

# The Connected Business

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## IT incumbents learn to love the cloud

Established groups are keen to demonstrate they are still relevant, writes *Richard Waters*

**R**evolutions in corporate IT systems tend to take years. But even in slow motion, the effects can at times be startling.

So it is with the current swing towards cloud computing, which is poised to pick up momentum next year.

Established leaders in the IT industry have been trying, with mixed success, to demonstrate they are still relevant in a world of vast and agile data centres and technology delivered as a service.

For years, it has been clear that trends such as these represent the future of IT. However, the inertia of corporate spending meant there was no advantage for the established leaders of the business technology world in rushing their customers into a new era in which their own dominance – and profit margins – would be called into question. But meaningful portions of IT budgets are now starting to shift this way.

If 2014 was the year that companies including IBM, Microsoft and Cisco faced up to the need for a deeper and more rapid overhaul of their businesses, it will become clear in 2015 just who the winners and losers from the cloud revolution will be.

Two months ago, IBM abandoned its demanding profit targets, citing the need to ramp up investment in its cloud computing business. Meanwhile, Microsoft chief executive Satya Nadella has put the cloud at the centre of strategy



this year. The software company plans to move from its heavy focus on PCs, while Cisco has been forced to shed staff in the face of growing pressure on its core networking equipment business.

Behind this upheaval lies a shift in the

pattern of spending on IT. As more routine workloads are automated or farmed out to cloud companies, a greater share of the budget is being freed for more productive uses.

The question for chief information

officers will be how much money they can provide for projects that will help business managers achieve their most pressing objectives, while taking advantage of cloud infrastructure to cut costs.

According to Forrester Research,

technologies with a direct impact on a company's business, such as customer relationship management services and analytics, eat up only about 20 per cent of IT spending. But they are where the

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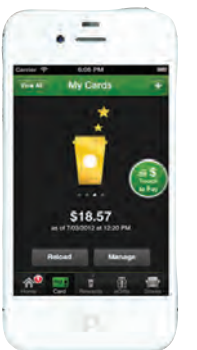
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## Leaks and breaches boost privacy protection start-ups

### Online data security

The stolen pictures of a Hollywood star have raised the concerns of ordinary people, says *Hannah Kuchler*

Companies that aim to provide better standards of privacy for internet users are hoping to seduce the mass market next year, after sprouting in 2014 to cater for customers increasingly worried about their data.

Businesses focused on providing private messaging, calls and browsing have surged in popularity after revelations last year by National Security Agency contractor Edward Snowden highlighted how much important information about people can be found online.

But users for such services so far are in the millions, not billions, and companies including San Francisco-based Wickr and Abine are working on forming partnerships to boost the number of people signing up.

Nico Sell, chief executive of Wickr, has struck deals with partners as varied as the CME Group, the US exchange operator, which is interested in private messaging for traders, and Wargaming, an online gaming company.

"I think we'll get to tens of millions of users through natural growth of the app," she says. "But the board won't settle for anything less than 1bn users. They push me every single day and the only way to get there is through partnerships."

Both the CME Group and Wargaming also invest in Wickr, as do Richard Clarke, a former White House security adviser, Jeff Moss, the founder of the Def Con hacking conference, and Breyer Capital, a private equity investor.

Ms Sell also has her sights on telecoms carriers, who can rapidly boost an app's popularity by preloading it on smartphones. She says Wickr is gunning for "pole position" on the phone, so its messages, which are not stored on a server and can be set to disappear, become the standard.

The market should be there. According to a survey from the Pew Center Research Center, 81 per cent of US adults feel "not very" or "not at all secure" using social media sites to share private information; 61 per cent feel insecure using chat or instant messages;



Start-up founder: Nico Sell

and 57 per cent feel insecure sending private messages via email.

Lee Rainie, director of the Pew Internet Project and co-author of the study, says: "Far from being apathetic about their privacy, most Americans say they want to do more to protect it."

Rob Shavell, co-founder of Abine, which recently released the Blur security product to protect passwords, emails and financial information online,

'Here's why a small little company like mine is going to win: we will never give up the key'

also thinks next year will be crucial to making privacy mainstream.

Before the Snowden leaks, he says privacy tools were "fragmented" and none were "really user-friendly" for people who are not technical experts. The situation has been transformed in the past nine months, he says. There are a lot more start-ups.

Partnerships are important to helping Abine grow beyond its core audience.

"Privacy has to be easier and a better internet experience for it to go mainstream," Mr Shavell says. "You have maybe 25m-100m people globally that care enough to download or use different pieces of software, which is a very small minority."

He says Abine and its rivals will be seeking bigger partnerships, many of which will be announced in 2015.

Marc Boroditsky, president and chief operating officer at Authy, which wants to replace passwords with stronger authentication methods, has another theory about why consumers are increasingly interested in better privacy: Hollywood star Jennifer Lawrence. When nude photos of her spread over the internet after her iCloud account was hacked, it had a big effect on the everyday consumer, he says.

He notes that security breaches have been occurring every week or two. "Home Depot or Target or JPMorgan – everywhere you look, there's some kind of breach. The consumer might get inconvenienced, but ultimately an institution shields them – the banks absorb the costs, retailers reverse transactions and you go on your merry way," he says.

"But the Jennifer Lawrence pictures brought home that these systems may not be as trustworthy as we thought."

Mr Boroditsky thinks the password, insecure and easy to guess, will begin a slow death next year. "I would love to say next year is the year the password dies but I think next year is when we rally the troops to kill the password. It will take a couple of years to eliminate it on a large scale."

Big technology companies are also improving their own measures to protect privacy, realising there is a demand for safe as well as flashy products. Google, Facebook and Yahoo are among those improving their encryption.

But Wickr's Ms Sell thinks it will be a start-up combined with a bigger partner, rather than a company such as Google, that will eventually win out, because advertising-based companies have an interest in being able to access masses of data about their users.

