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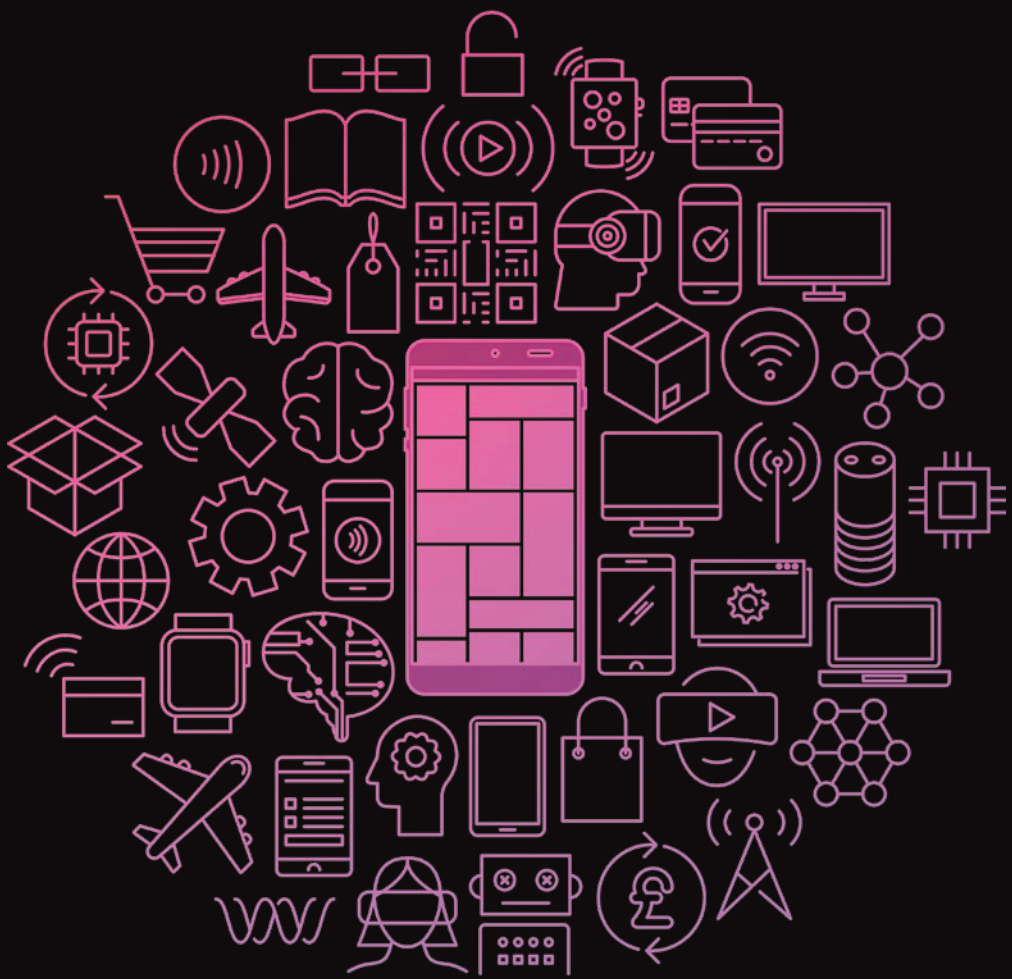

The Deloitte Consumer Review

Digital Predictions 2018

March 2018

Contents

About this report
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Foreword	The digital consumer	Smart(er) phones	The machines are learning	Connectivity takes off
Augmented Reality bites	The subscription prescription	Block by blockchain	Contacts	

Foreword

I'm pleased to share with you the latest edition of the Deloitte Consumer Review. In this report we look at how digital technology and innovation continues to redefine the world of the consumer.

Drawing upon the Deloitte Global TMT Predictions report, we share six digital technology trends that will have implications for consumers and the businesses that serve them.

Our predictions for 2018 focus on the different ways in which technology is being used to enhance the consumer experience and transform the way that consumer businesses operate. In some cases the technology may be displacing humans, as with self-service; in others it is augmenting their abilities, for example with concierge applications. One thing we can be sure of is that the nature of work will continue to morph to exploit these new digital capabilities.

Last year we predicted the rise of less-mainstream technologies such as 5G connectivity, driverless cars and biometric sensors. And we have seen these continue to gather momentum, acceptance and adoption.

This year, we shift our focus to look at innovative technologies that are set to drive the next phase of disruption in the consumer market such as blockchain, augmented reality, and artificial intelligence. But at the heart of things remains the smartphone. Almost all of us have one, they get more powerful every year, communicate faster, operate in more locations, offering an ever-increasing range of applications that embed them in our lives to make things easier – it seems we just cannot live without them…yet!

Our six trends for this year are:

1. Smart(er) phones: smarter applications – innovations that are likely to drive smartphone design, and influence smartphone use in the next ten years.

2. The machines are learning – how machine learning is moving into the mainstream as barriers to adoption fall.

3. Strap in: connectivity takes off – inflight connectivity has profound implications for the industry as a whole, promising to revolutionise how we think about in-flight entertainment and shopping.

4. Augmented Reality bites – the growing adoption of Augmented Reality (AR) and as both a social and commercial tool.

5. The subscription prescription – the growth in 'subscription retail' as brands look to get closer to consumers.

6. Rebuilding the supply chain – block by blockchain – blockchain technology has the potential to fundamentally disrupt the consumer supply chain.

From a dominant role in the consumer-facing 'front office', we are increasingly seeing digital technology play a more disruptive role in business operations of the 'middle or back office'. In some cases, a gap has grown between what consumers expect in terms of a brand's products and services, and what those brands are able to provide. We believe these gaps will close, as the focus for digital investment migrates towards improving the agility, and capability of the operational organisation in order to deliver on the evolving consumer promise of the 'front office'.

We hope you find this report insightful, and thought provoking, and we welcome your feedback.

Phil Neal
Digital Transformation Lead,
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Foreword	The digital consumer	Smart(er) phones	The machines are learning	Connectivity takes off
Augmented Reality bites	The subscription prescription	Block by blockchain	Contacts	

The digital consumer

With digital technology creating a more connected world, the power structure in the relationship between the consumer and brands has shifted in favour of the consumer.

Empowered by technology that allows them to connect and share information with anyone, anywhere in the world, at any time, today's digital consumer expects businesses to react to all their needs and wants instantly. This shift in power was first driven by the home computer, then the laptop and in the last ten years, the smartphone. In the next ten years, smartphone technology will improve, offering even more freedom and providing even more power to the consumer. But the smartphone will not be alone in empowering the consumer. A new wave of technology, including the Internet of Things (IoT), Artificially Intelligent home hubs, and various wearable technologies will allow consumers to move 'beyond the glass' and will shift the balance of power even further in favour of the consumer.

The evolution of the connected device will impact businesses and consumers alike. Consumer demand will increasingly be satisfied via a mobile, or home hub experience. From search to payment, the smartphone and devices such as the Amazon Echo and Google Home will play an integral role in how consumers buy goods and services. But businesses will also be impacted as the mobile phone increasingly becomes the device of choice in the workplace and the IoT transforms the supply chain. Over the coming years a key objective for businesses will be to improve the productivity of their workforces, and mobile is likely to play a major role in helping businesses to meet that objective.

The focus will be on using technology to make all workers more productive. 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 fundamentally disrupted. The entire consumer supply chain, from production through to stock management, customer service and all the way to the 'last mile' of delivery and after-care service will all be disrupted, and ultimately improved by the power of connected devices.

The smartphone still offers new possibilities

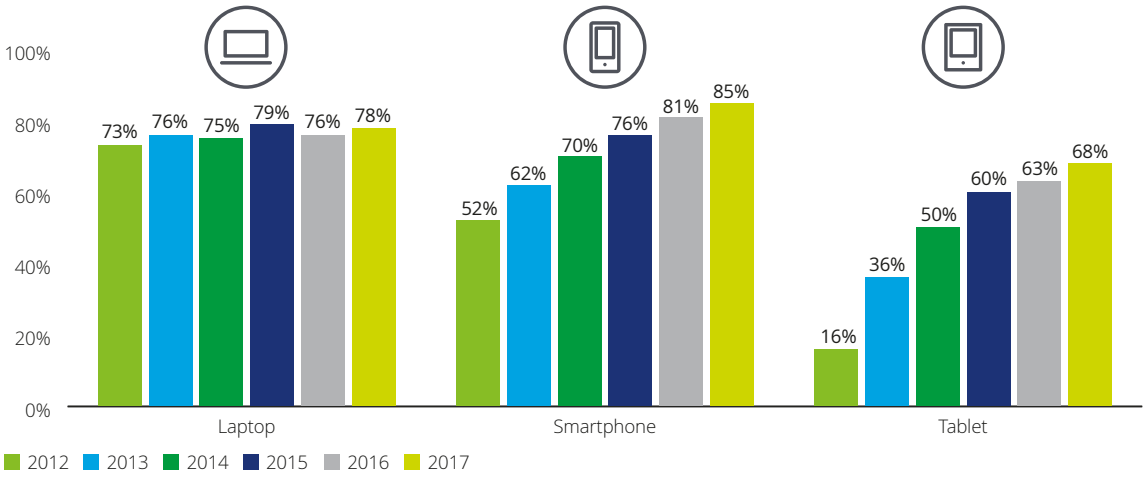
In spite of the growth of new connected devices, the smartphone remains the key technology of our time, with penetration and usage levels still expected to increase in the next few years. In the UK, smartphone penetration among adults is now 85 per cent and we would expect this to reach 90 per cent by 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, making it by far the most used digital device when compared to computers, laptops and tablets.[1]

Usage is also likely to become even more extensive over the coming years, as the capability and utility of smartphones continue to increase. Over the next ten years we are likely to witness the arrival of Gigabit/s connectivity speeds, even faster processing power, 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 how we operate on a day-to-day basis as it offers solutions for both our work and social lives.

