

# The Connected Business

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## Tech firms hope new year will start with a bang

Untried products and shifting markets will feature in the industry's story in 2016, says *Richard Waters*

We may hope Santa will bring us gadgets that can make our dreams come true, but it is worth remembering that big technological leaps do not happen quickly. Nokia's 9000 Communicator packed email, web browsing and fax into a phone in the mid-1990s, while the iPhone, launched in 2007, came after more than a decade of developments.

With hindsight, such breakthroughs seem to have been inevitable. But false dawns abound – and 2016 is likely to have more than its fair share of them.

In a period of abundant experimentation, the challenge will be telling which are harbingers of shifts in work and personal life and which are dead-ends in technology evolution.

The new year may begin with a bang, with the mass-market launch of a staple

of science fiction, virtual reality (VR) headsets. Facebook's Oculus Rift will finally hit the market in the first quarter, following Samsung's introduction of its own VR headsets, also using Oculus technology, this year. Before the end of 2016, augmented-reality goggles from Magic Leap and Microsoft, which overlay virtual images on to a view of the real world, could also become available.

The much-hyped arrival of 3D television three years ago is a reminder of how expectations of eye-catching technologies can be ahead of reality. Even if virtual and augmented reality do not flop they will have trouble living up to expectations. High prices – the company has said the headset will cost "up to \$400", though a bigger cost will be buying a PC capable of running the software – a shortage of content and applications, and uncertain consumer adoption of



such a different technology cloud short-term prospects. Companies such as Facebook have been doing their best to talk down expectations, but 2016 will at least bring the first real glimpse of a computing platform with profound implications for entertainment, social interaction and work.

Another future computing platform is likely to see a burst of innovation after a disappointing first wave. "Wearables" such as smartwatches were meant to extend mobile computing beyond smartphones and tablets to other, even more convenient, products. However, the two flagship wearables of 2015 have not lived up to the hype surrounding them. The performance of the Apple Watch has been cloaked in uncertainty

3D television is a reminder of how expectations of eye-catching technologies can be ahead of reality

as the company has not provided firm sales numbers and Google's Glass has gone back to the drawing board.

Both are likely to appear in their second iterations in 2016. Optimists will point to the fact that the iPod and iPhone had only modest sales before hitting their stride in year two. But wearables have yet to develop must-have apps and the advances are now needed in the uses to which they can be put rather than in developing the hardware itself.

If delivering a breakthrough product is hard to plan, the technological forces that make them possible are easier to trace. In the same way that cheap sensors, power-efficient processors and higher-bandwidth mobile networks made the iPhone possible, a number of factors are pushing what is likely to be one of the defining technologies of 2016

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## The Connected Business

## Lending services revolution piles pressure on banks

## Financial services

Investment in the fintech sector is likely to increase over the coming year, reports *Emma Dunkley*

From banking to investment, mobile technology has revolutionised access to financial services as clients demand the ability to transfer money or take out an instant loan while they are on the move.

In the past year, traditional lenders have been working hard to keep up with the latest developments or risk having business models upset, or even killed off, by nimble “fintech” companies.

While this is not expected to change in 2016, some investors believe there are certain fledgling companies in particular sectors that are set to grow over the next year, which may present opportunities for would-be backers.

Warren Mead, head of alternative finance at KPMG, expects that investment in fintech will balloon to more than \$30bn over the coming year, up

from \$20bn this year and \$12bn in 2014.

Mr Mead says that 2016 could be “the year in which peer-to-peer (P2P) lending becomes mainstream – expect significant growth and continued investor appetite. We might even see the first UK initial public offering of a P2P business.”

Peer-to-peer lending, which emerged in 2004 with the UK’s Zopa platform, connects investors to borrowers online with the aim of reducing rates on loans and increasing returns on investment.

These lenders, who provide loans to companies and individuals quickly and often attract smaller business that banks have rejected, are growing at a rapid rate. In the UK, cumulative lending reached £3.7bn by the end of the third quarter, up from £2.6bn at the end of the first.