Wickr's basic consumer app is free, but it charges for additions and tools.

Ms Sell says: "Here's why a small company like mine is going to win. We will never give up the key, [while] they will always want to be in the middle to know exactly what customers are doing. They aren't making money in a brand new way."



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Flight plan: SpaceX, founded by Elon Musk, has developed a reusable first-stage rocket that can be recovered from the sea, so reducing the costs of launching space vehicles. Other space exploration companies now hope to follow its lead

# Commercialisation of space is new final frontier

**Entrepreneurs Rich investors reawaken dreams of intergalactic travel, writes Jane Bird**

Space travel used to be the preserve of governments, but high costs and public spending priorities had driven it into hibernation, says Tom Captain, vice-chairman for aerospace and defence at consultancy Deloitte.

However, thanks to advances in technology, reduced costs and the interest of high-profile billionaires, the space industry is experiencing a renaissance. "Despite the risks, the vast investment and focus required, we're at the dawn of a new space era," Mr Captain says.

Passionate and dedicated investors such as Richard Branson, Elon Musk and Jeff Bezos have the money and willpower to succeed, says Mr Captain.

"These are very successful business people, who are not doing it as a science

experiment but because they see a commercial return."

His view is shared by Tom Markusic, chief executive of Texas-based Firefly Space Systems (see box, right). Entrepreneurs are spotting opportunities and believe they can do things more cheaply, Dr Markusic says.

Many of their companies are focused on reusability, miniaturisation and economies of scale. Recovering the first stage of a vehicle – which propels the rocket into space – may save up to 75 per cent of the launch cost, says Dick "Rocket" David, chief executive of NewSpace Global, which tracks more than 800 companies in the industry. "Reusability is the revolution."

He gives the example of the Falcon 9 rocket built by SpaceX, founded by Mr Musk: "No other company, government agency or military organisation, has accomplished what SpaceX has in the past year, which is to launch a rocket that delivers a commercial payload to the International Space Station and returns the rocket's first stage via a

### Case study Firefly hopes to fuel cost cuts

The market for small satellites is growing fast, but there are no rockets specially designed to launch them. They have to use existing rockets to achieve lift-off, says Tom Markusic, chief executive of Texas-based Firefly Space Systems.

"This is inconvenient, costly and doesn't necessarily take the satellites where they are wanted," says Dr Markusic, a seasoned space engineer. Recognising this need, he set up Firefly in January 2014. Its aim is to build a launcher, with the relatively modest price of a few million dollars, to send small satellites in to low orbit.

Designed for high-volume production, the launchers would achieve economies of scale not possible with rockets built for larger payloads.

The company has 40 staff at its headquarters near Austin and a 200-acre test site and its current focus is on propulsion for the rocket engine.

The plan is to use an aerospike engine, which is more aerodynamically efficient in directing the rocket's exhaust to produce thrust than traditional rockets. Engine testing will begin in mid-2015, and the first launchers are expected in 2017.

Once the rocket can be mass produced, the way to achieve significant cost savings will be to make it reusable, says Dr Markusic.

Firefly has plans to use methane as fuel, as it is efficient, cheap and emits fewer greenhouse gases. "But as this hasn't been done before, we need to prove it works," Dr Markusic says.

Jane Bird

soft landing in the Atlantic Ocean."

According to Dr Markusic, SpaceX "has legitimised the purely commercial approach to space travel that makes it possible for small companies like us to raise funds".

Blue Origin, founded by Mr Bezos, which aims to reduce the cost of space flight, and Mr Branson's Virgin Galactic, which has the goal of developing space tourism, have had a similar effect on the industry, Dr Markusic says.

Two incidents in October, the crash of Virgin Galactic's SpaceShipTwo, in which a pilot died, and the explosion of an unmanned Antares rocket operated by Orbital Sciences of the US, should be seen in the context of a hugely improved reliability record, Mr Captain says. "Launch success is now 98 per cent compared with 60 per cent in the 1970s."

The industry is focusing on miniaturisation, such as small "cubesats". These have a wide range of applications, from low-gravity experiments to improved weather forecasting.

Glasgow-based Clyde Space makes

cubesats that can be used for multiple purposes. They cost \$50,000 each, compared with \$100m for a single-purpose satellite. The company expects to make more than 25 in 2015 and 1,000 a year within five years, says Craig Clark, Clyde Space's chief executive.

Clusters of smaller satellites – called constellations – working together are highly robust, says Dr Markusic. If one fails, others can take over.

