartphone sales a few years.

We predict that the smartphone multiplier will drive $459 billion (£361 billion) of revenue globally in 2020 alone.[103] This is a 15 percent increase over the prior year.[104] With smartphone sales in 2020 expected to reach $484 billion (£381 billion),[105] the entire smartphone ecosystem—smartphones plus smartphone multipliers—will be worth over $900 billion (£700 billion), or close to one trillion dollars. Spend on cellular and fixed-broadband connectivity is additional to this, and is likely to be hundreds of billions of pounds in spend in 2020.[106]

The UK's smartphone multiplier is also in glowing health, and will be close to £16 billion in 2020, 12 percent higher than in 2019.[107] This compares favourably to the mobile operators' retail revenue value of £14.6 billion generated in 2018.[108]

In the medium term, we expect global smartphone multiplier revenues to grow at between 5 to 10 percent annually through 2023, lifted by continued robust growth in its largest constituents.

What does the smartphone multiplier consist of?

The smartphone multiplier includes a wide array of products and services (figure 1), most of which fall into one of three categories:

- **Hardware**, including audio accessories, power-related accessories, adjunct devices such as wearables and smart speakers, camera accessories, cases and screen protectors, phone stands, and spare parts

- **Content,** including mobile advertising and software content spanning games, music, video, and many other content types

- **Services,** including repairs, insurance, cloud storage, and business software
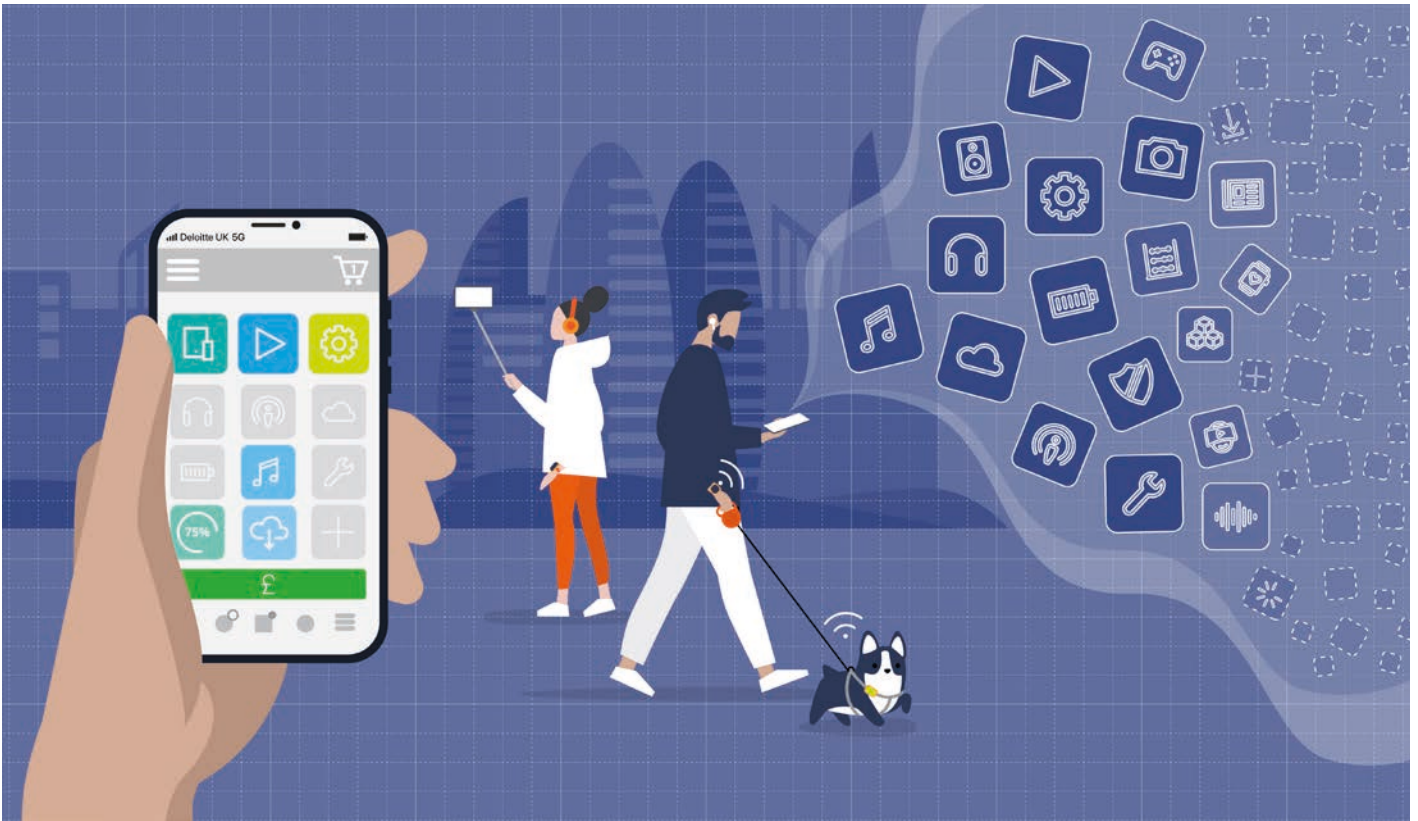
Revenues related to the sale of wearables and smart speakers can also be linked to smartphones. While these are distinct devices in their own right, their utility is highly dependent on smartphones.