Government is also increasingly interested in the sector. Harriett Baldwin, economic secretary to the Treasury, said in October: “We believe that peer-to-peer lending is a brilliantly innovative new form of finance, which we want to see continue to grow and evolve.”

Other alternative lenders that are not P2P, such as Iwoca, which offers credit

facilities to small businesses, have emerged in recent years.

“The revolution in lending will continue with [companies such as] Zopa and Funding Circle leading the charge, while emerging players, such as Iwoca, Borro and MarketInvoice will all be ones to watch in 2016,” says Tim Levene, founder of Augmentum Capital, which backs European fintech companies.

Other potential competition for the traditional institutions comes from the so-called “challenger” banks, such as

‘Traditional institutions have been slow to embrace new technology’

the UK’s first mobile-focused lender, Atom, which will be launched next year.

Paul Lamacraft, fund manager of Woodford Investment Management, a shareholder in Atom Bank, says: “Due to the many different IT systems that traditional banks have in place, they face a real challenge in modernising and

have, therefore, been slow to embrace new technology.”

In contrast, challenger banks have no legacy issues. They can develop infrastructures that adopt and adapt to the latest technologies and offer products designed for “the needs of today’s consumer”, says Mr Lamacraft.

But large high street banks, as part of their fightback, are starting to work with innovative companies and, in doing so, they are providing another possible growth avenue for investors.

Chris Wheatcroft, of Angels Den, a crowdfunding platform, says one example is DataSine, a UK tech company whose proprietary platform analyses transactions to create psychological personality profiles that can be used by banks to personalise services and target marketing messages better.

Next year could also see more disruption in the insurance industry from the likes of Digital Risks, which provides online specialised insurance and risk management services for tech businesses. Mr Levene at Augmentum says: “I’ve no doubt that there will be several unicorns [start-ups with more than

\$1bn in funding] in that space in the coming two to three years.”

One area affecting all sectors and businesses is the “cloud”, which uses a network of remote internet-based servers to store data, rather than a local service or computer.

Mark Hawtin, manager of the GAM technology strategies fund, says that of the \$1tn companies spend annually on IT hardware, software and services, somewhere between 2 per cent and 5 per cent goes to the cloud.

With banks, insurers, asset managers and traditional businesses all facing the prospect of disruption, many are now being forced to digitally innovate and collaborate with new cutting-edge companies offering to guard against hackers.

“Until recently, security has been a key barrier to broader cloud adoption, with companies worried about losing control of their data,” says Mr Hawtin.

“But, with the endless string of security breaches in the past two years, the vast majority penetrating corporate-owned IT systems, cloud is looking like a relative safe haven.”

## Tech firms hope new year will start with a bang

*Continued from page 1*

and beyond: artificial intelligence. The largely invisible nature of AI means predicting how it will affect popular consciousness is as much a sociological as a technological challenge. Two years ago, a wave of anxiety spread that intelligent machines would put humans out of work. The same concerns were rife in the 1960s, but AI technologies are now advancing quickly.

Cloud computing power and new approaches to machine learning, with the “big data” that act as the raw material for AI systems to “learn” from, have combined to bring a leap forward in machine intelligence. Some of the planet’s richest, most ambitious companies have hired top academic talent – such as Facebook, which in 2013 hired Yann LeCun, a computer scientist who founded the Center for Data Science at New York University – signalling something of an AI race is under way.

The results of this competition will be largely hidden from view. Many AI advances will come in the form of improved performance of existing systems or in more effective man-machine interactions, rather than new products or services. Voice activation is likely to feature on more devices, along with more intelligent forms of interaction. Businesses that learn how to use the technology should create more effective advertising, enjoy a higher conversion of leads into sales, and have happier customers. However, the last thing most of these businesses will do is brag. Results will be seen in the gulf between the performance of companies that harness this technology and those that do not.