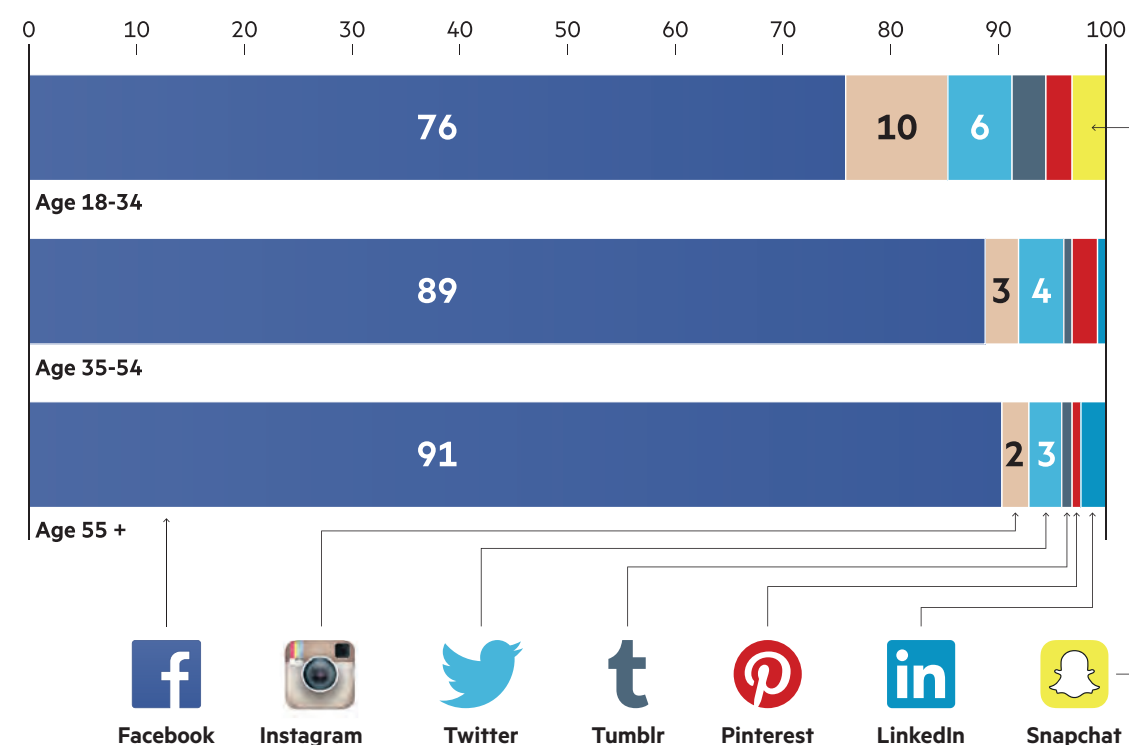
One of the potential commercial uses for small satellites includes better observation of things happening on earth as they occur. At present, commercially available images from space tend to be poor quality and out of date.

But soon, farmers will be able to see immediately if their cows are safe in their fields and supermarket bosses can check how busy their car parks are.

Deloitte's Mr Captain says the new space barons are also happy to use off-the-shelf equipment, which helps cut costs. "What's expensive about space is designing something for a special purpose," he says.

### How the most popular social media websites compare

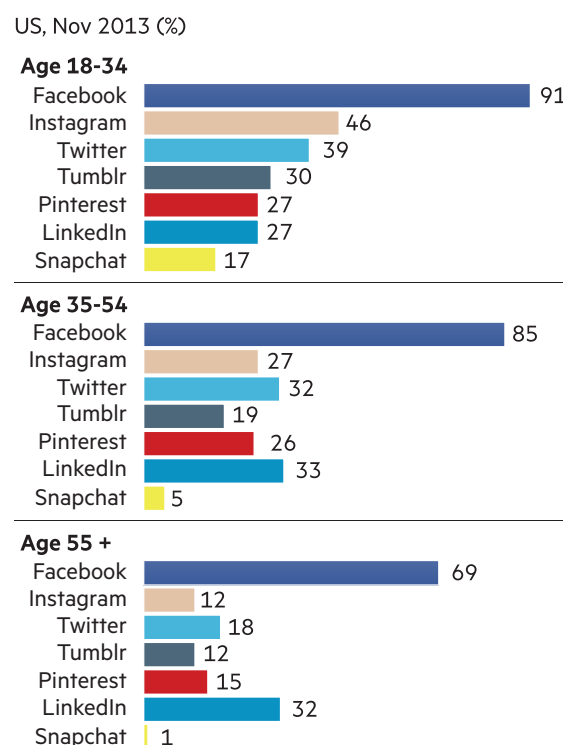
Total minutes among selected leading social networks  
US, Nov 2013 (%)



FT graphic. Source: Comscore

\* Selected social networks based on those with at least 1bn combined desktop, smartphone and tablet minutes in Nov 2013

### Penetration among selected leading social networks\*



## Wearables and cars stimulate demand

### Apps

Manufacturers are looking for easier ways to make the 'internet of things' a reality, writes Jessica Twentymann

"Exciting new experiences, right on your wrist." That was the promise made by Apple's senior vice-president of worldwide marketing Philip Schiller at last month's launch of Watchkit, the software development tool for the forthcoming Apple Watch.

Watchkit, said Mr Schiller, will enable developers to build apps that Apple Watch wearers can use to turn off house lights after they have left home, find the latest flight information on their way to the airport or make alternative plans to get there if their train or bus is late. American Airlines has already built an Apple Watch app, as has social-media photo company Instagram.

According to a report from Deloitte, downloads of mobile apps to smartphones and tablets are slowing, but the stream of coming devices could trigger a development gold rush, which is likely to kick-start another phase of the app economy's development.

Wearables, such as Apple Watch, the Google Glass headset and fitness-oriented wristbands such as FitBit, which measures exercise, calories used and sleep, are leading the charge, but apps for in-car "infotainment" systems, healthcare monitors and home appliances are not far behind.

Such "smart" devices are the fastest-growing element of the "internet of things", the linking of everyday objects to the internet so they can collect and receive information from other connected devices and web-based services.

The numbers of interconnected items – excluding PCs, tablets and smartphones – are forecast by IT market research firm Gartner to swell to 26bn units in 2020, from 900m in 2009.

It is thanks to apps that devices are able to collect and convey information about their usage, current state and immediate environment, as well as receive instructions and updates remotely from their manufacturers.

Today, most devices come preloaded with apps that help users make the most of the features and functions their phones or tablets offer, although an increasing number can be supplemented with extras from third-party developers available on app stores.

A proliferation of apps could signal problems ahead, warns Andy Hobsbawm, co-founder and chief marketing officer of Evrythng, a British start-up. If every device comes with its own app, he

explains, each interaction that customers have with it takes place within a silo. Setting the mood for a dinner party in a "connected home" – dimming lights, selecting music, warming the oven and setting the thermostat – could be a multi-app, multi-step process.

Frank Gillett, an analyst at Forrester Research agrees, noting that individual apps running on individual smart products, create "walled gardens" for users that it is hard to add services to.