Foreword	The digital consumer	Smart(er) phones	The machines are learning	Connectivity takes off
Augmented Reality bites	The subscription prescription	Block by blockchain	Contacts	

Figure 1. Smartphone, laptop and tablet penetration among UK adults, 2012-17

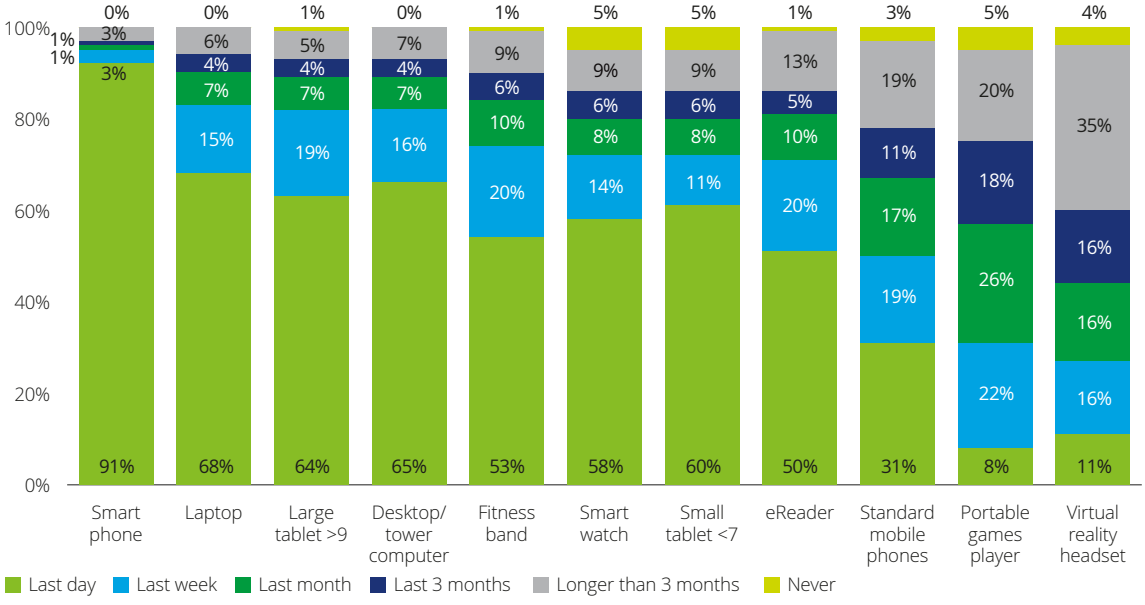
Question: Which, if any of the following, connected devices do you personally own or have ready access to?



Weighted base: (2012/2013/2014/2015/2016/2017). All UK respondents 18-75 years
Source: Deloitte UK, Global Mobile Consumer Survey, May-Jun 2012 – May-Jun 2017

Figure 2. Frequency of usage by device

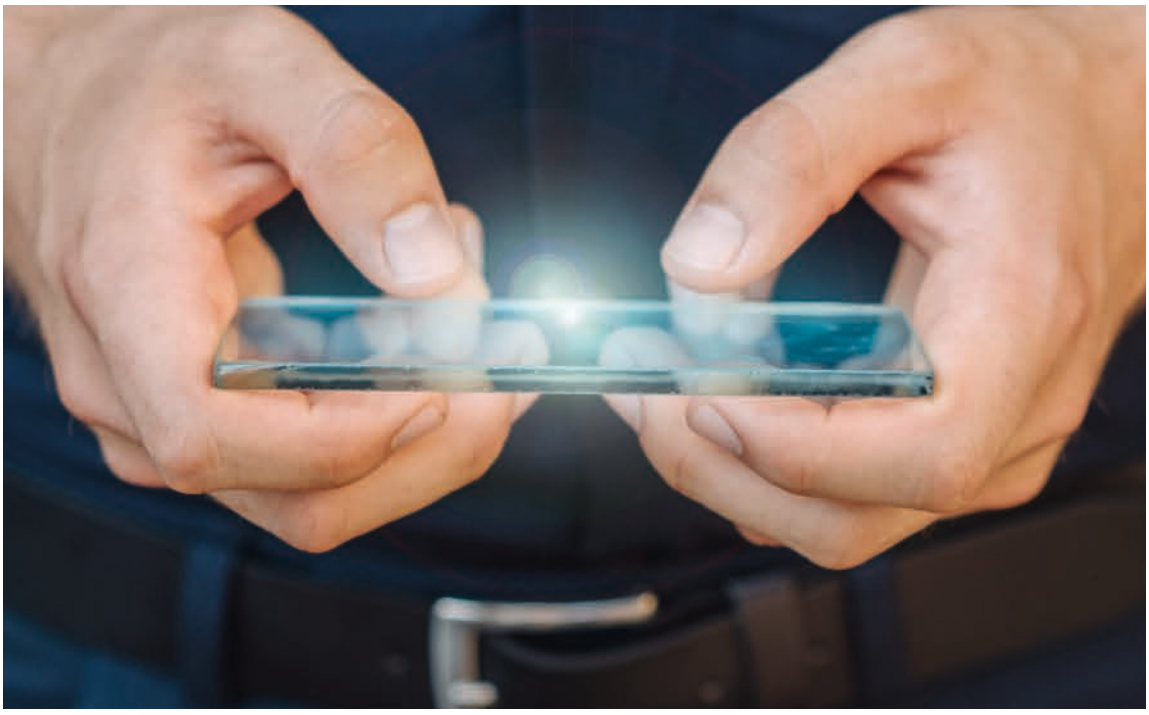
Question: Thinking of when you used each device, was it within the...?



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

Foreword	The digital consumer	Smart(er) phones	The machines are learning	Connectivity takes off
Augmented Reality bites	The subscription prescription	Block by blockchain	Contacts	



Smart(er)phones: smarter applications

The smartphone is a once-in-a-generation innovation whose full potential has yet to be realised. The smartphone is set to become ever more central in the everyday life of the consumer. As technology develops and consumer behaviour shifts, the smartphone will become the preferred device for countless consumer activities.

Despite their seeming omnipotence in the modern world, there is still room for the smartphone to increase its global reach. Deloitte predicts that by the end of 2023, penetration of smartphones among adults in developed countries will surpass 90 per cent,[2] a five percentage point increase over 2018. Smartphone sales will reach 1.85 billion per year in 2023, a 19 per cent increase over 2018 and equivalent to over five million units sold per day.

The main driver of higher adoption rates in each market will be take-up among older age groups. We would expect ownership among 55-to-75-year-olds to reach 85 per cent in developed countries in 2023, a ten percentage point increase over 2018.[3]

Foreword	The digital consumer	Smart(er) phones	The machines are learning	Connectivity takes off
Augmented Reality bites	The subscription prescription	Block by blockchain	Contacts	

The secret to the smartphone's success over the next five years is likely to be the introduction of an array of innovations that are largely invisible to its users but whose combined impact should feel tangible in the form of greater ease of use (such as facial recognition based on depth maps) or improved functionality (for example, for maps and photos). The 2023 smartphone should offer superior performance across a range of business and consumer applications, thanks to enhanced connectivity, processors, sensors, software, artificial intelligence and memory.

Case study: Smartphones in retail

The recent public opening of the Amazon Go store in Seattle and the Alibaba Hema stores show just how important smartphones could be to the future of retail. In China, Alibaba has fully integrated the mobile into the shopping experience. Blending the online with the physical, the stores look like normal neighborhood supermarkets, with a selection of packaged foods, produce, beverages and other goods, every item has a scanable bar code, which yields price and product information, including origin and any backstory on the item. Customers scan the code and complete their electronic purchase through Alipay at a checkout register before leaving the store.[4] In the US, Amazon has taken this one step further, using the phone as a pass card to access their store, removing the need for interaction with it during the rest of the shopping trip, by utilising the same technology used for driverless cars such as computer vision, sensor fusion and deep learning. All you need is an Amazon account, the free Amazon Go app and a recent-generation iPhone or Android phone. After using your phone to access the store, you can put it away and Amazon's 'Just Walk-Out' technology takes care of the rest – you do not even need to stop to pay.[5] This approach will spread throughout the consumer industry, with smartphones becoming an integral part of buying a car, travelling through an airport, checking into a hotel or dining out.

The smartphone's growing capability and ubiquity will strengthen its strategic importance to the private sector. It will also likely be regarded as the primary way to communicate, interact and transact with consumers.

Consumer demand for a mobile friendly experience will grow as the smartphone becomes more pervasive in our lives. But this does not just mean mobile friendly websites for retailers, it means integrating the mobile experience into every element of the customer journey. For example, allowing consumers to book, pay for and access tickets on their mobile has become commonplace across the travel and hospitality sector. As a result, a growing number of applications are likely to become optimised for smartphones. Currently, there are a few discrete, mundane but common processes, such as checking the weather and the news, getting bus times or simply searching for information for which the smartphone is the preferred device. 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.

In terms of consumer applications, payment has already become optimised for mobile with Apple Pay and Samsung Pay built into many new smartphones, and Alipay and WePay used extensively across different parts of the world. The technology is in place for businesses to accept mobile payments and consumer adoption is growing. In time, payments from mobile devices will overtake traditional methods as the method of choice for consumers.

And it's not just the physical world where smartphones are disrupting retail. Mobile commerce is growing quickly, taking a significant share of overall retail sales. For example, it was estimated that in the UK, around 41 per cent of online sales took place through mobile devices during the 2017 Black Friday weekend.[6]

Foreword	The digital consumer	Smart(er) phones	The machines are learning	Connectivity takes off
Augmented Reality bites	The subscription prescription	Block by blockchain	Contacts	

Case study: Mobile shopping China

China is leading the way in m-commerce. The smartphone has been the device of choice for Chinese consumers since 2015, when they first made more purchases through smartphones than on computers. Sales in China have continued to shift towards mobile since 2015 with over 75 per cent of online sales, equating to over $1 trillion, expected to be conducted on mobile devices in 2018.[9]

Although this reflects a wider global trend, there are a number of specific factors that have driven China's adoption of the smartphone for online shopping at a faster rate than some other developed countries. For example, the early stages of China's digital revolution coincided with the rapid growth of China's consumer economy and the demand for more luxury and disposable goods from China's growing middle classes. As a result, there was an immediate demand for online shopping, but falling mobile prices and cheaper network investment meant that mobiles rather than computers offered a means to connect to the web and satisfy this demand far more cost efficiently than via the digital networks that are more commonplace in developed countries like the UK and US. As Chinese consumers have become more sophisticated and competition has intensified, companies like Alibaba have been forced to innovate. The result is one of the most advanced digital marketplaces in the world.

In terms of the scale of opportunity, China offers a glimpse of what is possible. Mobile use in China dwarves that of other nations. According to a recent study, China has over one billion mobile devices and accounts for a quarter of all global mobile spending. Use of mobile apps is so prevalent in China that users spent well over 200 billion hours using apps (over 4.5x the time compared to the next largest market).[7] China also leads the way in mobile commerce. For example, 90 per cent of Alibaba's sales were processed via mobile on Singles' Day in 2017.[8] The UK is nowhere near the ceiling for m-commerce adoption, but we may soon see mobile overtake the laptop as the preferred device for browsing and shopping online. In order for this to happen, retailers and consumer businesses alike will have to optimise their e-commerce platforms for mobile browsers and apps, making it possible for consumers to shop on mobile devices without suffering an inferior shopping experience.

More applications means greater utility

As smartphone optimised applications grow to meet consumer needs and wants, the rationale for owning a smartphone should accordingly edge higher, and it may become ever harder to live without one. The more applications a smartphone supports, the greater its utility.

The impact of this in the UK can be seen in Figure 3 which shows that the smartphone is absorbing the functionality of other devices such as the PC and laptop, and displacing them as the preferred device for a growing range of applications.

Consumers rarely turn down the opportunity for convenience, and by the end of 2023 the smartphone is likely to have assimilated various additional non-PC functions not shown in Figure 3.

Foreword	The digital consumer	Smart(er) phones	The machines are learning	Connectivity takes off
Augmented Reality bites	The subscription prescription	Block by blockchain	Contacts	

Figure 3. Device preference for various activities, UK (2016 versus 2017)
Question: Which, if any, is your preferred device for each of the following activities?