The tendency with technology is to always look forward to the next big thing, so it is easy to forget the big thing that is already here. As 2016 dawns, the

Companies have rushed to hire academics, signalling the start of an AI race

## Battle to win the eyeballs of early adopters has begun

Advertising Companies are preparing for the arrival of virtual technology, says *Shannon Bond*

Broadcaster HBO lets *Game of Thrones* watchers ascend a 700-foot ice wall. Customers of the footwear company Merrell lace up their shoes and climb a treacherous ridge in Italy’s Dolomites. Mountain Dew, the Pepsi-owned beverage brand, takes would-be snowboarders to carve fresh tracks on the slopes of Utah.

In each case, the journey is a digital one, made possible by virtual reality (VR).

Interest in the technology has been building as a number of headsets are coming to market that will allow consumers to use their smartphones, computers or gaming consoles to immerse themselves in three-dimensional, 360-degree virtual environments.

Gaming companies and entertainment groups are gearing up to produce new forms of content for devices such as Samsung’s Gear VR, which went on sale in November, and Sony’s PlayStation VR and Facebook’s Oculus Rift, which are both expected to be available next year.

Advertisers do not want to be left behind. IHS, a consultancy, forecasts 38m VR headsets will be sold by 2020, including the inexpensive Google Cardboard. Analysts at Piper Jaffray predict

spending on devices and content will total more than \$60bn in the next decade. But no one yet knows what the equivalent of the 30-second TV ad will look like in virtual reality, which many expect to be the next big tech platform.

“It’s at the mobile flip-phone stage. We haven’t gotten to the smartphone era yet,” says Resh Sidhu, creative director at the Framstore VR studio, a visual effects company that has worked on virtual reality projects for HBO, Volvo and Marriott hotels.

Most marketers believe full-blown integration of advertising into VR is some way off, but they say 2016 will be an important year in the development of the medium as more affordable headsets become available to early adopters.

Online gamers are likely to be among the first to buy into the technology. “Gaming will be a Trojan horse,” Ms Sidhu says. “It’s the way into consumer households. . . . The real test will be the quality of that content. We’re on a mission to get marketers to create experiences that are memorable and add value to consumers’ lives. If not, we’re at risk of jeopardising the medium.”

Marc Gowland, executive creative technology director at ad agency Deutsch, expects virtual reality and its



**Different view: people trying the Google Cardboard virtual reality experience**

David Paul Morris/Bloomberg

sibling, augmented reality, in which digital images are superimposed over the real world when viewed on devices, to be “more and more on clients’ radar”.

But, he warns, there may be complications. “How do you interact with a brand or entertainment when you have a 360-degree world to look around?” he asks. VR may work best in cases where people “have a reason to engage with the brand versus just reading information or consuming small fragmented bits”, he says.

Car companies have a perfect platform for testing VR, Mr Gowland says. A client could use a website to customise a car with their preferred features and colours. Then they could visit a virtual dealership to see models and options. A visit to the dealer would occur when a customer decided to buy.

Mr Gowland says one advertising opportunity is the application of artificial intelligence (AI) to “build smarter experiences that are more magical in their delivery. . . . We can give the customer more while asking them for less.”

AI can make it possible to search for information in plain English – so-called “natural language” – which can help brands have what Mr Gowland describes as “more human” interactions with their customers.

‘How do you interact with a brand when you have a 360-degree world to look around?’

## US elections offer rich pickings for cyber criminals

## Security

Hackers view new technologies as potential revenue streams, reports *Hannah Kuchler*

The era of the large-scale cyber security breach looks set to stretch into 2016, with new targets replacing the likes of US-based Anthem Healthcare, Ashley Madison, a Canadian dating website for married people, and UK telecoms company TalkTalk in the headlines.

Hackers have become experts in finding new vulnerabilities to exploit as soon as old holes are closed. In contrast, there has been no great leap forward in cyber security defences.