Mr Hobsbawm comments: "Market fragmentation before consolidation is probably unavoidable, but a consumer backlash against millions of discrete apps seems inevitable."

Mr Gillett says that integration platforms such as Android Auto, Apple's HomeKit framework and Samsung's SmartThings, signal another approach, one that recognises the need to let customers add or integrate other devices, apps or services to items they already own, rather than forcing people to buy brand-new products.

Industry insiders say that cloud-based services are needed that can connect the apps running on multiple



Apple Watch wearers might be able to turn off their house lights after they have left home

devices, allowing users to share data and providing a central point from which to manage individual privacy settings and information access.

In this scenario, smart products themselves connect with each other to deliver easier interconnectivity. A washing machine may well come with its own app, for example, but it might plug in to a cloud-based integration platform in order to be able to communicate with a smartphone-based home management app such as Apple HomeKit, with product support services from retailers such as Tesco or Target, and with other in-house appliances.

In some cases, these interactions might be automated, without a person needing to use an app at all. In June, for example, home monitoring specialist Nest announced that it was working with carmaker Mercedes-Benz on a software integration project. As a commuter drives home from work, at a certain point in the journey the central heating or air-conditioning in their home can be switched on automatically by their in-car system, guaranteeing a warm (or cool) house on their arrival.

Everything already provides this kind of integration platform to clients that include drinks manufacturer Diageo and consumer goods provider Unilever.

## Facebook's latest rivals fight for attention

### Social media

There is an opportunity for alternative platforms to flourish alongside the big names, writes Maija Palmer

Inlope, which launched last month, is the latest social media platform hoping to make it big. The company, started by two 22-year-old German entrepreneurs and backed by Microsoft, wants to become the "local" social media network.

They see it as a site where people will go to connect with neighbours and with those who share their interests – a place to find a golf buddy or a local dog-walker. Christopher Obereder, one of the youthful founders, says the plan is to reach 1m people in the first year.

In the US, more than that number – and at least one horse – have already joined Ello, a new, US-based social media website that promises to never show you ads or sell your data. A further 3m people have signed up to join, according to Paul Budnitz, Ello's chief executive. The site aims to make money by offering a free basic service and a premium option that users pay for. Indeed, people have been signing up for Ello so quickly that the company was forced to bring forward plans to seek new investors and, in October, it raised \$5.5m from backers.

At this point it is traditional to ask: is one of these the next Facebook? But even Ello's financial backers steer clear

of any such claim. "No," says Lee Bouyea, managing director of FreshTracks Capital, one of the first venture capital companies to invest in Ello. "Facebook will be around for a long, long time. But there is an opportunity for alternative platforms to flourish alongside it."

Andrew Lipsman, analyst at ComScore, an internet analytics company, says: "Something new always gets talked up as the 'Facebook-killer'. I have seen that headline out there so many times. But it has never been true."

Facebook, with its 1.3bn users worldwide (as of June 2014), is still by far the most dominant social media site. Even the 18-34-year-old "millennials", who are the most likely to experiment with alternatives, still spend 76 per cent of their social media time on Facebook, according to research by ComScore.

"People aren't looking to swap over," says Ben Carson, head of product at Yatterbox, a company that monitors social media trends. "People [use] different social media sites but they tend to be working in sync with Facebook, rather than replacing it."

The most successful emerging social media platforms tend to be ones that fulfil a need that Facebook does not.

Instagram, which was bought by Facebook for \$1bn in 2012, was about making it easy to share pictures. Snapchat, a photo messaging app where pictures disappear a few seconds after being received, has tapped into a desire by younger people for less permanent communication, which allows them to be silly or mundane without leaving a permanent record.

One of Ello's key selling points is its vow – guaranteed by its becoming a public benefit corporation – to remain ad-free and not to profit from data collection. It has also made it easy for users to sign up without using their real names.

This has attracted to the platform a large number of the female impersonators who had been frustrated with Facebook's inflexible "real names only" policy. It may also be why it is the platform of choice for Vordis, an Icelandic horse who regularly posts selfies on the site.

Of the emerging sites, the ones that get mentioned most often by social media managers are Instagram (owned by Facebook), Vine (owned by Twitter), Pinterest and Snapchat.

'In order to get critical mass for a social media platform, you need 15-20 per cent market penetration'

Pinterest, the pinboard-style sharing site, is popular with businesses in fashion, interior design and even property, where photos are an essential part of selling a product.

Carla Bradman, social media manager at Paramount, a London-based residential and commercial property company, says: "Pinterest works incredibly well for us. As a property company, we use it to tap into the lighter side of property, focusing on interiors and the con-

cept of home through various boards."

ComScore's Mr Lipsman says: "These sites are the ones that have made it to the mainstream, by which we mean having tens of millions of users. Others that have been talked about, such as Secret and Whisper, are still used mainly by the Silicon Valley crowd."

Secret and Whisper are two social media networks based on anonymity, where people can share confessions and shocking revelations securely.

A few media brands such as MTV and Hulu have run campaigns on Whisper to create a buzz around their programmes, but most social media managers looking to build promotions see these platforms as too small to invest time and effort in.

Mr Lipsman says: "In order to get critical mass for a social media platform, you need 15-20 per cent market penetration."

That is the "magical level", he says, at which social media sites start to take off. "Snapchat is in that range now with 18-24-year-olds. But we are still waiting to see if it will catch on with the 24-34-year-olds."

As for Ello, social media managers at commercial organisations are keeping an eye on it but not doing much brand promotion on the platform yet.

FreshTrack's Mr Bouyea says Ello will have to fight hard for attention. "There are so many social media sites that start up and then disappear," he says.

"It is something the Ello team is thinking about very closely, and they are making sure they make the user experience something that begs people to come back."