	Total	Male	Female	18-24	25-34	35-44	45-54	55-64	65+
Browse shopping websites	Laptop	Laptop	Laptop	Laptop	Laptop	Laptop	Laptop	Laptop	Desktop
Make online purchases	Laptop	Laptop	Laptop	Laptop	Laptop	Laptop	Laptop	Laptop	Desktop
Online search	Laptop	Laptop	Laptop	Phone (was laptop)	Phone (was laptop)	Laptop	Laptop	Laptop	Desktop (was laptop)
Watch short videos	Laptop	Laptop	Phone (was laptop)	Phone	Phone	Phone (was laptop)	Laptop	Laptop	Desktop
Check bank balances	Phone	Phone	Phone	Phone	Phone	Phone	Laptop	Laptop	Desktop
Video calls	Phone (was laptop)	Phone (was laptop)	Phone	Phone (was laptop)	Phone	Phone	Phone (was laptop)	Laptop	Laptop
Check social networks	Phone	Phone	Phone	Phone	Phone	Phone	Phone	Laptop	Tablet (was laptop)
Read the news	Phone	Phone	Phone	Phone	Phone	Phone	Phone (was laptop)	Laptop (was tablet)	Tablet (was laptop)
Play games	Phone	Game console (was phone)	Phone	Phone	Phone	Phone	Phone	Tablet	Tablet
Voice calls using the Internet (VoIP)	Phone	Phone	Phone	Phone	Phone	Phone	Phone	Phone	Phone
Take photos	Phone	Phone	Phone	Phone	Phone	Phone	Phone	Phone	Phone
Record videos	Phone	Phone	Phone	Phone	Phone	Phone	Phone	Phone	Phone
Stream films and/ or TV series	TV	TV	TV	TV	TV	TV	TV	TV	TV
Watch TV programs via catch-up services	TV	TV	TV	TV	TV	TV	TV	TV	TV
Watch live TV	TV	TV	TV	TV	TV	TV	TV	TV	TV

Weighted base: Smartphone owners in 16 developed markets (22,929 respondents). The figure is the average of 16 countries in our study, namely Australia, Belgium, Canada, Denmark, Finland, Germany, Ireland, Italy, Japan, Luxembourg, Netherlands, Norway, Spain, Sweden, the UK and US

Source: Deloitte Global Mobile Consumer Survey, developed markets May–Jul 2017
Note: The laptop category excludes hybrid laptops

Foreword	The digital consumer	Smart(er) phones	The machines are learning	Connectivity takes off
Augmented Reality bites	The subscription prescription	Block by blockchain	Contacts	

We are already seeing smartphones used to authenticate access to physical and digital environments, including homes, offices and hotel rooms,[10] cars,[11] buses,[12] trains and planes; corporate information systems; and e-commerce and banking sites and we will begin to see additional functionality created by the new application of existing smartphone sensors such as accelerometers, GPS, magnetometers and gyroscopes.

As well as new functionality and uses, we will also see developments and improvements in existing applications. Smartphones have always offered consumers the ability to consolidate multiple functions/apps in one place. The smartphone is a single point of storage for everything in your life and many applications make use of this by linking and sharing information between themselves. In the next ten years, we will see a growing industry around end-to-end services that consolidate and manage multiple applications to offer added functionality. In the travel industry for example, a type of concierge service that consolidates all of your applications could, in the case of a cancelled or delayed flight, reschedule your flight, rebook a taxi from the airport, change your dinner reservations, cancel your theatre tickets and apply for compensation from the airline all from a single app.

Bottom line

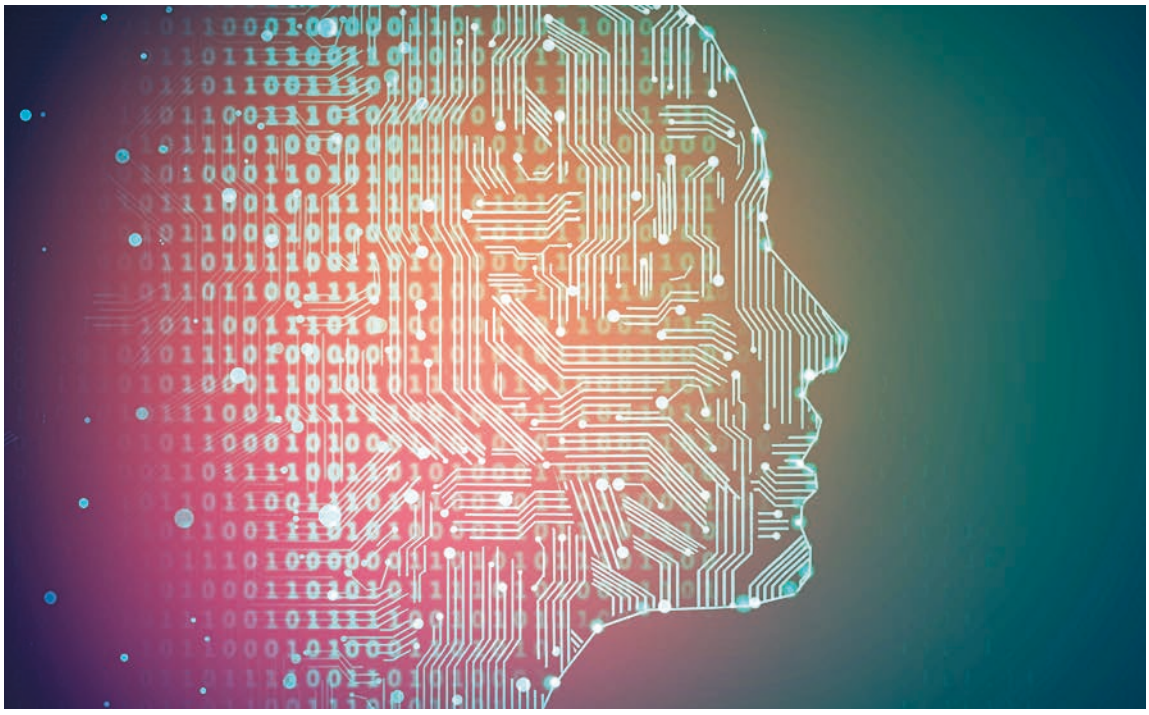
The smartphone is a mere decade old, and with every year has become ever more integral to people's lives. It has become more versatile and has absorbed a growing range of functions, from communication to navigation, from breaking global news to remembering personal stories. If the first ten years has been about changing our social lives, the next ten years will be about changing everything else. The next ten years will also see smartphones face a number of challenges; smartphones will have to innovate to stay relevant as consumers adopt new technology that enhances their lives, or baulk against technology becoming too pervasive.[14]

As improving technology continues to facilitate new consumer applications, the implications for our industry are massive. The ultimate beneficiary of this will be the consumer who will see increased utility and functionality, offering them a smoother more enjoyable mobile experience. But it is not just consumers who will benefit from the smartphone's invisible innovations: the role of the smartphone in society, for tech vendors, manufacturers, suppliers and retailers is likely to become ever more central. Over the next five years, it is likely to be the turn of enterprises to use mobile even more than they already do to transform the way work gets done in settings from retail store operations, manufacturing, restaurants, hotels and a variety of other services and processes.

Case study: Shopping and sharing made easier with an image-based app

Built on the premise that more and more people are using messaging applications to share images, San Francisco-based ShopChat adds an image-based keyboard to many popular methods of mobile communicating, including WhatsApp, WeChat, Viber, Facebook Messenger and Apple iMessage. Many people share images multiple times a day, and ShopChat removes the need to copy and paste links and the time-consuming process of taking photos and then attaching them to a message.[13]

Once a user sets up an account, the app can be personalised by setting certain brands and types of products as favorites. Companies already partnering with ShopChat include Foot Locker, Macy's, Sephora, Guess and PetSmart.



The machines are learning

Artificial intelligence (AI) – technologies capable of performing tasks normally requiring human intelligence – has seen rapid growth in the last few years. The ability of AI, in the form of Machine Learning (ML), to analyse big data has made it a must have investment for businesses.

ML is a method of data analysis that automates the building of analytical models. Computer systems built with ML develop the ability to improve their performance by exposure to data without the need to follow explicitly programmed instructions. In the simplest terms possible, machine learning is the process of automatically discovering patterns in data and using these patterns to make predictions.

ML is experiencing growth because capabilities are accelerating and the barriers to use are being removed. In the next five years, ML applications are poised to become commonplace.

One impact of making ML more accessible will be the rapid growth of consumer focused applications. ML will become standard in personalisation tools, helping retailers target consumers with recommendations for new/complementary/next best products based on a combination of data taking into account previous purchases, socioeconomic factors, demographic information and consumer behaviour. From a personalisation point of view, ML will also act as a foundation for chatbots as they become the go-to method for customer service.

Foreword	The digital consumer	Smart(er) phones	The machines are learning	Connectivity takes off
Augmented Reality bites	The subscription prescription	Block by blockchain	Contacts	

In 2017, we predicted that over 300 million smartphones, or more than a fifth of units sold that year, would have onboard neural network ML capability.[15, 16] We also predicted that over time ML capabilities would be found in tens of millions (or more) of drones,[17] tablets, cars,[18] virtual or augmented reality devices,[19] medical tools,[20] Internet of Things (IoT) devices[21] and unforeseen new technologies, but so far adoption by businesses has been slower than expected.

Despite the excitement over ML and cognitive technologies, and the aggressive forecasts for investment in these technologies, most enterprises using ML have only a handful of deployments and pilots under way. According to a 2017 Deloitte Consulting LLP survey of executives in the US, who said their companies were actively using cognitive technologies and were familiar with those activities, 62 per cent had five or fewer implementations or the same number of pilots under way.[22]

However, this is set to change. Progress in a number of key areas should make it easier and faster to develop ML solutions while also removing some of the barriers that have restricted adoption of this powerful technology. By making ML easier, cheaper or faster (or some combination thereof), and enabling applications in new areas, the market for ML will be expanded.

As a result, Deloitte Global predicts that in 2018, large and medium-sized enterprises will intensify their use of ML to analyse data and get insights. The number of implementations and pilot projects using the technology will double compared with 2017, and they will have doubled again by 2020. Further, with enabling technologies such as ML application programme interfaces (APIs) and specialised hardware available in the cloud, these advances will be generally available to small as well as large companies.

Data is a valuable resource for consumer businesses. Knowing who is buying your products, what else they are buying, when and where they are buying them, what they are paying with, what they have bought in the past, what they left in their basket online and what else they searched for and then using this knowledge for targeting and personalisation is a real competitive advantage for the most data literate consumer businesses. Given the scale of the data available from just one shopping trip, ML is becoming an important tool in understanding and analysing consumer data. If consumer businesses are not employing ML techniques in their data analysis, they are already at a serious disadvantage as their competitors are able to deal with more complex queries, providing them with a greater volume and quality of insights into consumer behaviour.

As ML becomes the common means of analysing data, the basic use of ML ceases to be a competitive advantage. Rather, the application of ML and the use of insights generated becomes the field where companies can excel. The standard theory behind ML software is that the bigger the dataset the better, therefore will it be the largest retailers and consumer businesses in the largest markets that continue to hold the advantage?

