

# The Connected Business

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## Telcos seek to redefine their role in digital era

Competition from the likes of Google and Apple disrupts traditional models, writes *Daniel Thomas*

Telcoms is fast becoming a dirty word for companies that want to become much more than providers of basic connections in a digital world in which technology is undermining traditional revenues. Companies in the sector are still at risk of being left behind or being pushed to the margins as simple providers of the pipework that technology groups use to make their fortunes. And even the latter holds dangers if the telcoms groups cannot keep up with ever increasing demands from customers for instant videos and entertainment by investing heavily in next generation networks capable of carrying vast quantities of data. The signs are that most groups are ris-

ing to the challenge, helped in regions such as Europe by regulators encouraging industrial growth through consolidation. This, alongside better economic conditions, is leading to higher profits and rising share prices. Now companies have the breathing space to invest in their future – and various strategies are emerging among managements keen not to be left behind. Hans Vestberg, chief executive of Ericsson, the Swedish telcoms equipment maker, says the biggest risk is not making the right decisions on strategy, given that the market is moving so fast. “You need to move now to where you want to play in future,” he says. “Ten years ago, they all did the same things. But now carriers have suddenly got a lot



‘You need to move now to where you want to play in future’

of options – some will go into TV and media, others into cloud services, others the connected car and home. Some will do them all.” At the heart of most strategies remains the desire to become the gatekeeper of the internet – and with it, the provider of services and

content such as TV and music. In this market, the distinction between mobile or fixed-line access to the internet becomes immaterial. Instead, the consumer gets to choose which screens to watch, play or work on, from a smartphone to a tablet or TV. *Continued on page 4*

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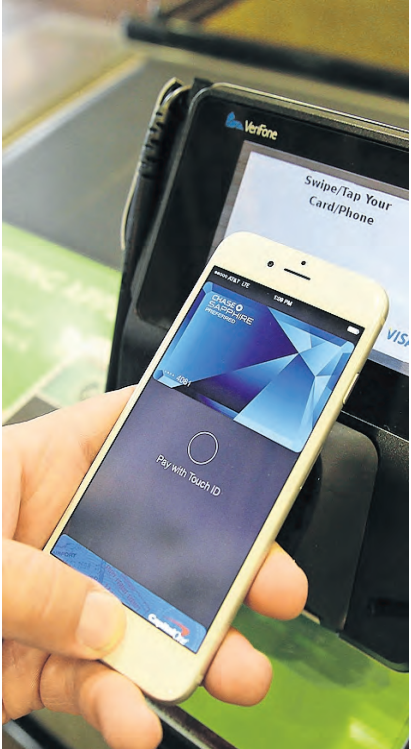
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## Year of substantial progress in store for payment systems

### Mobile wallets

Apple Pay is shaking up the market, but others are vying for attention in the same space, reports *Sarah Mishkin*

For years, the story has been that mobile is finally about to take flight and fulfil all its potential – in the process bringing wealth to a new set of entrepreneurs, inventors and investors. Mobile payments, for example, have long been hailed as the next big thing, but this year retail and payment industry leaders say that – finally – 2015 is going to be different. “Every year since about 2009 has been the tipping point year for mobile payments,” says David Hodgkinson, a consultant at KPMG in London, but he adds: “If I’m really honest, the quantified market projections vary wildly, and they’re fairly meaningless.” Yet he and others say developments indicate that 2015 will be – if not a breakthrough year – then at least a year of substantial progress. The factors behind this are the launch of Apple Pay, the efforts by ecommerce companies to give consumers better ways to buy goods with mobile devices, and the realisation by banks that they will lose out if they do not focus on the technology. The key event, says nearly everyone in the industry, was the launch last year of Apple Pay. This feature allows users to store their credit or debit card information on their iPhone and then either tap the phone on a special receiver to pay for goods in a shop or buy online with one click while shopping on an app that uses the service. Apple is not the first to make a so-called mobile wallet. US telcoms tried a similar wallet named Isis, later rebranded as Softcard. Google had Google Wallet. Square, a start-up led by Jack Dorsey, a founder of Twitter, which makes credit card readers and small business software, also tried a similar product. None were popular. The interfaces could be clunky, and too few retailers accepted the wallets to get consumers using them regularly. But Apple is Apple. The design of Apple Pay has been widely hailed and well reviewed. More crucially, Apple partnered with nearly all the leading US



Adding it up: Apple’s mobile payment system at work – Eric Risberg/AP

banks, as well as many big retailers and app makers, thereby ensuring that the vast majority of iPhone 6 users in the US can store their cards with Apple Pay and regularly find places that take them. Apple’s push into payments has helped drive the development of secure technology to store cards on phones. Visa, MasterCard and others use the technology and say it is highly secure against theft and fraud, although its defences have yet to be tested. Few card details will be handled by the retailer so, as it is bugs in retailers’ in-house software that often allow hackers to steal card data, this represents an improvement for consumers. For in-store payments, the requirement of a fingerprint will also cut down on “friendly fire” fraud – when customers fraudulently report their cards have been stolen and someone else has used them to purchase goods, says one person in the industry. For the financial