The Connected Business

# Web powers non-profits in the search for donations

## Philanthropy

The internet is helping charities to find fresh support and raise funding for projects, writes Sarah Murray

Signing up to the Dollar a Day charitable website takes the effort out of giving to a good cause. Each day, one dollar of the \$30 monthly subscription paid to the non-profit group automatically goes to one of the hundreds of charities and not-for-profit organisations the website founders selected as being worthy of support.

Just as the web has enabled millions to find romance, a job or a holiday, it is now helping donors to find worthy causes.

"The goal is to help people who have a charitable intent but don't have the time to find non-profits that may interest them," says Benjamin Stone, who launched Dollar a Day with Perry Chen, co-founder of Kickstarter, the crowd-funding platform.

While the high cost of investing in IT once meant the non-profit sector lagged

behind others, the spread of social media has seen a rapid adoption of technology by charities and foundations - particularly for fundraising.

Part of the reason the non-profit sector has not always been quick to adopt technology is that donor funding often comes with strings attached, since many philanthropists want their money to be spent on, say, feeding the hungry or curing disease.

Securing funding for support functions such as improved IT systems, software to create donor databases or the salaries of IT professionals is much harder.

Attitudes are changing, however, as both non-profits and their backers realise how technology can make it easier to find donors online or raise funds from as yet untapped sources. "Now people understand that technology can help," says Willa Seldon, partner in the San Francisco office of Bridgespan, a consulting group for non-profits.

Moreover, the ubiquity of the internet and the spread of social media has sharply lowered the cost of fundraising campaigns and building stronger connections between charities and their donors.

Mr Stone points out that the web

serves charities in several ways. First, it means large sums of money can be raised by large numbers of people making very small donations.

Since its launch in October, Dollar a Day has attracted more than 870 subscribers whose donations will generate about \$300,000 a year, assuming they stick with it. With 3,000 subscribers, the site would raise more than \$1m annually.

"One dollar to a non-profit is not going to make a big difference, but one times 10,000 is going to make a huge difference," says Mr Stone. "That's the power of giving together."

In addition, by introducing donors to hundreds of non-profits they might not have otherwise encountered, Dollar a Day has a second goal. "The chances are one or two will really speak to you," explains Mr Stone. "So the idea is not only that you're giving a dollar a day, but also that you'll go to their website and volunteer and get engaged."

Dollar a Day is not alone in using the web to engage donors who are giving small amounts of money.

On the Oxfam Unwrapped site of the UK-based development charity, for example, donors can buy goats, school supplies or clean water for developing



Live aid: goats can be donated to needy communities via the Oxfam website

communities and send an ecard to friends and family telling about the donation. Donors can also see how their money is being used to combat poverty.

Others are using the connective power of the web to encourage larger donations. Charitybuzz raises funds for non-profits by hosting online auctions for everything from a week in a luxury

villa to the best seats at a Rolling Stones concert and a meeting with Mick Jagger. Bids can run into tens of thousands of dollars.

The web not only makes giving quicker and easier. Online charity evaluators are also helping donors make more informed decisions about where to distribute their philanthropic dollars.

Charity Navigator, for example, assesses the financial health, accountability and transparency of more than 7,000 US charities. GiveWell conducts in-depth research into charities and makes recommendations. And GuideStar, which has websites in the US, the UK, Belgium, India and Israel, provides information on millions of non-profits.

Technology not only helps inform donors but also connects them more directly to the groups they support.

"You can provide donors with a customised experience that relates to their own interests by showing them images or videos that can be emotionally engaging," says Jacob Harold, president and chief executive of GuideStar in the US. "We've only begun to tap into that."

But while technology is helping non-profits improve the way they communicate with existing donors, its real promise lies in the ability to find new donors and gain support for causes in ways that would have been impossible before the advent of the web and social media.

"We're learning how to use technology to change fundamentally the way we do things," says Bridgespan's Ms Seldon. "When you think of the power technology can bring the non-profit sector, that's the phase we're in now."

## Service providers turn to the cloud



Continued from page 1

bulk of the growth is coming, says Forrester analyst Andrew Bartels.

Next year, spending in these areas is likely to jump by 10-12 per cent, compared with only 1-2 per cent growth in other parts of the IT market, Mr Bartels says.

Other estimates put the share of the tech budget that is going into productive business uses even lower. Companies may talk about "digital transformation", but the things that get most talked about - advances in areas such as mobile communications, cloud computing and social media to make workers more effective or increase value to customers - comprise only about 10-15 per cent of the average budget, according to Joe Pucciarelli, who heads the executive advisory service at research firm IDC.

To channel more into such areas, companies are racing to squeeze more out of their IT budgets. That often involves shifting computing workloads to more cost-effective cloud architectures, often run by external providers.

"The notion of wiring together your own data centre is going away," says Mr Pucciarelli. Three years from now, he says, chief information officers whose time is now taken up with IT infrastructure will instead spend 80 per cent of their effort on technologies with direct business benefits.

The pace of this move to the cloud gathered significant momentum in 2014, sparking a competition between visions of how data centres will be organised in future.

Companies such as VMware, which has expanded from server virtualisation - which more efficient use of servers' computing power - to sell software for automating data centres, say corporate IT is following the path set by big consumer internet companies.

The technologies behind the vast computing power of Amazon, Google and Facebook "hasn't crossed over to the [corporate] market yet", says Martin Casado, an executive at VMware. "We're going to see traditional IT look more like these mega data centres."

He says the techniques that transformed how large groups of servers run are being adopted at a faster rate for networking. VMware's networking virtualisation product achieved annualised sales of \$100m in its first year, he says.

Such developments are likely to make 2015 another difficult year for hardware makers. Price/performance has become the sole measure in many hardware purchasing decisions, giving the initiative to low-cost manufacturers.