By 2020, the majority of interactions a consumer has when shopping will be with a computer. At the moment, this experience is functional, but cannot guarantee the same experience as talking to a real-life sales assistant. If ML can deliver on the advances that we predict, then this could change and the consumer experience will be vastly improved. In addition to offering ML-based applications to improve personalisation and customer service, the increased adoption of ML will have a significant effect on the operational side of the consumer industry.

From an operational perspective in retail, we will see ML play an important role in areas such as demand forecasting, ranging and delivery optimisation.

Foreword	The digital consumer	Smart(er) phones	The machines are learning	Connectivity takes off
Augmented Reality bites	The subscription prescription	Block by blockchain	Contacts	

In aviation, ML will be used to track and analyse data points which can improve performance and safety by informing airlines when to pull planes out of service or when unscheduled maintenance is required. Ultimately, data analysis that makes use of ML across the supply chain will allow for more efficient production and maintenance of goods. The automation of tasks, driven by ML, will allow high skilled workers to focus on innovation meaning businesses can deliver the best possible experience to the consumer. Unstructured, redundant, and mundane tasks are the work patterns that typically benefit from automation. The increases in productivity and time savings then allow humans to focus on higher value work.

Case study: Yoox Net-a-Porter

Yoox Net-a-Porter group is at the fore-front of using ML and other advanced techniques to develop the latest in AI technology. As part of a £442 million investment, Yoox Net-a-Porter Group, which has opened its new Tech Hub in London, is now expanding its use of AI technology to personalise the shopping experience for consumers. The company, which was established in 2015 following the merger of the two luxury e-commerce sites (Yoox and Net-a-Porter) has been experimenting with AI since 2016 and is currently exploring new tools such as a virtual stylist to complement the work of their personal shoppers.[23]

The intelligent tool will draw on the past work of the company's stylists as well as the customer's purchase history, likes and dislikes, to learn what types of clothes work well together. The virtual stylist will offer customers a more sophisticated degree of personalisation by suggesting complementing products to create an outfit that works well for them. The system could also potentially help customers pick clothes based on their location, schedules, holidays and activities, while also speeding up the work of customer care teams and personal shoppers in making product recommendations and putting outfits together more quickly.

Case study: eBay

eBay is a true giant of the internet age. The online auction site has close to 170 million monthly active user accounts worldwide across 190 markets.[24] In the US alone, the website generates an average of 86 million unique visitors a month.[25] With over one billion live listings, the data produced by ebay is enormous. This data is a valuable resource, providing information on how, when, where and why shoppers bid on products, all of which can be used to optimise the site and develop the experience for buyers and sellers. However, making sense of data on this scale can be difficult. eBay makes use of ML and other advanced data analytic methodologies to sort and analyse their data. The result is more than just a deep understanding of their customers; eBay takes it a step further by using these techniques to develop tangible AI applications that can be used by both buyers and sellers. For example the eBay ShopBot, which deals with consumer search enquiries, was launched on Facebook messenger in October 2016 and a variation of the application is now available on the Google Home device, allowing users to interact via voice activated technology. ML is used to create a personalised response to buyers and sellers, estimating values, identifying potential items and providing customer service through various channels including voice visual and traditional search.

Foreword	The digital consumer	Smart(er) phones	The machines are learning	Connectivity takes off
Augmented Reality bites	The subscription prescription	Block by blockchain	Contacts	

Bottom line

Consumers leave 'digital breadcrumbs' throughout their day, from geolocation data produced by their phones, and online browsing behaviour, to health and fitness data from wearable technology. Making sense of this data and creating actionable insights and applications is made possible by ML. However, until recently, ML has remained a costly, complicated solution for businesses to employ. These barriers are slowly being removed, and as a result the scale at which ML is used to analyse, understand and improve consumer behaviour is set to expand. Advances will enable new applications across industries where companies have limited talent, infrastructure or data to train the models.

Companies should:

- look for opportunities to automate some of the work of their oversubscribed data scientists
- keep an eye on emerging techniques, such as data synthesis and transfer learning, which could ease the bottleneck often created by the challenge of acquiring training data
- find out what computing resources optimised for ML are offered by their cloud providers. If they are running workloads in their own data centres, they may want to investigate adding specialised hardware to the mix
- explore state-of-the-art techniques for improving interpretability that may not yet be in the commercial mainstream, as interpretability of ML is still in its early days
- track the performance benchmarks being reported by makers of next-generation chips to help predict when on-device deployment is likely to become feasible.

ML, a core element of artificial intelligence, will progress at a phenomenal pace this year. But this will be from a low base. Over the coming year, ML will become more commonly deployed in enterprises, but will remain far from ubiquitous. Almost every high-end smartphone will have a machine learning chip, but those chips will not yet be fully utilised. Nearly a million ML chips will be installed in data centres, but this quantity will seem small within a decade.

Foreword	The digital consumer	Smart(er) phones	The machines are learning	Connectivity takes off
Augmented Reality bites	The subscription prescription	Block by blockchain	Contacts	

Strap in: connectivity takes off

Deloitte Global predicts that in 2018, one billion passenger journeys on planes (about a quarter of the total) will be on aircraft equipped with in-flight connectivity (IFC),[26, 27] a figure 20 per cent higher than 2017.

While IFC has been available for many years in mature markets such as North America, it should be more popular and lucrative than ever in 2018, thanks to the rising number of routes covered, higher connection speeds and greater data capacity per flight.[28]

This trend is driven by two things: first, advances in technology are facilitating the supply and second, modern consumer lifestyles demand an always-on connected world. Until now, the aeroplane has remained one of the last connectivity-free zones in the world. By giving flyers the ability to connect at 35,000 feet airlines are opening themselves up to a world of commercial and operational possibilities.

It is not hyperbole to say that IFC will fundamentally change the flying experience. IFC will mean more than sharing travel selfies with friends on the ground (although this will happen), it will have a profound impact on the world of work. It will revolutionise the way we think about in-flight entertainment and commerce. It will dramatically alter the ability of airline crew to engage with their passengers and ground staff, and it has the potential to change the way that planes are built and airports are designed and operated on the ground.

How IFC works

There are two ways of providing connectivity to planes; on occasion both approaches are deployed in tandem:

Air to ground (ATG): A network of specialised ground-based mobile broadband towers relays signals up to antennas located on the underside of a plane's fuselage. As with a terrestrial cellular network, the plane automatically connects to the closest tower. ATG is cheaper and has lower latency than satellite-based services, but for evident reasons works only while over or close to land. In 2018, ATG providers will be able to deliver speeds to the aircraft of up to 100 mega-bits per second (Mbps). This is about ten times faster than existing ATG solutions and will be provided at a much lower cost.[29]

Satellite: A constellation of satellites, typically in geostationary orbit, sends to and receives signals from earth via receivers and transmitters. Connectivity is via an antenna on the roof of the aircraft. Satellite-based systems provide coverage across the globe, including over oceans, but are typically more expensive and have higher latency and lower capacity than ATG. IN 2018, satellite providers will be able to deliver speeds to aircraft of up to between 100Mbps and 400 Mbps, or five to ten times faster than previous speeds.[30]

Until recently, many airlines had taken a wait-and-see approach to IFC or had only partially equipped their fleets. About a third of commercial planes will be equipped with IFC at the start of 2018. Deployment was partial for a combination of factors, including the inability to offer quality service, the impact of legacy technology on the plane's weight and installation costs.

But in 2018 and beyond, the business case for IFC should become more compelling due to technological advances in satellite and ATG connectivity. IFC is likely to enjoy better speeds per user and greater capacity, enabling both an improved experience and lower prices. Deloitte Global expects an additional 1,600 to 2,000 aeroplanes, or around seven per cent[31] of commercial aeroplanes in service, to be equipped with IFC in 2018 alone. We also expect upgrades to planes already equipped with prior-generation IFC equipment, delivering better connectivity as a result. The scale at which IFC is adopted by airlines will be based on three motivating factors: consumer demand, revenue generation and cost savings.

Consumer demand – Demand for connectivity is now so strong that consumers would prioritise it over most other amenities. One survey found that if respondents had to select from a range of services, 54 per cent would choose Wi-Fi. This is almost three times the proportion (19 per cent) that would choose a meal.[32] Another survey, conducted among IFC users, found that almost 90 per cent would trade seats, additional legroom or another amenity for a faster and more consistent wireless connection.[33] Historically, demand has been concentrated among business users, most of whom expense usage. Consumers have always wanted in, but at lower price points and with better quality.

Revenue generation – Revenue could come directly, from the sale of airtime, or indirectly, when IFC is offered free, as a way to acquire new customers or improve loyalty. If it proves a revenue generator, IFC will allow airlines to augment the already booming ancillary services market, which has increased more than 13 times between 2007 and 2016.[34]

Foreword	The digital consumer	Smart(er) phones	The machines are learning	Connectivity takes off
Augmented Reality bites	The subscription prescription	Block by blockchain	Contacts	

There is also an opportunity for airlines to increase their advertising revenue. By owning the data that passengers create when connected in the air, airlines are in a position to add a new layer of insight and opportunity to the world of programmatic, targeted marketing. Consumers' in-air behaviour will now follow them to the ground, with push notifications and programmatic ads reminding them to follow up on the new watch or perfume they were viewing on their most recent flight. To exploit this opportunity effectively, the aviation industry will need to learn the experiences of industries such as retail and CPG that have done this successfully in the past.

Cost savings – Given the costs associated with IFC, it is likely that any company wanting to capitalise on the opportunity will, for the time being, have to work in partnership with an airline, subsidising IFC for passengers in return for access. However, in the long term, IFC will actually see cost savings. At the moment, equipping planes with traditional in-flight entertainment can be very costly. According to one estimate, based on a Boeing 767 aircraft with 260 seats, seat-back screens cost £2.3 million per plane, while the weight of cabling required for the system costs over £71,000 in extra fuel per year for every aircraft. In the future, planes will be built without incurring these costs because IFC will eliminate the need for traditional in-flight entertainment as passengers migrate to using their mobiles, tablets and other carry-on devices.[35]

As IFC becomes more commonplace, we are likely to see a comprehensive, structural change within the industry. Airlines and other organisations will look to capitalise on the commercial opportunities associated with IFC, with passengers able to access the internet via their carry-on devices, traditional in-flight entertainment will become obsolete, and instead, opportunities for online media services targeting airline passengers will appear.

Online streaming companies like Amazon Prime will be expected to target passengers with packages and content specifically designed around the capabilities of IFC.

In addition to in-flight entertainment, in-flight shopping can also expect significant disruption. In a world of two-hour delivery slots for Amazon Prime members, there is no reason why passengers would not shop with Amazon or other online retailers and have their products delivered to their homes, hotel or Air BnB in time for their arrival.

Home delivery opens up a completely new opportunity for retailers to work with airlines. We are already seeing examples of connected airlines offering products that can be ordered from the air, to the home, removing the issue of size and convenience from the equation, meaning that airlines can begin to sell bigger and heavier produce than previously possible.