Instead, security experts are predicting next year will see criminals abuse new technologies, such as the increasing reliance on mobile payments, and will see cyber attacks centred around political conflicts – from the battle with Isis to the US election.

“We have this horrible game of co-evolution of attackers and defenders, 365 days a year,” says Dr Richard Ford,

chief scientist at Raytheon Websense, a cyber security company.

Criminals will become more interested in attacking smartphones as laptops become more secure. Retailers that have spent this year securing their conventional point of sales systems after past breaches could see another wave of attacks as they shift to allowing customers to pay by phone at check-outs.

“There’s a lot of work for defenders every time there is a new technology,” Dr Ford says. “Attackers always think: ‘how can I use that to make money? To accomplish my job?’”

Kevin Mahaffey, co-founder and chief technology officer at Lookout, a mobile security start-up, says his company has predicted a “mainstream attack” on the iOS operating system used by Apple devices, which has in the past been less targeted than Google’s Android system.

Such attacks have already happened, as several “infected” apps found their way into the Apple App Store this year. “We were surprised by how fast it happened,” says Mr Mahaffey, adding there

**Hacked off: Dido Harding, chief executive of telecoms group TalkTalk**

may have been many more attacks that were not disclosed, as companies usually are only legally required to announce a breach if it affects customer data.

Concerns about the cyber security capabilities of Isis are also rising as the line between physical and cyber war blurs. In 2014, it was the conflict in the Ukraine that spilled over into cyberspace, but in 2016 many worry that Isis – or hired hackers working on its behalf

– could conduct cyber attacks. UK chancellor George Osborne recently warned that Isis was plotting to disrupt air traffic control systems and hospitals.

Many experts are concerned that the US presidential election will be targeted by cyber criminals. On a basic level, this could mean phishing emails that use news events or social media comments to lure recipients to insecure sites.

But it could also see campaign databases targeted by more sophisticated attackers, who are seeking large pools of detailed data, such as those obtained by hackers in the breaches at the US-based Office of Personnel Management and Anthem Healthcare.

Few experts see defenders gaining the upper hand in 2015. What some hope for, however, is that the insurance industry will come up with more robust options for companies to help protect against financial losses.

Insurance providers have struggled to assess risk and to set prices for cyber insurance policies, leaving some victims finding themselves out of pocket or without cover at all.

Comparing cyber insurance with car insurance, Dr Ford says insurers are working to find ways that can be the



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The Connected Business

# Executives seek excitement in latest plans for smartphones

**Mobile devices** Big marketing campaigns are not enough to entice buyers, says *Daniel Thomas*

Smartphone makers are facing something akin to a mid-life crisis. The excitement of the early days when people were clamouring for the latest technological marvel is long gone. Almost everyone has a phone in their pocket and, to a great extent, these devices look and act the same.

Companies such as Samsung, Sony and HTC are struggling to maintain the pace of innovation and are finding sustainable profits difficult in a market that is increasingly focused on low prices rather than high technology.

Analysts agree these groups need to find a way to inject excitement back into the market – and not simply by relying on big-buck marketing campaigns and celebrity endorsements.

But true innovation has stalled in the past two years, according to executives at mobile groups who complain about the lack of differentiation on offer to customers. Telecommunications executives fear there will be more of the same next year, with little in the plans outlined in confidence by handset makers so far suggesting much will change.

One telecoms executive, who did not wish to be named given her company's links to the smartphone makers, predicts there will be mostly incremental improvements on previous ranges.