To defend against such deflationary forces, big suppliers have sought to broaden the range of their products so they can keep a lock on IT spending decisions. This also matches the desires of many IT buyers, who would prefer not to spend money and effort on integrating technologies from several sources. The result is a growing preference for "drop-in clouds" of pre-integrated technologies that come from a single supplier, says Mr Pucciarelli.

Although the direction of the big IT suppliers has become clearer, most still lack the full range of capabilities needed in this environment. That makes an acceleration in mergers and acquisitions likely - a factor that has made this one of the most attractive markets for activist investors on Wall Street. Leading storage equipment maker EMC, with a majority stake in VMware as its prime asset, is likely to be only the first of many companies that come under pressure to break up or shed divisions as the realignment of IT takes place.

Chief information officers hoping to be relieved of the mundane aspects of running corporate IT infrastructure to focus on more productive business applications, meanwhile, still face one big hurdle: the need for stronger security to defend the vast data centres and widely distributed mobile computing networks that are coming.

The high-profile security failures of 2014 are going to make this a bigger issue in 2015, while the demands of cloud architecture are pushing security higher on the IT spending priority list.

But this is not likely to threaten the coming revolution. As Mr Pucciarelli says: "It won't slow adoption of the cloud; that genie is out of the bottle."

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## The Connected Business

## Smartphones will become our electronic assistants

**Devices** Debate about the look of phones is giving way to thoughts of what they can do, says *Dan Thomas*

The debate about the size and shape of the mobile phone could well be coming to end, as more manufacturers focus on the benefits that connectivity brings to users who are likely to own a range of smart devices rather than just one handset.

The mobile phone has been through a rapid evolution over the past two decades – from bricklike slabs via clamshell flip phones to where the market appears to have settled today in providing homogeneous slimmed down sleek rectangles of glass, plastic and metal.

The features inside the phone have developed as just quickly, from being capable only of making calls to boasting advanced cameras and music players.

Analysts report the smartphone has become the primary means of accessing the internet, and the video, games and apps data connectivity brings.

However, the development of the smartphone has largely stalled. Most devices feature largely the same specifications, with only incremental improvements on memory, camera and screen quality. Instead, cost has become the differentiator in a market that is increasingly dominated by cut-price Asian manufacturers.

Ben Wood, analyst at CCS Insight, says that when Steve Jobs pulled the iPhone out of his pocket on stage in 2007, he set the dominant design for mobile phones, in the same way that the physical design of TVs and cars has changed little over the past decade.

Various concepts have been put forward for devices that are transparent, or else foldable and rollable, or sporting plastic and sapphire screens.

Mr Wood, for example, believes that 3D imaging will become a widespread feature.

But many industry watchers believe that these shifts are a marketing side-show to an increasing focus on what smartphones will be doing in future rather than how they will look.

The question of a mobile phone's appearance is likely to become increasingly redundant as the shiny piece of metal and glass simply becomes a window to the internet and a way to link a



Phablet: modern devices combine the features of both phones and tablets

myriad other services and accompanying devices.

Ronan Dunne, chief executive of Telefónica UK, says there will always be personal preferences about the right size of phones, but that this issue is not going to drive innovation.

He predicts that the smartphone will become just one part of a wider collec-

tion of devices that people are likely to need in future.

For example, Mr Dunne expects people to take smaller phones, or even just a smartwatch or other smart wearable gadget, out for an evening to make calls, texts and maybe access an app or two.

For longer trips, he says, people will take tablets and "phablets" (which combine

smartphone and tablet functions), which are more suitable for web browsing and video watching.

Mr Wood also predicts a "network of devices that we'll be using and will be able seamlessly to switch between the series of connected screens we own to access a continuum of experiences that will be all be optimised for the device that is most relevant at that particular moment".

These devices will be connected to our homes, where the smartphone becomes a remote control for opening doors authenticated by biometric sensors or turning on the heating. It may even become a second screen to watch a different angle of a football game from the one being shown on TV, for example.

And in smart cars, the phone could be neatly slotted into the dashboard to act as the in-car entertainment centre and navigation system. In shops, smartphones could become the wallet to make purchases using contactless payment.

James Barford, at Enders Analysis, expects the smartphone to become more of a personal assistant – adding to voice activated services such as those provided by Apple's Siri or Microsoft's Cortana – with greater anticipation of users needs. So the device can tell you to

wear a jumper if its cold, for example, or warn that your route is congested.

Francisco Jeronimo, research director at IDC, an analysis company, agrees that the biggest revolution in the next 10 years "will be in the way we interact with the phone, or to be more precise, the way the phone interacts with us".

He predicts "intelligent" sensors, aware of our surroundings and personal preferences, and devices that can bring data together to help us manage our lives.

"Flexible screens, more sensors, augmented reality, you name it, will only have one purpose – to contribute to our phone becoming our personal assistant," he says.

Such developments will be led by operating system providers, he says, rather than device makers.

Indeed, given the range of uses that the phone, tablet, watch and other wearables will have, the question over whether it is slimmer or lighter, plastic or metal, 3D or augmented reality, will largely come down to choice.

There will undoubtedly be new designs to come from the leading manufacturers, as they seek differentiation, but the main focus will be what can be shown on the screen rather than what is around it.

## Driverless cars are still waiting for the green light

## Vehicles

Legal and technological hurdles have to be overcome before dream can become reality, says *Andy Sharman*

It is becoming a car industry parlour game to predict when fully driverless cars will arrive on the roads.

Audi chairman Rupert Stadler, whose company just topped a record 149mph with a fully self-driving RS7 sportback, says drivers will be able to take their hands off the wheel by 2016. A year later, Volvo will put 100 self-driving cars on the streets of Gothenburg, Sweden, with the aim of getting a fully autonomous vehicle on the market by 2020.