These larger, potentially more expensive purchases can also drive more interaction with airline loyalty schemes through the accumulation and redemption of air miles and loyalty points. But building an in-flight shopping experience is not an easy task. Airlines that look to exploit this opportunity will have to invest in distribution networks and the online architecture of their retail sites, manage supply chains across different continents and pay close attention to consumer tax implications.

By changing the way that passengers shop, IFC also has the potential to change the way that retail space is designed at airports. With so much extra choice available while flying, there will be no need for airports to replicate the high street shopping experience in the terminals. The focus will shift to experiential retail. Passengers will experience retail as marketing with brands looking to showcase their products and connect with their customers through unique experiences. We are also likely to see even more of a focus on hospitality, with additional space given over to restaurants and bars.

Foreword	The digital consumer	Smart(er) phones	The machines are learning	Connectivity takes off
Augmented Reality bites	The subscription prescription	Block by blockchain	Contacts	

Bottom line

The internet is a fundamental human right.[36] It therefore stands to reason that consumers in developed countries are demanding access to it at all times. It is no longer enough to be connected to the digital world at home; instead, consumers are demanding an always-on connection. Connectivity-free zones like the Underground and aeroplanes are vanishing as technology enables previous internet 'black zones' to offer high speed, quality connections to everyone with the device to access it. For three-quarters of air travellers at present, being on an aeroplane means disconnection from the world, whether or not they want that. In coming years, it may not be an option.

As connectivity improves and becomes cheaper, IFC is likely to become standard. The aeroplane, too, will be connected. The majority of passengers will be delighted by this and will express their happiness on social networks from 35,000 feet up.

But consumer satisfaction is the tip of the iceberg when it comes to the impact that IFC will have. This technology has the potential to cause a fundamental change in the way that airlines, aeroplanes and airports are owned, designed and managed. As far as disruptive technology goes, for the aviation industry, IFC stands to have as great an impact as the jet engine.

Foreword	The digital consumer	Smart(er) phones	The machines are learning	Connectivity takes off
Augmented Reality bites	The subscription prescription	Block by blockchain	Contacts	

Augmented Reality bites

Augmented Reality (AR) is the technology that superimposes images on a user's view of the real world. Primarily used as a social tool, AR is set to grow in popularity and start demonstrating some significant commercial and operational applications.

The majority of us are already familiar with AR in the form of Facebook and Snapchat photo filters. These companies make use of facial recognition technology to allow users to create and share AR- based content. To date, the most common application of Augmented Reality has been social, but AR is rapidly becoming a part of a consumer's everyday life. As early as 2015, Snapchat claimed that its branded geofilter AR marketing campaigns were on average receiving between 30 and 50 million views in a single day,[37] while in 2017, Facebook made camera-based geofilters available to all of its two billion monthly active users via the Facebook stories application.[38, 39]

This trend will continue into 2018, with an increasing number of the population not just viewing, but creating AR content. Deloitte Global predicts that over a billion smartphone users will create AR content at least once in 2018, with 300 million being monthly creators and tens of millions making and sharing content weekly. This integration into our everyday lives will facilitate the widespread adoption of AR in other contexts as consumers become familiar with the technology and its possibilities.

Foreword	The digital consumer	Smart(er) phones	The machines are learning	Connectivity takes off
Augmented Reality bites	The subscription prescription	Block by blockchain	Contacts	

However, AR is not just a social application. It already has numerous marketing and operational applications for businesses. As the technology improves, the range of applications will grow and the use of AR by retailers and consumer product businesses is set to increase rapidly.

The predicted growth in AR created content, and the growth in potential new applications for consumer focused businesses are driven by ongoing improvements in smartphone technology. The smartphone is the most common platform for AR. The majority of AR usage in 2018 is likely to involve the now mainstream practice of creating content using smartphone cameras. We predict that tens of thousands of apps incorporating AR capability will become available during the year, and that by year-end billions of smartphone users will have downloaded an app or an app update, or an operating system (OS) update that incorporates AR content creation capability.[40] We expect billions of people are likely to view – on smartphones and other screens – AR content created on a phone.

Smartphone technology is predicted to continue improving year on year meaning that while 2018 is likely to be a significant year for AR, subsequent years will be equally important. The core enabling technologies, particularly cameras, sensors and processors for AR should continue to improve, and the range of applications will grow rapidly.[42] This is likely to increase the number of users making and sharing AR content regularly, and to grow direct AR revenues beyond $1 billion by 2020.

Case study: Apple/Amazon AR tool kits

Creating AR applications was previously the domain of a limited number of developers, requiring specialist skills and knowledge. This is changing. Both Apple and Amazon have recently launched browser-based toolkits that allow developers to build, edit and publish AR apps quickly and with minimal coding. With the launch of iOS11, Apple introduced ARKit, a framework that allows anyone with an apple developer account, a Mac computer and the inclination, to create augmented reality experiences for iPhone and iPad. Meanwhile, Amazon has launched a preview version of Sumerian, on the Amazon Web Service platform.

Despite simplifying the process of creating AR applications, the tools from Apple and Amazon do not compromise on quality. For example, ARKit uses the latest Apple processors to optimise performance. It works alongside the iPhone X's TrueDepth camera for face tracking and uses Visual Inertial Odometry to track the world around it. As a result, it offers robust, accurate tracking that can detect surfaces, react to light and place objects on the smallest feature points.

All of this allows users to create compelling virtual content that maps seamlessly onto real-world scenes.[41]

Foreword	The digital consumer	Smart(er) phones	The machines are learning	Connectivity takes off
Augmented Reality bites	The subscription prescription	Block by blockchain	Contacts	

As AR becomes more commonplace and the barriers to use are removed, Deloitte predicts that the number of retail and consumer applications will increase significantly. AR as an application has the ability to truly enhance the consumer experience. It can be used in the decision-making stage of the consumer journey, to overlay product information and consumer reviews onto products in store. It can also be used to showcase products directly in consumers' homes and as an after-sale service, delivering clearer instructions for flat-pack furniture and electrical equipment.

Case study: Tesco

As with any retailer, Tesco faces challenges around recruiting new shoppers, as well as retaining existing shoppers and getting them to repeat their behaviour in-store. With consumers rapidly becoming more connected, Tesco must face these challenges in an online world. Tesco has experimented heavily with AR to remain relevant and deliver a 21st century shopping experience.

The Tesco Discover app, which makes use of Engine Creative's Reality Engine AR platform, is at the centre of Tesco's AR strategy allowing for content to be offered across three platforms it owns: publishing, products and in-store. By scanning Tesco product labels, magazines and in-store POS the app enables millions of readers to discover more about the provenance of Tesco products, interact with editorial features, purchase products and engage with in-store experiences. To date, Tesco's AR app has been installed on over 250,000 devices.[43]

The growth in AR use by retailers and consumer products businesses over the next five years will primarily make use of its ability to create increasingly photorealistic content. Starting in 2018, viewers of AR content on a smartphone may perceive it to be real and it will often be recorded and shared as video. The more realistic the digital image, the greater the 'wow' factor of the resulting composite.[44] We predict that while almost all AR (more than 95 per cent) in 2017 was cartoon style, AR will be over 50 per cent realistic in 2018.

The quality and accuracy of product images overlaid into the physical world has so far acted as an obstacle for consumer-facing businesses. Cartoon images can be effective for marketing and consumer engagement, but improvement in this area of AR technology will now allow businesses to complement their marketing and in-store content by making their products the focus of their AR applications. One area poised to take advantage of this is the home improvement industry. During 2018, we expect an abundance of home decorating apps to launch (and relaunch, taking advantage of better technology), enabling prospective customers to visualise how a piece of furniture would look in their homes. While this type of application has been in development for many years, such AR apps are likely to complement rather than replace a visit to the showroom in most instances. These apps enable someone to see – with varying degrees of accuracy – how a sofa with a certain fabric might look in their living room, and even to walk around it. In 2018, these apps should have more accurate scaling, and a visual of the sofa in different lighting conditions may be possible.

Foreword	The digital consumer	Smart(er) phones	The machines are learning	Connectivity takes off
Augmented Reality bites	The subscription prescription	Block by blockchain	Contacts	

Case study: IKEA Place

Augmented reality is increasingly being used to enhance retail experiences such as previewing furniture designs directly in the home. This application of AR allows consumers to 'see' a product in place before they buy it, eliminating those moments when you purchase a product only to find that it does not quite fit in the place you intended, or when something just does not look right. IKEA, the world's leading furniture retailer, is driving the increasing use of AR. The Ikea Place app contains a directory of over 2,000 products and automatically scales them, based on room dimensions, with 98 per cent accuracy.[45] The app makes use of Apple's advanced ARKit functionality to show photorealistic details such as the texture of the fabric, as well as how light and shadows are rendered on your furnishings. Additional sharing facilities within the app mean that once you have everything in place, you can capture the room setting and share it as an image or video with friends.

Accurate AR offers a practical application for farm and factory workers in the consumer packaged goods and certain industrial manufacturing sectors, allowing components to be identified, instructions to be added to equipment virtually, and instant performance and safety feedback shared. AR also has applications in the travel, hospitality and leisure sector. In aviation, AR will be used by ground staff who need detailed information about logistics, safety and compliance. More consumer friendly applications will be considered, for example tourist destinations will be enhanced through AR tours, or through consumer generated content such as messages left at points of interest.

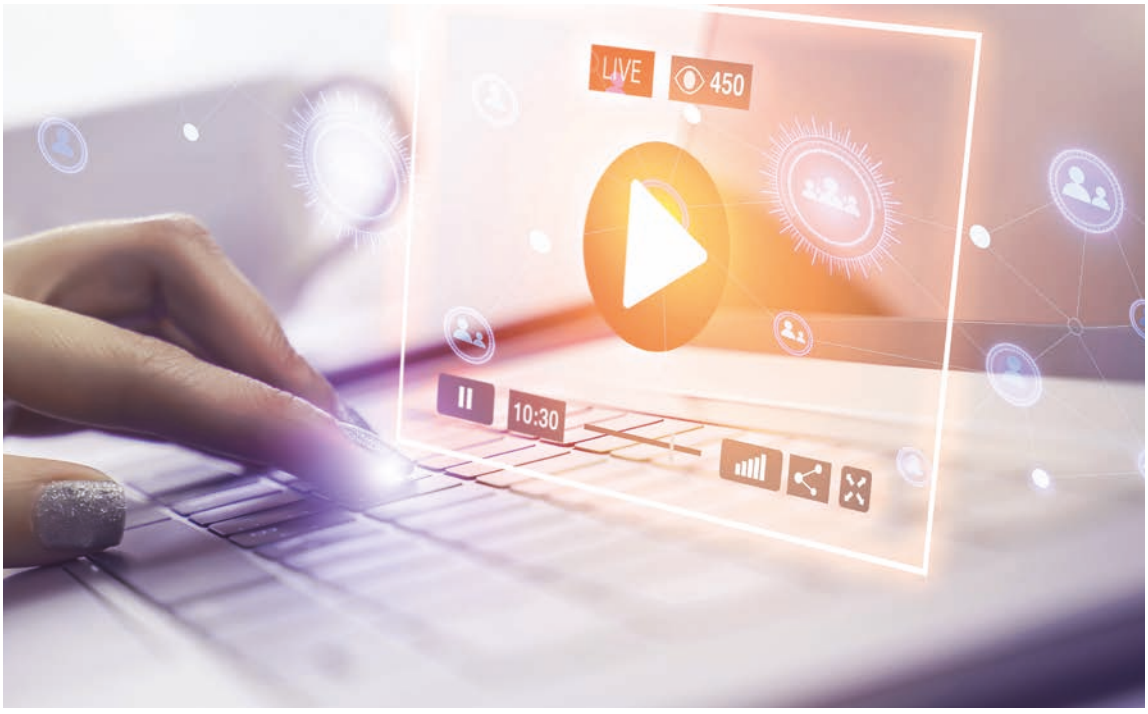
Bottom line

This year it is likely to be a year of progress and experimentation for AR. The quantity of premium AR devices will swell and there will be tens of thousands of AR apps. App stores specific to AR content may be launched, businesses will develop AR strategies and agencies will add AR to their list of solutions and capabilities. But it will not all go smoothly and mistakes inevitably will be made.