Phones will be updated with sharper screens, faster processing and more precise cameras, she says. But they are

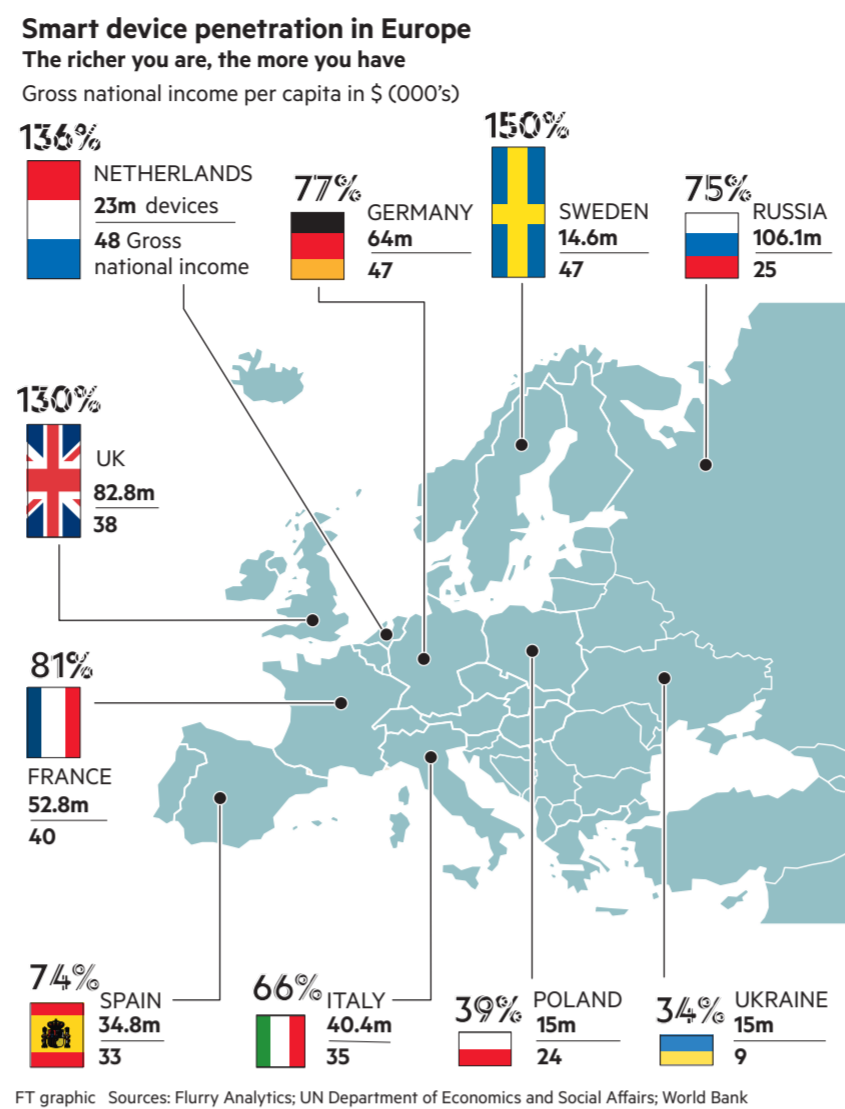
largely the same shape and broadly the same size. "The main trend next year will be how the phone looks and feels, as well as with improvements to the battery life and camera," she says, pointing to devices featuring dual cameras to provide greater depth to photos.

Instead, consumers can expect to get better deals on more expensive devices, with Chinese smartphone makers such as Huawei expected to continue to grow market share with phones offering the same sort of features as those from Apple and Samsung but at a lower price. Chinese manufacturers are "making handsets a commodity, with high specifications at an affordable price", says one telecoms executive.

However, the most excitement will come from the titans of the industry – Apple and Samsung – which will continue to slug it out with the most high-profile launches of the year.

Apple will almost certainly launch an iPhone 7 – probably in the autumn – while Samsung will find room for the Galaxy S7, most likely in February at the Mobile World Congress event in Barcelona, Spain. Both manufacturers are said to be developing pressure-sensitive screens, so the strength of the users' touch can let loose a range of added menus.

LG, Huawei and HTC are also expected to unveil new handsets in the spring to avoid clashing with Apple. Sony, whose future in the market has



FT graphic. Sources: Flurry Analytics; UN Department of Economics and Social Affairs; World Bank

been questioned given sluggish sales, is predicted to fight on with the Xperia Z6, while Google will continue to update its Nexus range.