institutions that issue credit, however, the rise of smartphone-enabled payments has risks. Banks profit when consumers use their cards, but as consumers store multiple accounts on their phones it is possible that the brand identity associated with each bank could weaken. As networks such as Apple Pay capture more of the market, they could also raise the portion of the profit on each transaction they take, or otherwise stop using banks or existing parts of the chain of companies that currently handle card payments. Doug Brown, who works on ebanking and mobile at FIS, a banking and payments technology company, says: “This is the defining moment for [financial services groups], for their brand identity and relevance. “If all the value is managed by an oligopoly, whether that’s Apple, Samsung, or a payment network, and at the end of the day everything accrues value to only a few entities, then for the thousands of financial institutions that we work with, that would be a fail.” There is still a best case, he says. Some banks are working to integrate payment capabilities into their own apps, so consumers could use those to pay rather than Apple’s app. To make their apps more useful, some banks are also installing systems on ATMs that allow customers to use their smartphone to withdraw cash without a card. Even if Apple Pay leads the market, others will still have a chance, analysts say. Speciality wallets could still serve a niche, such as ones that store bitcoins, or credits for video games or ones that are linked to and give rewards at a particular store such as Starbucks, which already has one of the more successful mobile payment apps. Regulators in the US and Europe are also likely to ensure that Apple keeps its platform open so that other mobile wallets can operate on its iOS mobile operating system, says Mark Thompson, a partner at law firm Sidley Austin. “My expectation is Apple cannot just say ‘we’ll only allow this payment app on our phone’, they will eventually allow other wallets [to use the platform],” says Mr Thompson. However, he adds, just because Apple cannot be anti-competitive and keep others from using its phones, this does not mean those competitors will be successful.



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# Developers see the future of games on much smaller screens

**Entertainment** Consoles are being supplanted by mobile devices, reports *Tim Bradshaw*

When King Digital Entertainment launched its eagerly awaited follow-up to the popular mobile game *Candy Crush Saga*, it looked far beyond Apple's App Store to promote it. Videos heralding the arrival of the *Candy Crush Soda Saga* blitzed 100m Facebook newsfeeds in a single day. TV spots aired in 20 countries and digital billboards were flooded with fizzy bubbles around the globe.

The multimillion-dollar launch illustrates that mobile gaming is no longer a poor relation of video games. Newzoo, a research company, forecasts that the mobile games industry, which it says has predicted global revenues of \$30.3bn in 2015, is poised to overtake console games sales for the first time.

Underlining the transition, Newzoo said in a report that Apple's forecast \$4bn in gaming revenues – made from just hosting and selling other developers' games, for which it takes a 30 per cent cut – is likely to be almost double Nintendo's sales this year.

As mobile games have increased in

sophistication, growing numbers of players spend many hours – and dollars – on addictive titles such as *Clash of Clans*, *Minecraft* and *Game of War: Fire Age*.

"The first wave of mobile games was simplistic – the gameplay was there but the polish wasn't," says Julian Farrior, chief executive of Backflip Studios, the mobile gaming company behind *DragonVale* and *Seabear*, which is now majority owned by toymaker Hasbro.

But, Mr Farrior adds: "Over time, the polish has increased, the budget has increased and revenue expectations have increased."

In the App Store's early days, barriers to entry were low. But, as it has become harder to be noticed in an overcrowded market, promoting and distributing a hit game has become an expensive but important part of the marketing mix.

"It's a very competitive market," says Riccardo Zacconi, King Digital's chief executive. "The 'top grossing' charts are very stable. It's a handful of developers there and the conditions for succeeding are very hard."

Despite this, King's marketing drove

*Soda Saga* to the top of Apple and Google's app download charts globally for November. In its earnings report, King said it set a new quarterly record of 1.5bn average daily game plays in the three months to December.

But King has an advantage other games makers do not. As well as the external advertising, many people downloading *Soda Saga* did so because they saw an ad in the original *Candy Crush* game, which has been downloaded hundreds of millions of times.

Electronic Arts, a veteran console games maker, has franchises that are just as well known as King's, including John Madden NFL football and FIFA Soccer. Even so, EA is only just starting to find its feet in mobile.

Andrew Wilson, EA's chief executive, says the company had a "breakout performance" in mobile over Christmas, generating a "record" \$121m in sales, up 25 per cent over the prior year.

Its rival, Activision Blizzard, whose *Call of Duty* and *World of Warcraft* franchises have dominated console and PC gaming, has been even slower to mobile.

In late 2013, Bobby Kotick,

Activision's chief executive, said there was nothing that had driven any sizeable amount of operating profit in mobile gaming. But in its recent earnings call, Activision's chiefs admitted mobile and tablet gaming had "moved up on our priority list" after finding success with a *Warcraft* spin-off, *Hearthstone*.

In the console world, developers create games and leave it to publishers, such as EA and Activision, to work with Sony, Microsoft and Nintendo on distribution. Mobile games are usually free, with revenue generated from ads or in-app sales.

"When you're thinking about that transition, it isn't wholly intuitive to console developers who are reliant on publishers for distribution," says Mr Farrior. "In mobile, you own the distribution and the development of the piece. That's... outside the comfort zone for traditional publishers."

Another challenge for console developers is that mobile games are created and updated very differently. Console games are typically left unchanged, but mobile games, once on a device, can be updated almost constantly.

King, for example, adjusts the difficulty of *Soda Saga*'s levels every few weeks. The first "cohort" of players was looking for something more difficult than the original *Candy Crush*, Mr Zacconi says, while newer players want something easier.

Despite the different dynamics, Mr Farrior says mobile studios such as Backflip are hiring console games developers in much greater numbers. "We've had to hire truly talented experience, and the bulk of that experience was in shifting from console to mobile."

Backflip is planning to use Hasbro's brands and characters to help its games stand out. But even names that could include *My Little Pony* and *Transformers* are not enough to guarantee a hit in the mobile gaming world, Mr Farrior says.

"A brand is important, but a brand alone won't get you there," he says.

To succeed, he says, you need an "absolutely killer game", with high retention and conversion from free downloads to paying customers. "You need to marry the good math with the good brand and have a really talented, aggressive user acquisition team."

**Party poppers:** actress Molly Sims at the launch of King's *Candy Crush Soda Saga* on Broadway last November

Bryan Bedder/Getty



# Privacy concerns colour success of the smartphone

Advertising

Lawmakers are increasingly turning their attention to the collection of data on mobiles, reports *Robert Cookson*

For advertisers, the smartphone is a dream come true. No other medium offers the same targeting capabilities – including the potential to track consumers as they move around the world with an accuracy of just 10 metres.