And 2018 is far from the endpoint for AR; many further years of evolution are likely to enchant users and enhance their creations. Over the medium term, AR will merge into camera-based apps and we will struggle to recall a time when AR was a mere novelty. At some point in the future, it may become increasingly hard to tell reality from AR-enabled fiction.

This year, one of the tasks for developers will be to determine when AR adds to an experience and when it is superfluous. Enterprises should experiment enthusiastically but pragmatically with possible applications. Aside from marketing opportunities (such as the ability to place an AR-generated animated company logo anywhere or to superimpose a branded mask on a user's face), there are also possibilities for AR to assist with sales, technical guidance and aftermarket support. Enterprises should be careful, however, not to start off with AR as an answer and then look for solutions it could address.

Foreword	The digital consumer	Smart(er) phones	The machines are learning	Connectivity takes off
Augmented Reality bites	The subscription prescription	Block by blockchain	Contacts	



The subscription prescription

Deloitte Global predicts that by the end of 2018, 50 per cent of adults in developed countries will have at least two online-only media subscriptions, and by the end of 2020, that average will have doubled to four.

We further predict that a fifth of adults in developed countries will pay for or have access to at least five paid-for online media subscriptions, and by the end of 2020, they will have ten. These subscriptions will be in addition to traditional media subscriptions that include online access, such as a pay TV or newspaper subscription that often includes one or more digital passes. This has wide reaching implications for the media industry, but also signals a significant change in consumer attitudes and behaviour, the impact of which will be felt by many consumer-facing businesses.

While the accumulation of multiple online subscriptions is relatively new,[56] consumers paying for multiple subscriptions is not.[57] Online media subscriptions are the digital update to behaviours exhibited a generation back, when households would subscribe to multiple media, including newspapers (morning and evening), magazines and books (adults and kids, from fiction to reference), analogue cable TV, music, and more recently, DVDs.[58, 59]

Foreword	The digital consumer	Smart(er) phones	The machines are learning	Connectivity takes off
Augmented Reality bites	The subscription prescription	Block by blockchain	Contacts	

Why did subscriptions seemingly go out of fashion? Surprisingly, sentiment towards subscriptions never really changed, instead it was the overall availability of subscriptions that went down. A major trigger was the online revolution in the mid-1990s and the accompanying belief that online ad-funded content, shown to hundreds of millions and ultimately billions of viewers, would be more lucrative than digital subscriptions. As so much content – particularly news – became free, media companies and their investors started to measure success by metrics such as global monthly web browsers (the number of individual web browsers that hit a site), expecting that revenues would follow views.

As of 2018, it is possible for a media site to reach hundreds of millions of different web browsers per month, a phenomenal total for a news publisher whose reach would formerly have been restricted to its local market.

But as reach has grown, revenue per viewer, visit, impression, web browser or click has steadily fallen. For some publishers, generating sufficient revenue from online advertising alone has felt like an impossible task. In response, content creators have increasingly started to focus on growing their online digital subscription revenue and on formulating ever more varied and appealing digital subscription packages. As this has happened, consumers have become increasingly willing to pay for digital content – even when the same content might be available for free via another source, legal or not.

Case study: Online news

The past two years have seen a marked increase in the number of online news publications earning regular income from subscribers – digital as well as physical.

In the US, *The New York Times* had nearly 2.5 million digital-only subscribers as of the third quarter of 2017.[46] Digital subscription revenue, including revenue from those subscribing to the crossword and its cooking app, rose by 46 per cent, to $85.7 million.[47] *The Washington Post* surpassed one million digital subscribers in 2017;[48] as of mid-2016, the newspaper had grown its digital subscriber base by 145 per cent year on year.[49]

The Financial Times, which has always had a paywall, ended 2016 with 650,000 digital subscribers, a 14 per cent increase over the previous year.[50] As of the end of June 2016, *The Times* and *The Sunday Times* had 413,600 subscribers, of which 182,500 were only digital.[51] *The Guardian* offers subscriptions as well as memberships. In July 2016, there were 50,000 members, each paying between £5, equivalent to 111 unique web browsers, and £30, equivalent to 666 unique web browsers per month.[52] As of March 2017, there were 200,000 members[53] and a further 185,000 subscribers.[54] In November 2016, *The Daily Telegraph* replaced a metered paywall with a range of subscriptions, with digital-only service starting at £2 per week.[55]

Foreword	The digital consumer	Smart(er) phones	The machines are learning	Connectivity takes off
Augmented Reality bites	The subscription prescription	Block by blockchain	Contacts	

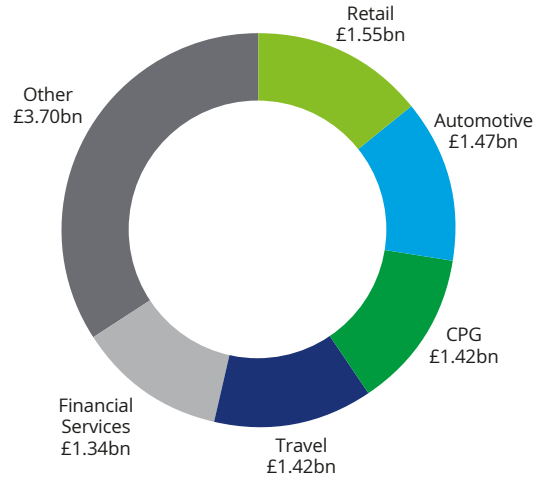
Looking across all forms of online media, we find the principal drivers of the rise in online media subscriptions are likely to include:

- **Supply side:** Steady growth in the number of companies offering online media subscriptions, and fragmentation of content libraries. For example, rights to watch a specific sports team may be split across two or more providers, requiring more than one subscription, or drama fans may need to purchase two or more subscriptions to be able to access all the programmes they want to watch. There has also been growth in subscription bundling. Amazon Prime is the best known, and it bundles a range of add-ons to delivery, including video. *The Telegraph* has offered Amazon Prime for free with its online subscription,[60] and in the US market, students were offered Spotify Premium with a subscription to the online streaming service Hulu.[61]

- **Demand side:** Increased willingness among consumers to pay for content online rather than consume ad-funded content. There is no doubt that an ad-free experience is high on the list of consumer wants, but it is far from the only driver of the growth of subscriptions. For example, it is also driven – especially for news – by rising awareness of the variations in the calibre of news outputs. Furthermore, the attractiveness of the online model is, for some genres, becoming more compelling than pre-existing traditional alternatives. Music subscriptions such as Spotify offer personalised access to tens of millions of tracks and hundreds of thousands of playlists. For many, this is superior to owning a digital or physical music library. In some markets, consumers are 'cord cutting' and 'cord shaving' their traditional pay TV bundles – that is, cancelling their pay TV subscriptions outright or else downscaling their package to reduce cost. In some cases, these consumers are replacing all or some of their TV content with subscription video on demand (SVOD).

As well as forcing media companies to reconsider the way they operate, the consumer shift away from ad-funded content to subscription content also has major implications for consumer businesses that have invested heavily in digital advertising over the last few years. In 2017, UK businesses spent almost £11 billion on digital advertising, with consumer businesses in retail, consumer products, automotive and travel accounting for more than half of this spend. This digital advertising spend represents more than half of all advertising spend and has been growing at a rate in double figures for several years.

Figure 4. UK spending on digital advertising by Industry, 2017



Total Digital Ad spending = £10.89bn

Note: Includes advertising that on desktop and laptop computers as well as mobile phones, tablets and other internet connected devices, and includes all the various formats of advertising on those platforms; numbers may not add up to total due to rounding.

Source: eMarketer, July 2017

Foreword	The digital consumer	Smart(er) phones	The machines are learning	Connectivity takes off
Augmented Reality bites	The subscription prescription	Block by blockchain	Contacts	

However, the growth of consumers paying for subscriptions has the potential to change the dynamics of the digital advertising market. If consumers are paying for content online via a subscription service, they will expect an ad-free experience. As a result, businesses that rely heavily on digital advertising will need to find another way to communicate with their customers. This could mean a return to more traditional forms of advertising including direct mail and print advertising.

We could also see more money being pumped into social media, or it could mean a re-evaluation of advertising spending as a whole. CPG businesses may determine that owning the consumer relationship is the only way to operate in this new world and this could facilitate the growth of direct-to-consumer sales.

The impact of media subscriptions on consumer businesses will also be felt beyond the allocation of advertising resources. Technology trends have the power to train transferable behaviour in people. The prevalence of online media subscriptions means that consumers are being conditioned to operate within a subscription marketplace. This makes subscription retail more accessible to consumers. On top of this, the likes of Amazon are redefining the rules of delivery, fulfillment and replenishment, and CPG companies are increasingly looking to sell directly to the consumer, creating a disruption that will force retail and consumer goods businesses to reassess their traditional business models.

Until recently, subscription services providing regular deliveries of products to consumers have primarily been seen as an acquisition tool aimed at shifting consumer spending beyond the subscription and towards a specific product or brand. Companies like Birchbox and Ipsy send out a variety of new and exciting products for the subscriber to experience. A carefully curated, personalised selection of products and offers that will surprise and delight the subscriber encourages consumers to seek out the products they have enjoyed the most for repeat purchase. This model also allows prices to be kept competitive as the costs of delivery are supplemented by suppliers keen to get their new products out to a wide base of consumers.

In the last few years, a number of new subscription services have sprung up, offering variations on this business model. One of the most popular subscription business models is based on replenishment. Demand for convenience when it comes to buying essential items such as pet food and toiletries has allowed a number of companies to grow by offering replenishment of these goods on a monthly basis. The Amazon Dash buttons, first released midway through 2015, allow users to order essential branded goods like paper towels and laundry detergent at the tap of a button. While Amazon Dash buttons have made use of big brands and the existing Amazon technology and delivery infrastructure, smaller companies like Dollar Shave Club have thrived in this market as they combine convenience with low cost, an irreverent sense of humour and brand values that appeal to the digital, tech savvy consumer.