Research group Gartner says that, by 2030, autonomous-enabled vehicles will make up about 25 per cent of passenger cars in mature markets. Consultancy Roland Berger says "wide adoption" could follow soon after, creating a market worth \$60bn for carmakers, parts suppliers and tech companies.

But Stefano Aversa, co-president at the AlixPartners consultancy, says completely autonomous vehicles will never happen. "You cannot think of something that is fully autonomous in any situation – you would never be able to cover the infinite possibilities," he says. "You have a pedestrian coming from your left, a bicycle on your right, a kid, a cat . . . or simply a speed bump or a hole in the ground."

Self-driving cars have been heralded as the answer to problems from tedious roads and congestion to traffic accidents – more than 90 per cent of which are caused by human error. Numerous companies and cities have conducted trials. Google has clocked up almost 1m miles of testing on public roads in the US and four cities in the UK will host pilot projects early in 2015.

But technical and legal experts are increasingly concerned that the frenzied excitement surrounding the technology is obscuring the significant obstacles that lie in the way of the introduction of autonomous vehicles.

For a start, driverless vehicles are only allowed on the road in four US states. They are also outlawed in Europe, though a recent amendment to the UN's Vienna Convention on road traffic means 72 countries, including in Europe and the Americas, can implement rules to allow a car to drive alone for periods.

But road traffic laws still require the driver to be able to take control of the vehicle and override autonomous functions.

"That contradicts the visions and fantasies of those who promote autonomous cars," says Stephan Appt, legal director in Germany for Pinsent Masons, the law firm.

"To sleep, to watch movies – that would not be possible at the moment,

Out on its own: Google has clocked up almost 1m miles of tests on US roads



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## The Connected Business

## Ease of use will determine fate of electronic wallets

**Payment systems**  
Consumer experience is the key to success, writes *Stephen Pritchard*

It can take a long time for new ideas to catch on in the payments world. Plastic debit and credit cards, for example, account for half of payments in the UK and US, but it has taken more than 60 years to get there. Globally, cash is still dominant.

Despite being 15 years old, online payment system PayPal only accounts for about 10 per cent of online payments, says Bob Graham, senior vice-president for banking and financial services at consulting firm Virtusa.

The online payments market is still small, accounting for just 2-3 per cent of consumer transactions worldwide, says Patrick Collison, co-founder of payment service Stripe. According to some estimates, 366bn non-cash transactions take place each year.

However, the online payments market is expected to grow, not least because consumers want easier ways to pay for goods. Businesses also want more efficient mechanisms to

handle trade invoices and payments.

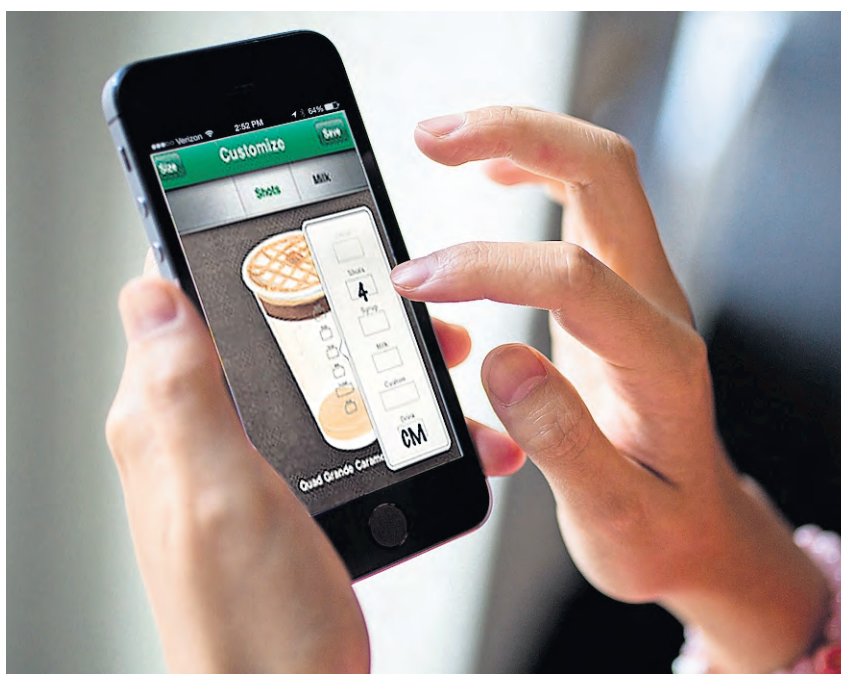
Barriers for new payment systems include cost and rates of adoption. Retailers have to pay for tills and card readers and banks have to put in software to process payments. New payment systems need to reach a point where there are enough cards, tokens or apps in circulation, and enough tills, ticket barriers, or websites willing to accept them, to justify any investment.

Despite this, there is no shortage of newcomers, such as PayM and Barclays' Pingit in the UK, Swish in Sweden, or Apple Pay, looking for customers.

These are likely to succeed or fail based on the experience of consumers. Unless they are secure and convenient, they will remain niche technologies.

A million people signed up to Apple Pay (a mobile wallet app that lets consumers make contactless payments with their phones) in its first week of operation in October. But this is tiny compared with the plastic cards market, says Mr Graham.

John Skipper, a technology expert at PA Consulting, says payment systems have to be easy for consumers. He says a big barrier to adoption has been confusion about how systems work. Pingit was a success among Barclays' custom-



Coffee time: Starbucks' app combines loyalty and payment card features

ers because it was clear and straightforward to use. But, he adds, it failed to become widely adopted, because it was too inaccessible for non-Barclays customers.

Another problem for newcomers is that the variety of payment systems is

detering retailers from investing in the technology, as they wait for global standards to emerge.