It is also a fast-growing sector. Advertisers are forecast to spend more than \$60bn buying ad space on mobile devices this year, up from \$40bn last year. Research group eMarketer reckons that spending on mobile adverts will surge to about \$160bn by 2018, accounting for almost a quarter of all advertising spending.

But as the industry has grown, so have privacy concerns. Regulators worldwide are seeking to introduce rules to protect consumers and restrict the ways in which advertisers use mobile data. The industry itself is also working on technological solutions to give consumers greater control over their data.

In the EU, legislators plan to introduce data protection regulations by 2016, toughening up on and replacing the existing legal framework, which dates back to 1995.

While Yves Schwarzbart, who deals with regulation matters at the Internet Advertising Bureau (IAB), a UK trade body, agrees the rules need updating, he says the European Commission's proposed rules are too "black and white".

The Commission has proposed that mobile device identification numbers, IP addresses and most other data used to target advertising should be regulated as "personal information". That would mean companies cannot collect the data unless they have obtained explicit consent from the consumer.

However, the IAB and other industry

bodies argue such information should be classified as "pseudonymous data" and be subject to lighter regulation than data such as telephone numbers, email addresses or medical records.

Until now, the mobile advertising industry has largely escaped state intervention. The regulation of cookies – the technology used to target advertising on websites – has had relatively little effect on mobile, as smartphone users mostly use apps rather than browse the web.

The industry has, however, launched self-regulatory schemes to address privacy concerns, including several recent developments focused on mobile.

"It doesn't matter what technology you use," says the IAB's Mr Schwarzbart. "From our perspective, you should be given transparency about what data are collected and why, and then have the choice over whether to allow that or not."

Google, Microsoft and most other large advertising groups have for several years operated a scheme called Ad Choices, which allows internet users to opt out of behavioural targeting on the web. The industry plans to extend this to mobile in the coming months.

'You should be given transparency about what data are collected and why'

Victor Malachard, chief executive of Byrd, a mobile advertising platform, says that, when done correctly, targeted advertising is good for consumers as it delivers ads that are more relevant.

One of Byrd's biggest customers is Weve, a joint venture created in 2012 by the UK's biggest mobile operators – Vodafone, EE and O2 – to mine their customers' data for use in targeted advertising.

Weve holds a vast repository of data about more than 22m smartphone users, including demographic details such as age and sex, as well as highly



Direct hit: adverts can be targeted

accurate information about their movements.

"We're able to look at consumers who have been near specific points of interest, such as a supermarket or a sports venue, and retarget them accordingly based on that information," says Mr Malachard. "That's quite powerful."

To protect customer data, Weve assigns each mobile subscriber an anonymised identifier that is visible only to the company's own services. These identifiers are never revealed to publishers, advertisers, or technology intermediaries.

Another innovative company seeking to take advantage of data without infringing privacy is AdTruth. The company, whose clients include King Digital Entertainment, says it has developed a tracking technology that includes "privacy by design".

Rather than tracking a device's unique identifier or using other techniques that provide 100 per cent accuracy for tracking purposes, AdTruth collects less sensitive information, such as a device's screen size, operating system and timezone.

Using these variables, the company generates its own "probabilistic" identifier for each device. The idea is that, on average, the identifiers are highly accurate for targeting purposes, but that they are not permanent and cannot guarantee a one-to-one match.

James Collier, regional managing director for EMEA at AdTruth, says: "Many of our clients don't want us to be more than 85 per cent accurate, because they believe that the 15 per cent [error rate] gives them enough coverage in terms of legislation changes and in terms of honouring consumer privacy."

# Low cost of emerging market apps offers benefits to developed world

Services

There is a need for products that are intuitive and easy to use, writes *Jane Bird*

Emerging markets are fuelling growth in the mobile phone market, but for app developers this presents big challenges. Almost 80 per cent of the 1.8bn people expected to acquire handsets in 2018, according to the International Data Corporation, live in areas where network coverage is patchy, budgets are tight and smartphones are relatively rare.

App developers need to take into account the smaller screen size and reduced capability of low-cost phones in emerging markets, says India-based Neha Dharia, a senior analyst at Ovum, a telecoms consultancy.

To be popular in these areas, mobile apps also need to overcome the cultural barriers of language, literacy and local content, Ms Dharia says. "They have to be more intuitive and easy to operate, with fewer interactions required. And they need to minimise battery usage."

Emerging markets are not just catching up with established ones, says Serpil Timuray, chief executive, Africa, Middle East and Asia-Pacific region for Vodafone. "In some ways, they are leapfrogging them."

Take the example of the tablet-based mobile app developed by Vodafone for tea farmers in Turkey, which digitises soil audit procedures and has led to a significant reduction in costs. The app replaces a day-long manual audit with real-time data collection, which is faster and more accurate, Ms Timuray says.

Not surprisingly, given the huge opportunity, mobile app designers are rising to the challenge. And because mobile technology does not rely on infrastructure such as fixed lines, computer hardware and good electricity supplies, it can be introduced quickly and cheaply.

In advanced economies, mobile payment for goods and services is in its infancy, says Ms Timuray, but in east Africa, millions of people use the M-Pesa mobile payment service

launched in Kenya in March 2007 by Safaricom, a Vodafone affiliate.

Meanwhile, some 14,000 small-scale cocoa farmers in Ivory Coast are using a mobile phone app to access farming advice, details of training sessions and real-time information on market prices. They can also record their usage of fertilisers, check their cash flow, and gain an accurate measurement of their farm's size by walking the perimeter.

The service is run by Olam International, an agricultural business that supports smallholders in 14 emerging markets. The aim is to reach more than 500,000 farmers by 2017, and to expand to include growers of coffee, cashew nuts and cotton.