Foreword	The digital consumer	Smart(er) phones	The machines are learning	Connectivity takes off
Augmented Reality bites	The subscription prescription	Block by blockchain	Contacts	

Case study: Unilever

In 2017 Unilever acquired Dollar Shave Club for a reported $1billion.[62] This move signaled Unilever's intention to add the burgeoning subscription retail market to their pre-existing business model.

Unilever's headline grabbing acquisition of the subscription based shaving products brand has provided a wealth of insight that will help them succeed in a growing sector. Despite already operating a significant direct-to-consumer business, the customer insight and lessons learned about owning and operating a subscription retail business are still a valuable commodity that Unilever can look to benefit from.

The potential benefits are likely to be felt across Unilever's brand portfolio; soon after acquiring Dollar Shave Club, it was reported that Unilever had earmarked a number of its brands for subscription style services.[63] One such opportunity has already been trialed in the UK. Hellmann's mayonnaise partnered with Quiqup, the on-demand delivery service, to offer consumers everything they need to make a Hellman's-based recipe delivered fresh to their door within an hour of ordering.

Away from the replenishment end of the market, we have also seen the emergence in the last few years of subscription services that trade on their ability to offer inspiration to the consumer. Recipe box companies like Hello Fresh and Gousto take the pressure out of preparing home cooked meals by offering a wide selection of recipes to inspire consumers. Subscribers receive weekly deliveries of fresh produce and recipe cards to create their dishes. In fashion, companies such as Rent the Runway, Stich Fix and Le Tote are also offering inspiration to their subscribers, but unlike other subscription models, fashion subscription schemes generally allow members to rent or return the items, allowing subscribers to achieve aspirational fashion goals without bankrupting themselves.

The longer-term impact of subscription retail on the industry as a whole is not yet totally clear. The role of subscription as a means of replenishment rather than inspiration could, along with the growing trend towards voice technology and voice-based search capabilities, redefine the role of brands in the consumer business industry. Subscriptions remove an element of choice from the equation. For example, when subscribing to a recipe box, it is up to the subscription company to choose the products for you. This will be based on a series of factors that a normal consumer will consider such as cost, quality and availability, but considerations such as economies of scale, relationship with the supplier and logistics will also come into play. While brand investment has traditionally been focused on packaging, marketing and in-store promotions, this is likely to change.

Foreword	The digital consumer	Smart(er) phones	The machines are learning	Connectivity takes off
Augmented Reality bites	The subscription prescription	Block by blockchain	Contacts	

Bottom line

Technology, and in particular mobile technology has enabled the growth of subscription services across the world, but having disrupted an industry, these newly formed subscription companies now face significant threats that will determine the subscription retail landscape in the next ten years. For starters, we must question how sticky subscription services are? Will they retain customers in the long term? And if not, are their business models set up to deal with the churn? Perhaps most significantly, we must question how these businesses from the first wave of innovation are set up to deal with a more competitive landscape? We can see that retailers and CPG businesses are facing up to the realities of increased competition and are adjusting accordingly. They are doing this either by taking greater control of their relationship with the consumer, by offering an in-store experience that cannot be matched online, or by using their advantage of scale and expertise to compete with subscription retailers at their own game.

As subscription retail continues to disrupt, the bigger players in the market are starting to take notice. Given the costs associated with acquiring customers and delivery, retailers and brands that already have an existing customer base and network in place for fulfillment and delivery are poised to undercut the costs of pure-play subscription services. Amazon's acquisition of Whole Foods has seen them start to offer a recipe box service, and Amazon's Prime Fashion service is competing against the major fashion subscription services.

To be successful, subscription services must counter these threats by satisfying a variety of consumer needs and wants. At the very least, they must look to compete on convenience, or value. If they cannot do this, then they will have to make sure their offering has unique qualities that the consumer wants and that cannot be replicated.

Foreword	The digital consumer	Smart(er) phones	The machines are learning	Connectivity takes off
Augmented Reality bites	The subscription prescription	Block by blockchain	Contacts	

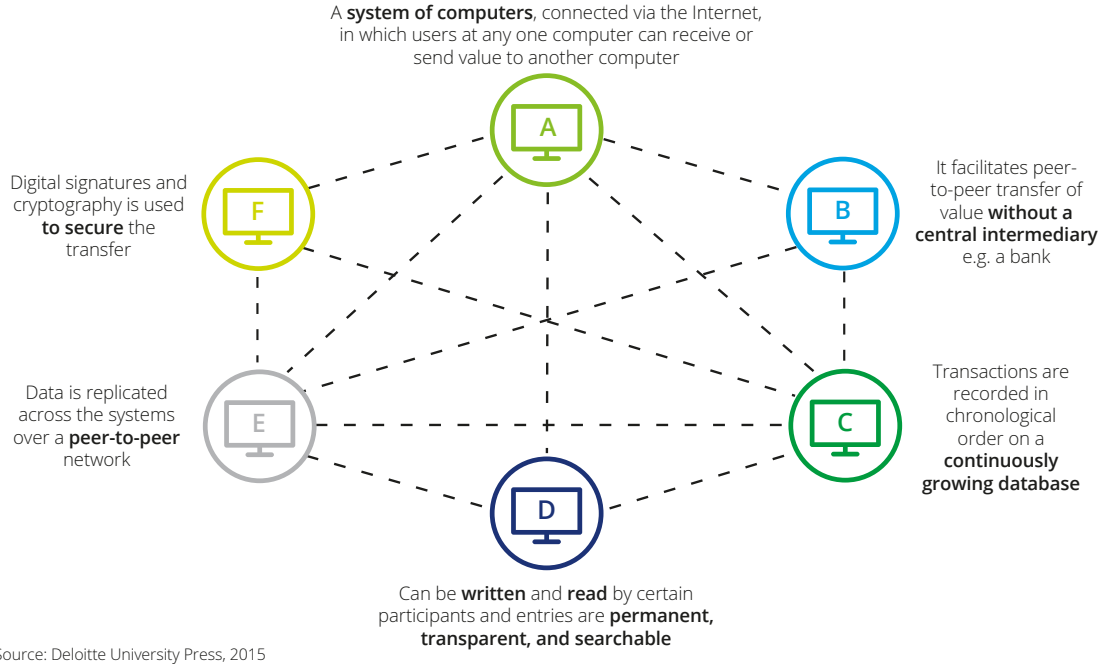
Rebuilding the supply chain – block by blockchain

Blockchain is a digital, decentralised, distributed ledger that provides a way for information to be recorded, shared and maintained by a community.

The technology relies on well-established cryptographic principles and operates as a repository for information, which is recorded and shared through a peer-to-peer community. Within the decentralised network, all participants maintain their own copy of the ledger, referred to as a 'node', where they validate new entries to the chain through the use of a consensus protocol. Simply put, this means that blockchain technology allows everyone to keep an eye on what is going on within a system, without giving any single person control over the information.

Foreword	The digital consumer	Smart(er) phones	The machines are learning	Connectivity takes off
Augmented Reality bites	The subscription prescription	Block by blockchain	Contacts	

Figure 5. A definition of blockchain



Source: Deloitte University Press, 2015

Blockchain is the technology that underpins crypto-currencies. The hype surrounding bitcoin and other cryptocurrencies such as Ethereum and Ripple has seen it dominate column inches and become a talking point in boardrooms across the country. At the start of 2017, Bitcoin was valued at under $1,000, but just 11 months later, it had reached a high of $20,000[64] only to fall back to around $10,000 by February. This massive growth elicited a flood of articles in the mainstream media, conversation and debate at the highest levels of government and statements of concern from central banks. By the start of 2018, we were left in no doubt that cryptocurrencies had entered the wider consciousness as Arsenal football club struck a deal to advertise Cashbet Coin,[65] the rapper 50 Cent announced that he had amassed a $7 million bitcoin fortune from a forgotten investment[66] and Lloyds Bank banned customers from buying bitcoins using their credit cards amid fears that large numbers of customers were racking up unsustainable debt buying the volatile cryptocurrency.[67]

But ultimately, blockchain is much more than the cryptocurrency headlines might suggest. It is also part of an ecosystem of advanced but fledgling technologies, including artificial intelligence, robotics, big data and the Internet of Things, that look set to play a fundamental role in the future of commerce and society. Blockchain will affect the way that individuals and organisations interact, the way that businesses collaborate with one another, the transparency of processes and data, and, ultimately,

Foreword	The digital consumer	Smart(er) phones	The machines are learning	Connectivity takes off
Augmented Reality bites	The subscription prescription	Block by blockchain	Contacts	

the productivity and sustainability of our economy. It is in these applications of technology, not in the mining and trading of cryptocurrencies that we believe blockchain will thrive in the next ten years.

Deloitte predicts that blockchain technology will reach a tipping point in the next five years, moving from a fringe technology associated with dubious cryptocurrency investments and get rich quick stories to a standard operational technology across the financial, manufacturing and consumer industries.

In 2015, Deloitte identified six specific characteristics of blockchain:

Figure 6. Six specific characteristics of blockchain

Blockchain is:

- **near real-time** – enabling almost instant settlement of recorded transactions, removing friction and reducing risk
- **reliable and available** – as multiple participants share a blockchain, it has no single point of failure and is resilient in the face of outages or attacks
- **transparent** – transactions are visible to all participants, with identical copies maintained on multiple computer systems, increasing the ability to audit and trust the information held
- **irreversible** – it is possible to make transactions irrevocable, which can increase the accuracy of records and simplify back-office processes
- **immutable** – it is nearly impossible to make changes to a blockchain without detection, increasing confidence in the information it carries and reducing the opportunities for fraud
- **digital** – almost any document or asset can be expressed in code and referenced by a ledger entry, meaning that blockchain technology has very broad applications.

Source: Deloitte University Press, 2015

The ability of blockchain to track and trace products, record contracts, guarantee the movement of information and record transactions will see the technology move beyond its association with cryptocurrencies and become mainstream. Along the way, blockchain will face significant challenges, but if certain fears can be overcome and the technology continues to develop as expected, there could be widespread adoption among enterprises.

Blockchain enters the mainstream

The path to broad adoption of blockchain looks strikingly well paved. Global investment in the technology has exceeded $1.7billion and Gartner Inc. projects that blockchain's business value-add will grow to $176 billion by 2025.[68]

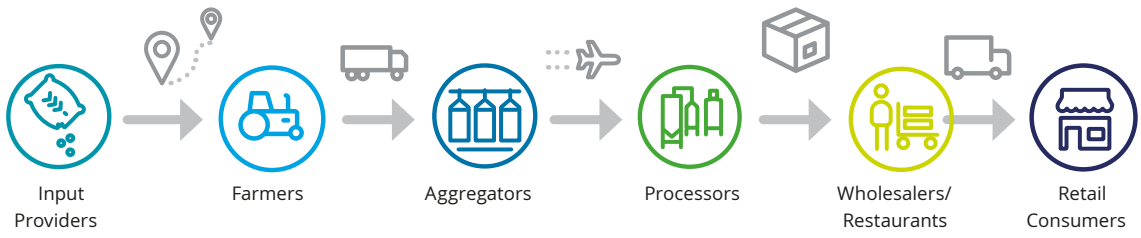
Yet there are several issues that warrant attention. With the proliferation of platforms and protocols in the marketplace today, no single technology has emerged as the clear winner; consequently, no technical or process standards are yet in place. This is common in the early stages of new technology, one only needs to think about the 1980s videotape format war between VHS and Betamax to appreciate the potential implications of finding yourself on the wrong side of history. Likewise, operational siloes keep some companies from either developing clear business plans around blockchain or collaborating with ecosystem partners for mass adoption.