Poor sales have also led analysts to ask if Microsoft has the appetite to keep the Windows phone franchise going. One boost, according to analysts at CCS Insight, would be if chipmaker Intel supports Windows 10 mobile in 2016. Qualcomm, the other big US chipmaker, already supports Windows 10 phones, and such a move by Intel might encourage more manufacturers to do likewise.

However, there is always the chance of a surprise. CCS Insight predicts at least one manufacturer will offer a "radical new smartphone design using free-form [non-rectangular] display technology in 2016".

CCS says that mobile phones have been constrained by the need for a rectangular display, but that free-form display technology from suppliers such as Sharp will break this mould.

Other innovations will emerge in

connected wearable devices, according to telecoms executives, even if some still question whether there is consumer demand for more smartwatches.

CCS sees niches opening in the wearables sector, such as pharmaceutical companies making disposable devices part of medical prescriptions to remind the wearer to take medication, or suggest different dosages depending on data gathered by the band.

However, CCS says that the most popular wearables will have a fitness theme, such as the Fitbit fitness tracker band. Devices that track children are also expected to become more popular.

CCS expects Google to develop a version of Android Wear to offer low-cost fitness bands, including its own "Nexus Band", which will generate data that can be used for advertising sales.

Virtual reality is also likely to be a prominent theme, with low-cost headsets that can link up with the Samsung smartphone range, which will be available for gaming and movie watching.

# Europe's start-ups attract investment

**Innovators**

*Murad Ahmed* identifies a selection of cutting-edge companies to look out for in the coming year

While Silicon Valley has been churning out world-beating tech start-ups for decades, over the past few years Europe has also begun to produce young digital companies that are gaining global attention. In 2015, companies such as London-based online money transfer group TransferWise, Paris-based ride-sharing service BlaBlaCar and Amsterdam-based payments processor Adyen, all gained valuations over \$1bn following new investment. So here is a selection of the companies to look out for in 2016.

**Onfido:** Founded in 2012 by a three 20-something Oxford university graduates, this platform automates background checks on would-be freelance staff. It is already being used by UK-based sharing-economy companies such as Deliveroo, a food delivery group, and Hassle, a cleaning service.

It allows companies to check the criminal and financial histories of people trying to get work for on-demand platforms, giving some reassurance that those offering their services are trustworthy. Onfido has raised \$5.3m to date and has top investors on board, including Lastminute.com co-founder Brent Hoberman and BlaBlaCar co-founders Frédéric Mazzella and Nicolas Brusson.

**EyeEm:** This Berlin-based company has created an app that allows people to share photographs with professional publishers.

It has become a network for 13m amateur snappers who can make money from their best shots by offering them as stock photography.

It raised \$18m last year from Valar Ventures, a fund run by Peter Thiel, the co-founder of PayPal.

**Improbable:** This three-year-old UK company is building cutting-edge technology that can create "virtual worlds". These online universes could have multiple applications, from allowing thousands to play complex computer games all at the same time to allowing healthcare staff to simulate how a virus spreads across a city transport network.

The concept is the brainchild of its chief executive, Herman Narula, who founded the company with fellow computer science graduates from the University of Cambridge. In March, it received \$20m in investment from Andreessen Horowitz, one of Silicon Valley's top-tier venture capital funds.

**The Curious AI company:** Based in Helsinki, this group is trying to develop software that can learn and think for

Online universes could have multiple applications, from gaming to healthcare

itself – with the goal of creating robots that mimic human cognition. Founded just this year, it has raised \$894,000.

**Tictail:** This Stockholm-based company has created an online platform that allows individuals and small businesses to set up their own online retail stores. Co-founded by Swede Carl Waldekrantz, its chief executive, in 2011, it has helped more than 85,000 brands create their own digital shop fronts. Its planned expansion in 2016 will be fuelled by the \$22m it raised in July from venture capital groups.