Chris Brett, head of corporate responsibility and sustainability at Olam, says. "We want to make [these small farmers] more stable, because the supply chain is highly fragmented and inefficient, with the risk that farmers will stop growing staple crops."

The app is free, easy to use, in the local language and has symbols rather than words where possible.

"Restricting the options helps makes



Agri app: Olam is targeting its mobile services at Ivory Coast cocoa farmers

it accessible, and reduces the opportunity for error," Mr Brett says. "It's much easier to teach someone to use a mobile phone app than to cope with the complexities of a PC."

Coping with the developing world's constraints has led to a branch of engineering known as "frugal innovation", says Abhijit Kabra, global lead in mobile applications at Accenture Mobility.

He adds: "Emerging markets are breaking new ground in creating apps that can capture video content when network traffic is at its lightest and store it to play back late."

This avoids buffering and losing connectivity and can also be used in developed markets to improve customer satisfaction and make use of networks at quieter times.

Another problem with the large scale of app rollouts in developing countries, and the diversity and fragmentation of handsets, is that it is hard to develop secure apps that remain up to date, says Mr Kabra.

In response, app developers are using crowdsourcing – inviting computer enthusiasts to help test and enhance computer systems. These techniques will lead to the creation of more robust applications in the developed world too, Mr Kabra says.

Emerging markets are also using apps from developed markets. "WeChat, the successful China-based competitor to WhatsApp [a messaging service that does not use up data time on phone contracts], is becoming more than a platform for chatting," says Mr Kabra.

He adds: "It has moved into gaming, shopping and banking, allowing its 500m users to send digital cash and make purchases."

However, one of the toughest challenges facing mobile app developers, particularly in emerging markets, is making money. "Emerging markets are very price-sensitive," says Stephen Kennedy, chief executive of Magpie, which identifies apps suitable for use in China, Mexico and India.

To take off, services need to cost less than \$10 a year, Mr Kennedy says. But at such low prices – which will spread to the developed world – it will be hard for app providers to reap big profits.



The Connected Business

# Backers bet on start-ups as hopes of profits rise

**Venture capital** High valuations of companies have attracted investors, writes *Richard Waters*

All-pervasive mobile computing platform has been the great hope of tech investors for the better part of the decade: a successor to the PC-and-server world, it would provide the foundation for the next generation of Googles or eBooks.

Now, as that promise starts to show signs of being fulfilled, the money is pouring in. In the US, the amount of venture capital investment in mobile more than doubled last year, hitting \$7.8bn, according to CB Insights, which gathers start-up data. That represents 16 per cent of all the money invested by venture capitalists during the year.

Payment companies such as Square, delivery services such as Instacart, and mobile security providers including Lookout and social media apps such as Yik Yak are all part of a wave of mobile-first start-ups that have tapped into investor enthusiasm for businesses that are prepared for this paradigm.

“When the platform shifts, we get a new opportunity,” says Bill Gurley, a partner at venture capital firm Benchmark and a backer of Uber. The car-hailing service recently raised \$1.2bn, one of the biggest fundraising rounds ever for a private company, giving it a valuation of \$40bn. That makes it a powerful statement of the sort of opportunity Mr Gurley claims for the smartphone era.

“The mobile platform puts a

processor just about everywhere,” says the Benchmark partner, who was speaking at a Goldman Sachs conference last month. “It’s what’s behind a company such as Uber.”

If smartphones have put processors into more than 1bn hands, then the next extension of the mobile platform – “wearables” such as smartwatches and glasses carrying sensory devices – could soon make them inescapable, adding to the revolution’s momentum.

It has been long expected that mobile businesses will take off, but it has taken some eye-catching valuations of companies to convince investors that big profits are finally up for grabs.

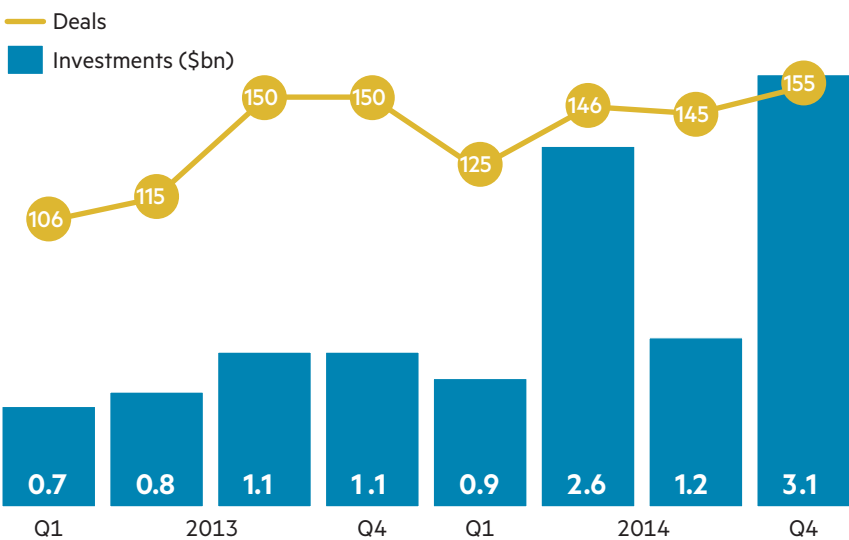
The emergence of Uber as Silicon Valley’s hottest start-up since Facebook, for instance, has caused an investment stampede into many other services that have modelled themselves on the ride-hailing company. Most style themselves as “on-demand services” – using mobile handsets to address a want and then supplying it by means of offline fulfilment.

Excluding Uber, companies that fit this description raised \$1.46bn in venture capital in the 12 months to September 2014, CB Insights says. The rising tide of so-called “Uber for X” companies (because many style themselves “the Uber” of a particular industry) includes rival taxi app Lyft, as well as delivery services such as Postmates.