Foreword	The digital consumer	Smart(er) phones	The machines are learning	Connectivity takes off
Augmented Reality bites	The subscription prescription	Block by blockchain	Contacts	

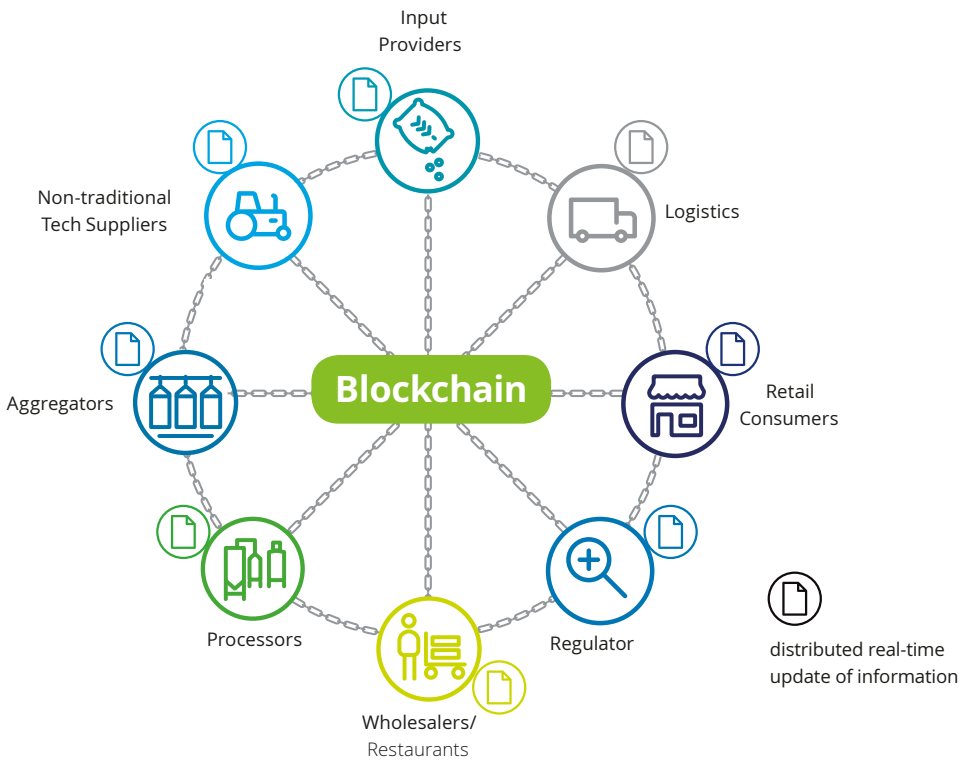
Figure 7. The food supply chain today and tomorrow

Food supply chain

Today



Tomorrow



Source: Deloitte Ireland 2017[69]

Foreword	The digital consumer	Smart(er) phones	The machines are learning	Connectivity takes off
Augmented Reality bites	The subscription prescription	Block by blockchain	Contacts	

In the latest blockchain trend that will unfold over the next 18 to 24 months, we expect to see more organisations turn initial use cases and proofs of concept (PoCs) into fully deployed production solutions. Though the tactics they use to achieve this goal may differ by sector and unique need, many organisations will likely embrace three approaches that, together, comprise the latest blockchain trend:

- focus blockchain development resources on use cases with a clear path to commercialisation
- push for standardisation in technology, business processes and talent skillsets
- work to integrate and coordinate multiple blockchains within a value chain.

Use cases

Among consumer enterprises, we believe that blockchain will (in the short term) have the largest impact on traceability across the supply chain. In a supply chain, a private or permissioned blockchain may be implemented, dictating a user's ability to read and write to the blockchain. The implementation of blockchain technology can be used to solve or reduce common issues such as traceability, compliance, flexibility and stakeholder management.

Blockchain's tracking capabilities (including timestamping) provide a full audit trail which gives businesses increased confidence in the authenticity and quality of goods, impacting sourcing decisions. The distributed nature of the platform allows for greater oversight and control of products while real-time tracking via smart contracts gives supply chain stakeholders the flexibility to make rapid decisions and update inventory levels on a continuous basis, thereby reducing working capital inactivity.

Not only does this benefit companies from an operational point of view, it also has direct consumer applications. Figure 7 shows how disconnected the consumer is from the input providers and farmers in a traditional food supply chain. However, with a blockchain enabled supply chain, the consumer is only one step away from knowing about inputs at this stage of production.

With provenance of food becoming a growing concern for consumers, blockchain ensures confidence that the food you are eating reflects what has been advertised on the packaging. The importance of establishing detailed product provenance has potential well beyond the food industry. In the luxury goods sector, where authenticity is vital and fake products are abundant, blockchain removes uncertainty from purchases and creates confidence in even second hand goods. In industries where safety is critical, such as the automotive and aviation industry, blockchain can guarantee that manufacturing processes adhered to the strictest, most rigorous standards.

Case study: Provenance – using blockchain to tell a product's story

Provenance is a Software as a Service (SaaS) platform that enables brands to track and display their supply chain information using blockchain.[70]

Transparency regarding where products come from is something many companies stress, and are quick to promote their corporate social responsibility initiatives. A new network is using blockchain to help companies share information on their supply chains.

Provenance is a data platform that enables brands to introduce greater transparency by showing the history of a product. Using blockchain, companies can easily tell their products' stories, verify their supply chain and use this data to show their brand's transparency and authenticity.

Businesses can create a free profile on the Provenance platform, and input information about the materials, people and processes behind their products. For the £29 per month plan, companies can generate labels and unique product IDs to prove product authenticity, as well as add manufacturing stories to their e-receipts.

Foreword	The digital consumer	Smart(er) phones	The machines are learning	Connectivity takes off
Augmented Reality bites	The subscription prescription	Block by blockchain	Contacts	

Case study: INS

INS to create a decentralised grocery shopping platform so consumers can buy directly from manufacturers.

INS is a company that provides a glimpse of what the future of retail could look like. It plans to build a blockchain-based platform that will allow consumers to order their favourite branded goods direct from the manufacturers. The enterprise believes this could offer consumers a considerable discount on the prices they currently pay in supermarkets. As the brands will be free to set their own prices, without the need to negotiate with supermarkets and invest in trade promotions, they could conceivably improve their product margins while also saving the consumer money. INS claims that the potential savings for consumers could be as much as 30 per cent.

INS was set-up by the founders of grocery delivery service Instamart and a group of blockchain experts. They have completed their first round of funding, raising $42 million and already signed memoranda of understanding with a number of leading consumer product manufacturers such as Unilever, P&G and Mars.[71] INS will also allow global and national brands to sell alongside local and independent producers who would otherwise fail to achieve listings in supermarkets allowing the consumer to decide which products most interested them.

The platform which is currently in development proposes to use blockchain for order payment and fulfillment. Consumers will be able to pay in three different ways: FIAT currency, cryptocurrencies such as bitcoin or Ethereum or via INS tokens which will be created to facilitate trading and rewards on the platform.

Blockchain also has the potential to change the way we shop and pay for products. In the consumer products industry, blockchain's most obvious application – if not the most compelling because of entrenched competition from cash, and credit and debit cards – is as an alternative payment platform in retail. Other applications are more futuristic. For instance, DocuSign, a provider of electronic-signature and digital transaction-management technology, created an app for Visa's 'connected car' proof of concept; the app integrates with the bitcoin blockchain and can record contracts. It is intended to simplify the car buying and leasing processes and enable auto-based secure payments. In travel and hospitality, as well as retail, blockchain may offer a superior means of powering loyalty-points programmes – including more advantageous accounting treatment of the liabilities created by the accrual of points, real-time updating of points balances, and better management of points across franchised operations – because its shared distributed ledger can simplify the settlement process.

Across the consumer industry, blockchain will become a standard tool for solving certain strategic challenges, but it will also facilitate innovation and offer solutions to problems we did not know existed. Ultimately, blockchain could provide the foundations for a completely new way of doing business.

Foreword	The digital consumer	Smart(er) phones	The machines are learning	Connectivity takes off
Augmented Reality bites	The subscription prescription	Block by blockchain	Contacts	

Turning ideas into reality

Regardless of industry bias, blockchain use cases that feature a clear path to commercialisation often stand a better chance of reaching production. By focusing available resources exclusively on those use cases and proofs of concept (PoCs) Chief Information Officers (CIOs) are offering clear incentives for stakeholders and partners, driving return on investment in individual blockchain solutions, and potentially creating additional revenue or cost saving opportunities. In a way, they are also formalising and legitimising blockchain development strategies, both prerequisites for further refining project goals, setting timelines and recruiting specialised talent.

By answering the following questions, companies can assess the commercial potential of their blockchain use cases:

- How does this use case enable our organisation's strategic objectives over the next five years?
- What does my implementation roadmap look like? Moreover, how can I design that roadmap to take use cases into full production and maximise their ROI?
- What specialised skillsets will I need to drive this commercialisation strategy? Where can I find talent who can bring technical insight and commercialisation experience to initiatives?
- Is IT prepared to work across the enterprise (and externally with consortium partners) to build PoCs that deliver business value?

Bottom line

Blockchain provides huge operational upsides, but businesses will not be the only beneficiaries of this transformational technology. The ultimate beneficiary will be the consumer. If blockchain can create efficiencies and save costs throughout the supply chain, these benefits can be passed on to the consumer in the form of lower prices. If blockchain provides more transparency across the supply chain, these benefits can also be passed on to the consumer in the form of safer products and higher quality. And, if blockchain is used to provide comprehensive product tracking and tracing throughout the manufacturing process, then consumer trust around the provenance of products will grow.

Blockchain has the potential to disrupt and transform the consumer industry, but there are a number of challenges it must overcome to enter the mainstream. Companies should look to standardise the technology, talent and platforms that will drive future initiatives and, after that, look to coordinate and integrate multiple blockchains working together across a value chain. While blockchain can be used in isolation, it is likely to have a bigger impact when combined with big data and other technologies such as the Internet of Things and AI.

Blockchain is not a tactical response to a standard technology problem.[72] While it can facilitate transformation, a clear strategy must be developed based on proofs of concept for opportunities. Complexity and value will inherently differ between organisations as will business objectives and strategies on how to achieve them.

Foreword	The digital consumer	Smart(er) phones	The machines are learning	Connectivity takes off
Augmented Reality bites	The subscription prescription	Block by blockchain	Contacts	

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Augmented Reality bites	The subscription prescription	Block by blockchain	Contacts	

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Foreword	The digital consumer	Smart(er) phones	The machines are learning	Connectivity takes off
Augmented Reality bites	The subscription prescription	Block by blockchain	Contacts	

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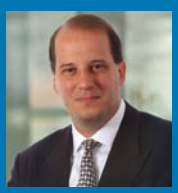

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