But perhaps the greatest change is the way consumers use smartphones to make purchases. To pay by a card on a smartphone, says Jean Lassignardie,

chief marketing officer at Capgemini Financial Services, means typing in a card number and an address, which can be awkward, so an electronic wallet or PayPal is a strong alternative.

The services consumers are paying for on their phones are changing too, from purely digital items such as music downloads, to taxis, accommodation, or meals. As a result, digitally driven services, such as Uber, a car ride-sharing company, or Airbnb, which lets people rent accommodation online, are as much about processing payments and creating trust as they are about the apps.

Physical retailers are also adopting digital payments. Companies such as Starbucks have persuaded consumers to pay by mobile apps by combining payments and a loyalty scheme.

One reason electronic wallets – and other alternatives to cash and cards – have so far failed to take off is that they have not made consumers' lives simpler or brought value to the businesses that use them.

"There is no value added in a business such as a hotel accepting additional payment [systems]," says Deborah Baxley, a consultant at Capgemini Financial Services. "But," she adds, "it can remove a source of irritation for consumers."

Businesses are more likely to invest in systems that will give them greater control over the value such systems can add to their business.

"Big corporates are taking matters into their own hands [on payments]," says Christophe Uzureau, a payments expert at analysts Gartner. "There is a movement to have more control over issues such as cash management."

Ultimately, online payments could allow businesses to wrest more control of the payment value chain from banks. Along the way, they stand to gather more data about customers' habits by combining information on purchases, locations and loyalty programmes.

Smart online wallets, which calculate the best bank, card or other payment scheme for a consumer using criteria such as offers, loyalty points, interest charges and exchange rates, may be the next thing, suggests Matthew Friend, managing director and head of Accenture Payment Services in North America.

Nonetheless, the online payments sector will grow, if only because accepting more ways to pay will allow businesses to sell more. "Every time a website accepts new ways to pay, it drives more transactions," Mr Friend says.

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## Just how much should you know about the deep, dark side of the internet?

### INSIDE TECH

Maija Palmer



How much should you know about the dark side of the internet? Beneath the surface – the eBay auctions, Wikipedia entries, news pages – there is a hidden part that cannot be found in a Google search.

This is the deep web, and experts say it is larger than the internet. Some estimates reckon the ratio could be about 95 per cent deep web to 5 per cent surface internet.

For the most part, the deep web is unsearchable for mundane reasons. The data may be in formats that are not easy to access. They may not be linked to anything else, forgotten.

A small percentage of the deep web, however, is intentionally hidden, accessible only to those who know what they are looking for and those who have been invited in. This is the dark net, a place that titillates the imagination, where drugs are bought and sold, terrorists plot, paedophiles share images and trolls plan campaigns of harassment.

Jamie Bartlett's book *The Dark Net* is a good introduction. In his book, Mr Bartlett, a director at London-based think-tank Demos, visits chat rooms where trolls perform "life ruins" by posting personal information and embarrassing photos of people, often women, they have taken a dislike to. He orders a very small amount of marijuana on the Silk Road, a notorious online marketplace where everything from drugs to weapons can be procured, and is blown away by the customer service.

In one awkward scene, he perches on the edge of a bed in a suburban house while three young women perform a webcam sex show to a paying audience.

Reading about the dark web is more than just a cheap thrill. Businesses would do well to understand more about it. For a start, there are a number of business cases studies to be mined here.

Despite being unregulated and connecting anonymous buyers and sellers, the Silk Road has evolved sophisticated mechanisms – escrow services, ratings – to avoid customers being ripped off. Legitimate sites such as Amazon and eBay might take note.

And the young people running sex show cam sites are highly entrepreneurial, know their audience and are good at maximising the profit they can make from each viewer. The shows earn them enough to make mortgage payments at a time when much of their peer group is unemployed.

Trolls and hackers are some of the most interesting people Mr Bartlett meets.

Trolling, trying intentionally to upset people by posting inflammatory comments online, can be sophisticated and politically motivated, a way of pushing people's boundaries to unlock ideas.

One troll, Zack, explains how he joins an online forum, deliberately makes basic grammatical and spelling mistakes, waits for someone to criticise his writing and then locks them into a conversation about politics.

A deeper dive into the world of hackers can be found in Gabriella Coleman's book, *Hacker, Hoaxer, Whistleblower, Spy*, which is about Anonymous, the loose collective of hackers that became famous for their involvement in movements such as Occupy Wall Street, WikiLeaks and the Arab Spring.

Ms Coleman has been criticised for getting too involved with these internet pranksters, but she succeeds in giving a much-demonised group a human face.

Their motivations are varied – some political, some looking for fun, some just because they can and because they believe they are untraceable online. Their motivations are rarely financial and there is a huge disconnect here between the internet prankster and the business world.

It is worth businesses understanding this. Trolls and hackers frequently bump up against the surface, corporate-run internet. They take over comment threads, steal data, disrupt computer networks. They make a nuisance of themselves. But from their point of view it is the corporates that are the interlopers. Hackers resent businesses taking over what they see as "their" internet.

Despite emerging from a US military project, the internet has developed in uniquely decentralised, democratic ways.

Anyone can connect, anyone can extend and develop their corner of the internet as they like. Collaborative projects such as the open-source software movement thrive on the internet in a way that is difficult to imagine in other contexts.

Ideologies and belonging to a group (however loosely) are the key currencies online. The pure profit-and-loss mentality of the corporate world sits uneasily with this, especially when businesses begin to talk of ending net neutrality and differentiating access to the internet, depending on how much people can pay.

Companies may not like the tactics that hackers and trolls use. They may not agree with their points of view.

However, businesses should become more familiar with some of the species that swim beneath the surface web. There are more of them than you might imagine and this is their territory.

The Silk Road has evolved sophisticated mechanisms – escrow services, ratings – to avoid customers being ripped off. Legitimate sites such as Amazon and eBay might take note