The value of mobile Investment trends and data predictions



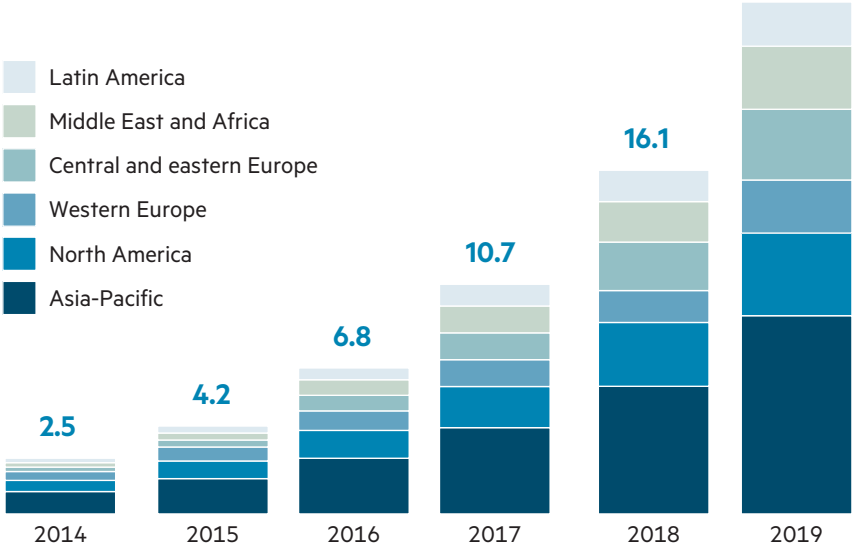
Mobile venture capital investments and deal volume trend Q1 2013-Q4 2014



FT graphic Sources: CB Insights; Cisco Photo: Cesare Ferrari/Stock

Mobile data traffi

Billion gigabytes per month, by region



The conspicuous success of other early mobile leaders has also attracted investor interest to other promising categories. Facebook’s \$22bn acquisition of WhatsApp last year, for instance, has confirmed chat apps as one of the hottest areas of mobile investment.

Last year, partly encouraged by Facebook’s acquisition, venture capital investors put \$1.41bn into mobile messaging companies, CB Insights says: from Snapchat’s vanishing messages to Slack, a service for teams of workers with a heavy mobile component.

The investment boom is spreading well beyond mobile-first companies. Many whose histories date from well before the smartphone boom are also shifting their focus towards mobile and, in some cases, putting substantial investments behind their plans.

For instance, when Change.org, an

online service for organising petitions, raised \$25m late last year, much of its motivation was to extend its mobile reach. Already, half of all interactions with the service are on mobile devices.

“There has been a historic false divide between web and world, which is collapsing with mobile,” says Ben Rattray, Change.org’s chief executive. By adding a geolocation tag to its petitions, for instance, anyone with a mobile device would be able to see all of the Change.org campaigns taking place near them, potentially bringing much more publicity and support for local events.

“You can engage people where they are in the world or in real time,” says Mr Rattray – things that could add to both relevance and immediacy for a wide range of internet services.

How many of the companies staking

out a place in the mobile world will produce a return for their investors is another matter. WhatsApp had barely scratched the surface in experimenting with ways of producing revenue before it was acquired; Facebook has since put the question off and shifted its focus to user growth. Few can afford that luxury.

Advertising, the main source of revenue for many desktop internet companies, is growing fast on mobiles, albeit from a low base. By the first half of 2014, it had reached \$5.3bn, or 23 per cent of all US digital advertising, according to the Interactive Advertising Bureau.

Yet, with the most successful companies in mobile attracting sky-high valuations, it could take years for the business fundamentals – the elements that genuinely reflect the values of companies in the mobile industry – to catch up.

‘There has been a historic false divide between web and world, which is collapsing with mobile’

# Fears of a spectrum shortage spark networks’ bidding frenzy

Wireless communications

While US telcos race to buy more airwaves, others have taken a different approach, writes *David Crow*

When US telecoms groups spent \$44.9bn snapping up airwaves in a record-breaking auction of government-owned spectrum last month, it took many in the industry by surprise.

Most analysts had predicted the auction would raise a fraction of the amount, with some pencilling in estimates as low as \$15bn.

The total haul is more than double the amount the government raised last time it auctioned airwaves in 2008, when the smartphone revolution was still in its infancy. Since then, there has been a surge in the number of consumers using their mobile phones to download videos and music, prompting fears that the US and some other developed countries could be facing a spectrum crunch.

Mobile data traffic has been growing at a blistering pace. By the end of last year, traffic stood at 2.5 exabytes a month, according to Cisco, more than double the amount in 2013. By 2019, Cisco predicts that it will have grown 10-fold to 24.3 exabytes a month. An exabyte is equal to 1bn gigabytes.

The primary reason for the predicted explosion in mobile data traffic is the shift in how people consume video. Generation Z – shorthand for those born from the mid-1990s onwards – are abandoning their parents’ television sets and desktop computers in favour of mobile phones. Content producers are following them.

Jonathan Chaplin, an analyst at New Street Research, says this has prompted a “fundamental like-change” in how the likes of Verizon and AT&T view their ability to cope with the surge in mobile data.

This explains why they were so willing to shell out billions in the auction, even though they have had to take on more debt and sell assets to fund the purchases.

## Staying online Cooper’s Law

**Spectral efficiency** Marty Cooper, pictured on the phone below, formulated the law of spectral efficiency.

“Cooper’s Law” states that the efficiency of spectrum has doubled every two-and-a-half years since Marconi made the first transatlantic wireless transmission in 1901. Dismissing an imminent spectrum crunch, Mr Cooper says: “Spectrum is 1tn times more efficient than it was at the start of the century.