Figure 1. Global smartphone multiplier value in 2020 (£ billion)
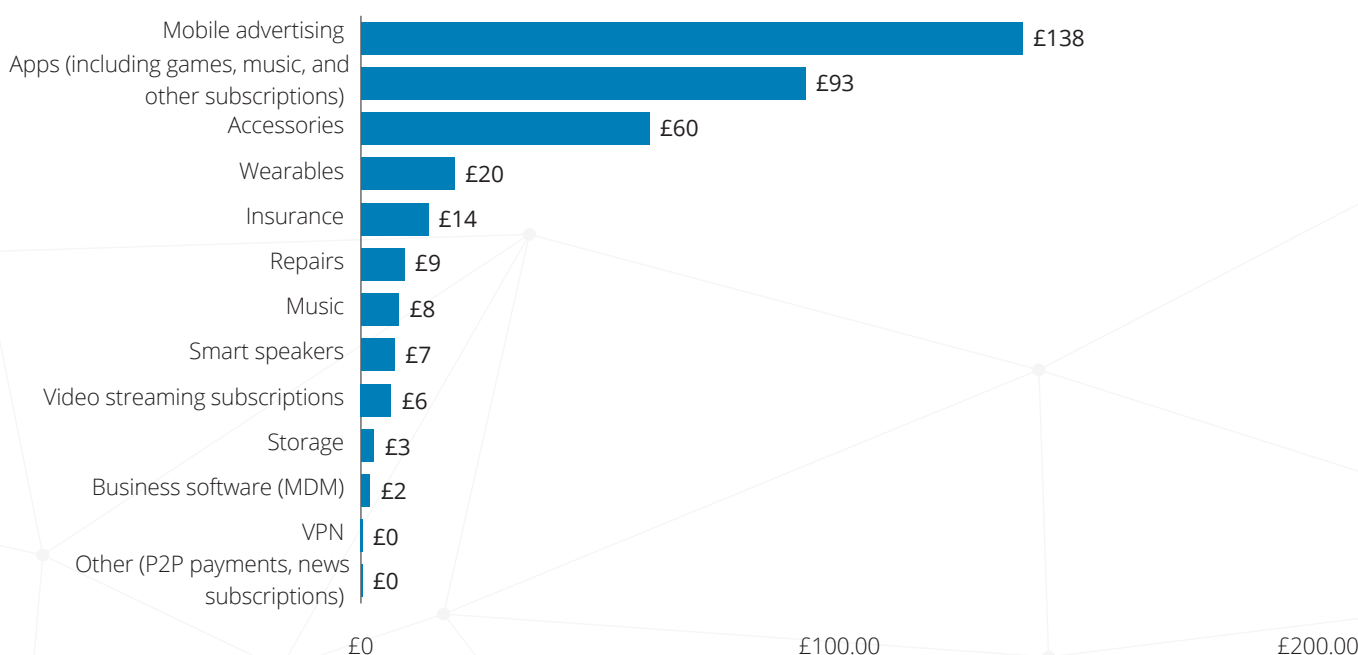
Source: Deloitte analysis of data from App Annie, IFPI, Zenith, and others.

In 2020, we expect the three largest elements of the global smartphone multiplier to be mobile advertising, apps (mostly games), and hardware accessories. We predict these three elements together to generate £291 billion, 81 percent of the total, in 2020.

Mobile advertising: Billions of pounds' worth

Mobile advertising, the smartphone multiplier's top money-maker, has thrived despite the smartphone's small screen. While the phone's screen is far smaller than TVs or laptops, it is ubiquitous, heavily used, deeply personal and offers functionality (such as multiple cameras and near-permanent connectivity) which is not available on other devices on which ads are displayed). We predict that smartphone advertising will reach about £138 billion in 2020, a 18 percent year-over-year increase. The UK market will near the £9 billion mark, rising at between 10 to 15 percent.