**Vinaya:** Based in Shoreditch, London, and formerly called Kovert Designs, this company is trying to bridge the high-fashion, high-tech divide.

Founder Kate Unsworth's ambition is to create "wearable technology" in the form of items of jewellery, fitted with sensors, which allow wearers to receive emergency notifications when their phones are out of reach.

# Sixty years on and we are still waiting for the house of the future



At the annual Consumer Electronics Show in Las Vegas next month, people will again be talking about the "smart home", full of wirelessly networked toasters, kettles, heaters and lights.

Theorising about the "home of the future" has a long history. It has been called, at various times, the automated home, the connected home and the smart home. The French have coined the term *domotique* to describe it, although this has not really caught on outside the francophone world.

Predicting just which digital gadgets and services will be most popular around the home is more difficult, however.

For example, at the Dublin Web Summit last month, I saw Israeli start-up Candle Touch, which makes a real, scented wax candle you can light with a smartphone app. But I am inclined to be sceptical about how useful this will be. Surely striking a match to set the mood is not one of the huge problems we are waiting for technology to solve?

But then I looked up what I had written 10 years ago about the "digital home" and felt humiliated by the inaccuracies of my forecasts.

I was, for example, dismissive about the take-up of services streaming music over the internet. Don't judge me too harshly. This was, you must remember, 2005, and Pandora had only just come on to the scene and Spotify would not be launched for another three years. While we had iPods, the iPhone was still two years away.

Nonetheless, it was chastening to note that I was less accurate, in fact, than an article published in the US magazine Ladies' Home Journal in 1900. This predicted that one day "grand opera will be telephoned to private homes".

In addition to that article, there is a 1956 illustration titled House of the Future, by artist Fred McNabb that seems remarkably prescient. While some of the things it depicts, such as helicopter commuting, have not come to pass, a flatscreen TV and a girl



Future perfect: Jane and George Jetson have a Skype-like chat as a robot cleans up. Futurologists did not foresee humans performing mundane manual tasks — Alamy

talking to a friend over what looks like a tablet device seem strangely modern. However, it also shows a man smoking a pipe – no one foresaw our obsession with health.

The picture could almost have been the inspiration for the 1962 Hannah-Barbera cartoon series *The Jetsons*, in which a typical family in 2062 is looked after by sentient robots and devices. However, we did not know then that so much work in the new millennium would still be performed by humans.

The Ladies' Home Journal article also predicted deliveries from shop to home by pneumatic tube. In fact, a system of

TaskRabbit in the US and Deliveroo in the UK, have given us cheap ways of parcelling out these kinds of chores to other people rather than machinery.

One thing that has not changed since my 2005 article is the concern about how smart devices connect. Vendors then were slow to adopt common standards, and they still are.

My colleague, Tim Bradshaw, reported this year that he had – almost – managed to create a working smart home system in his house, complete with connected lightbulbs and kettle. However, supposedly compatible devices were not always communicating – the lightbulbs would not link to the home hub for example – and the whole thing added "more complication than automation".

Some of the names of the companies seeking to associate themselves with the smart house have remained constant over the past 10 or so years. Microsoft and Intel, for example, have been building iteration after iteration of the connected home for more than a decade. But other names are new. Back in 2005, Google was still just a search engine, and Apple's efforts to make a TV set-top box in the 1990s had failed. Amazon, which this year launched a voice-controlled home-hub product, mainly sold books.

It may well be that the smart house is at last becoming a reality. But the names of the companies that will be providing the technology to run it could still turn out to be a surprise.

I am inclined to be sceptical about how useful an app that lights a candle will be

pneumatic, underground tubes for delivering mail was built in the late 1800s in cities that included London, Rome, Paris, Vienna and New York.

Today, although the idea of transport via a sealed tube is being revived by Elon Musk's Hyperloop, home deliveries are much more likely to be made by a human employed by a delivery company.

Tech companies have regularly promoted the "smart fridge" that would automatically order your groceries. What has happened instead is that a series of start-ups, such as

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