“We know enough to keep us going for another 50 years at least.”

If steel and oil were the commodities that defined the 20th century, then wireless spectrum is arguably the one needed by the internet industries that will dominate the next 100 years. And, as with oil, there is a finite amount. Yet analysts and experts are sharply divided on whether it will actually run out.

According to the US Federal Communication Commission’s models, demand for spectrum will eclipse supply some time in 2018. Mr Chaplin says Verizon, the largest wireless group by market share, is in the worst position. It accounts for about 40 per cent of industry revenues, but controls 17 per cent of spectrum capacity.

The situation is not as acute in developing markets, where smartphone penetration is still in its infancy, or in Europe, where a greater share of the population lives in urban areas. Cities and towns would be in a better position to cope with any spectrum crunch, because lots of traffic can be offloaded on to WiFi networks.

However, Marty Cooper, a US engineer who is widely credited with inventing the first real mobile phone, is adamant that there is not going to be a spectrum crunch. Instead, he

says the telecoms industry will “find a way of using spectrum more efficiently”, just as the modern hybrid engines that power the Toyota Prius use less petrol.

Nokia Networks recently suggested that existing spectrum could be made a thousand times more efficient by 2020, by deploying new technology and using new frequency bands.

So why are telecoms companies willing to pay so much for spectrum? The industry insists it needs to grab as much as possible to satisfy users’ hunger for mobile data. But Mr Cooper suggests that they could be “hoarding” it to stop competitors from entering the market.

While the big US telecoms group are engaged in a race to buy more airwaves, some companies are taking an entirely different approach: building mobile phone networks that use no wireless spectrum at all.

Cablevision, the US cable operator, last month launched Freewheel, a mobile phone service that allows customers to make voice calls and download videos and music by solely using the company’s WiFi hotspots.

The service has huge limitations: the minute customers are outside the range of one of Cablevision’s hotspots, they will be unable to use their phone. They must also use a specially modified Motorola phone that is designed to work on the system.

Yet the trade-off is partly reflected in the price: \$9.95 a month for Cablevision customers, on top of their regular monthly bill, or \$29.95 for non-customers. That is a fraction of the cost of the most basic \$50 plans on offer – which are also subject to strict caps on data usage.

Craig Moffett, an analyst at Moffett Nathanson, says of Freewheel: “The best way to view [it] is as a proof of concept. The service itself is unlikely to be financially material for either Cablevision or the wireless industry. The concept, however, is a big deal.”

If a larger cable group, such as Comcast, were to follow suit with a service that was predominantly powered by WiFi hotspots, it would have “the potential to attract a meaningful number of customers”, Mr Moffett says.

“If priced aggressively, it could also be enormously deflationary for traditional cellular providers,” he adds.

That is a sobering thought for those companies that have just shelled out billions on spectrum.

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# Industry hails streaming as ‘new white knight’

**Music** The uptake of services will not replace lost revenues just yet, says *Matthew Garrahan*

Digital downloads — once seen as the salvation of a music industry ravaged by online piracy and falling CD sales — are in decline, and record labels are worried.

Amid great promise, downloads became the main way to listen to music, but a decade of growth came to a shuddering halt in 2014 and sales are set to fall further in 2015.

Enter streaming, the latest white knight with potential to return the music industry to the good times. A range of companies led by Spotify and including Apple and Google, are betting music fans will migrate to new services that give listeners all the music they want to hear for a fixed monthly price.

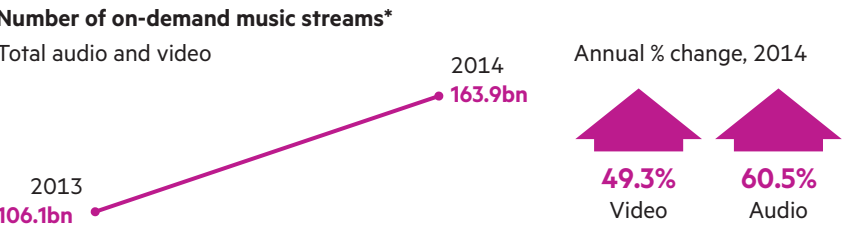
Access, not ownership, is the order of the day and Spotify is the operator leading the charge. The Swedish company added 2.5m subscribers at the end of last year and now has 15m paying customers, with 60m people around the world using its services.

Its growth is attracting investor interest. It recently hired Goldman Sachs to raise about \$500m, a new round of financing that is expected to value Spotify at as much as \$8bn, according to people familiar with the matter.

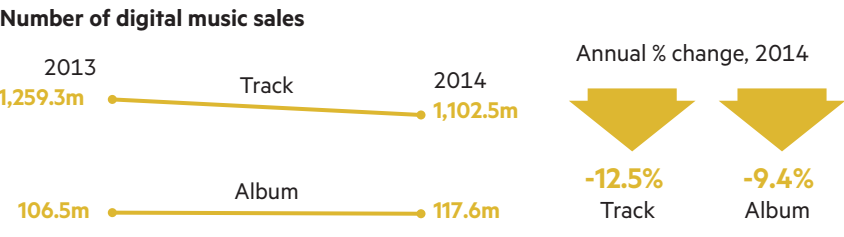
Spotify’s investors include Sean Parker, the founder of Napster, and Technology Crossover Ventures, the Silicon Valley investment firm that led its most recent fundraising at the end of 2013, when it secured \$250m. Record labels Universal Music Group and Sony Music also own shares in Spotify.

It is easy to understand why investors do not want to miss the boat. Consumer behaviour is shifting: global digital downloads of albums slipped 9 per cent in 2014 and sales of individual tracks fell 12 per cent, according to Nielsen Music data. Around the world, demand for streaming services is increasing, rising more than 50 per cent, with 164bn songs streamed in the US alone in 2014.