Mobile advertising spend may continue to grow strongly in subsequent years, with growth of 13 percent in 2020-2021 globally.[109] Particularly notable is that online ad growth is being propelled by online video and social media—genres that are bolstered primarily by sustained advances in smartphone technology.[110] New mobile ad formats such as visual search, whose usage remains nascent in the UK, should also prove popular on smartphones.

Accessories: Going wireless

The second largest contributor to the smartphone multiplier market in the UK is accessories, expected to generate £2.1 billion in 2020, and £60.2 billion globally. This market consists of three principal subcategories: audio, power, and protection. Of these, audio and power are likely to experience significant growth over the medium term.

Some consumers may choose to enhance their existing smartphones through accessories and defer the purchase of the latest device. They may prefer to accessorise their phone with a new pair of wireless headphones, or, more prosaically, replace their battery.

The aggregate spend on accessories should be bolstered in the medium term by mass market upgrades to categories such as wireless headphones or wireless charging – as of 2020 both are niche, with only a minority of smartphone owners having upgraded thus far. As of mid-2019, only a quarter of UK adults respondents had wireless headphones (fitting over the ear), and 17 percent had wireless ear buds (fitting in the ear).

We would expect tens of millions of UK smartphone owners, especially those in younger age groups, to spend over £100 annually on ancillaries.

Apps: Games, games, and more games

The third-largest component of the smartphone multiplier market is apps, expected to generate £93 billion globally in 2020.[111] We expect the value of app stores to continue to grow in the near term, driven primarily by spend within existing apps.

Smartphone-based game apps are the most lucrative. They are expected to generate £63 billion globally in 2020, up by over 10 percent from 2019.[112] For the UK, consumer spend on mobile (smartphone and tablet) games is forecast to reach £1.2 billion in 2019, growing nearly 20 percent year on year, according to App Annie. Deloitte estimates that the 25 million UK consumers who play smartphone games, spent close to one billion pounds on games in 2019. Revenues may be lifted further by the availability of mobile games subscription services.

Bottom line

The smartphone market is nearing its peak in terms of unit sales per year. However, the UK's smartphone revolution is far from complete: its power as a foundation for multiple associated revenue streams – hardware, content, advertising, and services – is growing apace.

Smartphone vendors and mobile operators are likely to put stronger emphasis on these categories to offset the decline in smartphone sales.

Content providers, financial service providers, high street retailers, central and local government and indeed every other sector will look at how to grow revenues from the vast base of smartphones owned by UK consumers. Despite the high level of adoption, the reliance on smartphones is still patchy – and therein lies the potential. For example, in 2017, only 5 percent of UK POS spend was through a mobile wallet. By contrast in China the volume of mobile payments was $41.3 trillion (£33.7 trillion) in 2018.[113]

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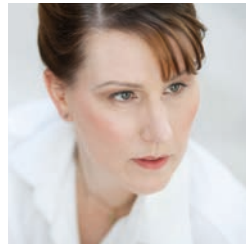+44 (0) 20 7303 0197
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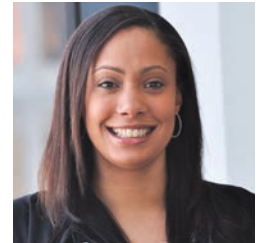
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104. Across the document the currency conversion rate from US$ to GBP is 1 US$ = 0.7862 GBP. This is the average rate between January 1, 2019 to November 11, 2019.

105. Deloitte Global estimates based on various sources including 4A, Zenith advertising expenditure forecasts, September 2019. App Annie, The state of mobile 2019, 2019. International Federation of the Phonographic Industry, IFPI global music report 2019, April 2, 2019.

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107. There are over one billion broadband connections globally. Average revenue per user varies, and in many developed markets the broadband connection is conditional upon the rental of a landline. In developed markets monthly broadband costs are between £16 and £39 per month, equivalent to £187 to £472 per year. Broadband subscriber numbers are sourced from Point Topic. Also see ISPreview, Global fixed broadband subs total 1.047 billion as fibre dominates, July 23, 2019.

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112. To arrive at the total app store revenues, Deloitte Global has considered various publicly available information such as App Annie, The 2017–2022 app economy forecast: 6 billion devices, $157 billion in spend & more, May 2, 2018.

113. To arrive at the total app store revenues, Deloitte Global has considered various publicly available information such as App Annie, The 2017–2022 app economy forecast: 6 billion devices, $157 billion in spend & more, May 2, 2018.

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