Downloads v streams Winners and losers



FT graphic Source: Nielsen \* Includes audio and video data from AOL, Beats, Cricket, Google Play, MediaNet, Rdio, Rhapsody, Slacker, Spotify, Xbox music, YouTube/Vevo



‘Google, Apple, Spotify and others are all converging on this space’

Despite the growth of streaming, no one in the music industry is yet popping the champagne. Even if it continues on its growth trajectory, streaming will not replace revenue lost by declines in downloading for two or three years. Still, it is a model the record labels love, because it replaces one that depends on hits with one that delivers steady, recurring revenue.

Downloads may be falling, but 2015 still ranks as a pretty good year to be a music label. Technology groups are launching competing music streaming services and are on the lookout for

exclusive deals with labels and big acts — anything to give them an edge over their competitors.

One record executive commented: “Think about it: Google, Apple, Spotify and others are all converging on this space. And what do they need? Our music.”

Apple is — unusually, given its size and pedigree in digital music — an underdog in streaming: its iTunes store is the world’s largest music retailer.

The company took steps to change this last year when it paid \$3bn for Beats Electronics, the audio group founded by

entrepreneur Jimmy Iovine and hip-hop star Dr Dre. The deal gave Apple the Beats brand, which has cachet among young music fans, but will ditch the name when it launches its own subscription streaming product this year.

Due in the summer — the release date has slipped back from the spring — the Apple streaming service has the advantage of a vast installed base of devices. Apple will effectively pre-install the app on new devices, including it on an upgrade of its iOS operating system.

Mr Iovine, who Apple retained after buying Beats, is opposed to having a free



Premium rate: Taylor Swift

## Telecoms companies seek to redefine role as digital competition intensifies

Continued from page 1

This trend is being played out in mergers and acquisitions in the sector, for example in the £12.5bn acquisition of mobile group EE by BT in the UK.

But, inevitably during one of the most tumultuous periods of change for telecoms since European deregulation of the sector two decades ago, there are risks — not least that some overstretch, or others under-reach, in setting out business strategies.

Mr Vestberg predicts a segmentation of the industry, as some concentrate on network provision, while others look to open new markets. But, he says: “It’s new turf. There will be competitors in the technology industry wanting the same customers.”

Some still ask why telecoms groups worry about maintaining the status quo. On the face of it, there is little cause for concern. Mobile revenues are estimated at close to \$100bn a month, according to research by The Mobile World, an industry database provider. This is generated by rising global mobile connections, more than 7bn at present.

The telecoms market generated nearly \$2tn in revenues in the past 12 months, Mobile World said, with 61 per cent from mobile services. These grew almost 4 per cent in the past year, even if fixed revenues slid almost 1 per cent.

But the overall positive industry numbers belie a more mixed picture in many developed markets, in particular in Europe, where revenues have fallen and profits barely cover investment costs.

More importantly, the bigger risks are ignoring what is happening elsewhere, in particular as the technology sector looks to compete directly with telecoms groups in internet-based



voice, messaging and network services. Network operators still control certain parts of the customer relationship but these are coming under attack.

One obvious area is customer billing, which has been crucial for telecoms companies as the trusted provider of communications and digital services. However, the introduction of services such as iTunes, Google Play and Amazon have disrupted this link with the customer.

Meanwhile, control of the technology for directing communications in IP-based networks is being challenged by various technology-led services, while even the trusty Sim card — the piece of plastic that gives a phone its identity and connection — is being challenged by Apple’s own electronic version,

launched in autumn 2014.

The network operator, in other words, is losing control of the customer, and with it the ability to make more money than by just providing a basic level of connectivity.

But Bain & Company, the management consultancy, sees a chance to make telecoms services premium again. A study by the group found that the fight for market share has driven down prices for network services such as voice, text and data as well as devices. This has taught customers to make price the main criterion over factors such as network quality, brand or services.

Laurent-Pierre Baculard, partner with Bain, says: “As connectivity costs have fallen, customers have begun to think of telcos as mere providers of pipes and have shifted their perceptions of value from the network to their mobile devices and content providers.”

Mr Baculard says that telecoms groups need to invest in their networks to provide better connectivity and monitoring of sensors and other connected objects and become “enablers of an integrated, premium digital lifestyle . . . not only entertainment and communication, but also smart and connected homes and cars, security, healthcare and other digital services”.

Ben Verwaayen, former chief executive of BT and Alcatel-Lucent, similarly sees an important role for telecoms companies — if they want to take it.

But Mr Verwaayen says that while telecoms groups are all about providing individual services, precisely what these will be will be decided by customers and not the networks that serve them. As for the original use of the phone, he says: “Voice is now just an application.”

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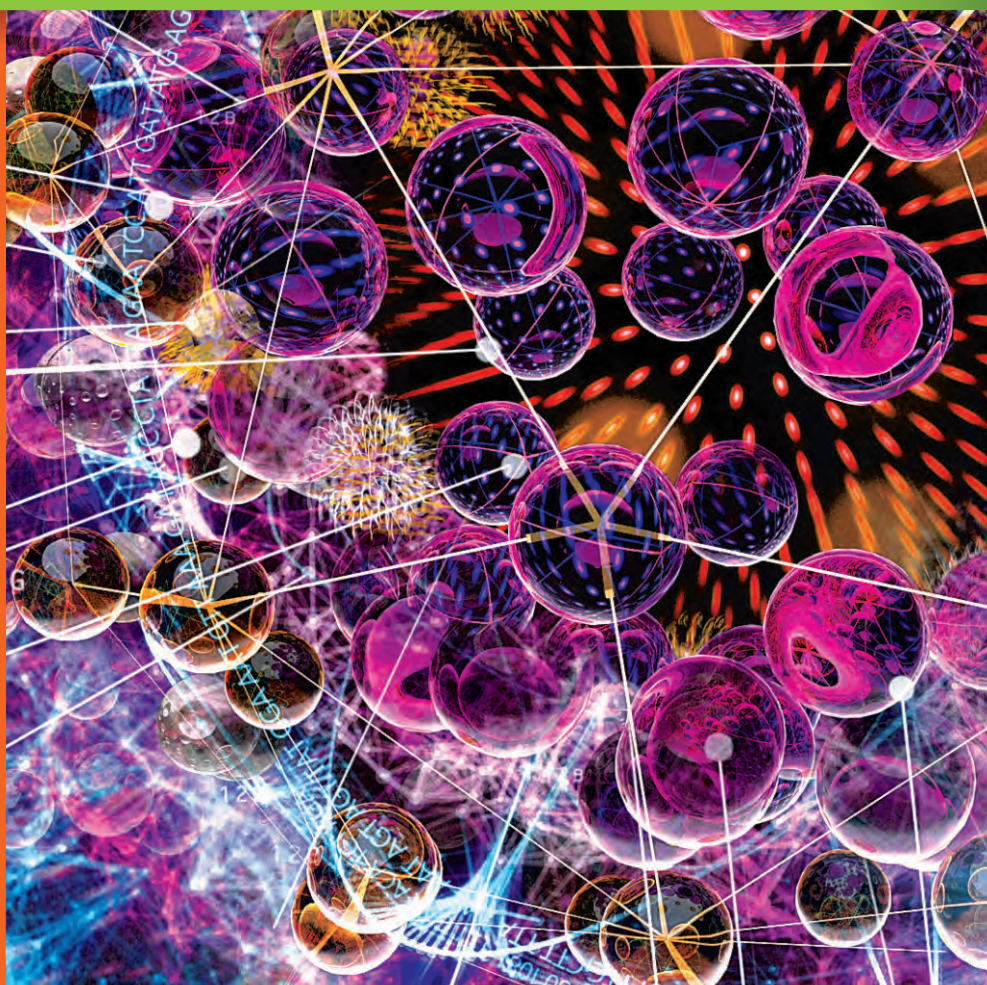
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The Connected Business

# SMEs at risk of falling behind the digital curve

**Technical advantage**  
Businesses that exploit mobile best grow faster than their rivals, says *Jessica Twentyman*

A pop-up shop at the Boxpark mall in London's Shoreditch is a fashionable starting point for a small business hoping to start a trend. Newcomer Wines aims to popularise Austrian wines by whetting the appetites of younger customers. Daniela Pillhofer, the company's co-founder, says mobile technologies have a big role to play in educating shoppers on the pleasures of Austrian wine – and in taking payments. In-store tablet computers show videos about winemakers, and purchases made by credit or debit cards are processed on a mobile phone or tablet via a card reader and app from Swedish mobile payments specialist iZettle. “About 80 per cent of our customers want to pay that way,” says Ms Pillhofer.

Not every small business is able to handle its customers' payment preferences so readily. A study in five European countries by Visa Europe found small businesses push about one in four clients away by not accepting cards. Companies such as iZettle, Payleven and SumUp use mobile technologies to deliver low-cost competition to traditional card payment services, which often have long contracts and monthly fees that deter small businesses. It is not just in the area of payments that small businesses may lose out. A Boston Consulting Group study of small and medium-sized enterprises (SMEs) found the 25 per cent of SMEs that use mobile services most intensively have revenues that grow up to twice as fast as their peers and create jobs up to eight times faster. The report says SMEs behind the digital curve “are at risk of being left further behind”. Mobile technologies underpin the franchise strategy at Diamond Logistics, a courier company in Surrey, England. The scheme, launched in 2012, has seen the company open 14 locations in the past two years and it plans to increase these to 40 by the end of 2015.



Streets ahead: Kate Lester, chief executive of Diamond Logistics

The company uses mobile provider Vodafone's One Net platform for small businesses that integrates landline and mobile connectivity into one system. Using this, Diamond keeps its distributed network of franchisees and drivers working as a single, customer-focused team, says chief executive Kate Lester. This means that, when drivers are on

the road, it is easy for office staff to alert them, via a mobile app, to new collections they need to make for same-day and next-day delivery services. A feature in the One Net platform automatically diverts customer calls to the person best placed to help them. The field-based sales team at First Mile, a London-based provider of

recycling services to SMEs, uses an Android-based mobile app when members visit businesses in London and Birmingham to gauge their interest in signing up for its services. The app, linked to a customer relationship management system from cloud-based services provider Salesforce.com, gives the team a map showing which businesses they need to visit in a particular area. After each visit, they use the app to score that prospect according to a “warmness rating”. A “hot” lead is followed up by the office-based sales team, “colder” leads are flagged up for automated email marketing campaigns. Bruce Bratley, First Mile's chief executive, says the company quadrupled its field sales in a matter of months using the app, which paid for itself within a month of its launch in January 2014. Patrick Rusby, an analyst at Analysys Mason, agrees that better use of mobile technologies can transform a small company's prospects. “Mobile opens up new horizons for SMEs, giving them better access to better tools, which enable them to compete on a level playing field against much larger rivals,” he says.



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# Milk-buying robots may be the end of us all

**INSIDE TECH**  
**Maija Palmer**



Could an internet-connected thing — a smart fridge, a thermostat or a home-help robot — become a millionaire? This is not as ridiculous a question as it may seem. If we do indeed move toward a world in which devices are connected to the internet and performing mundane chores, it is likely that many of them will be connected to some kind of bank account. For maximum efficiency, the smart fridge that orders your milk should also be able to also handle the payments to the supermarket. You may not hook the fridge directly to a current account — worried perhaps a software glitch might cause the fridge to accidentally put you in debt by ordering £20,000 worth of dairy products in a single day. But you might set up a pre-paid account with a set amount of milk money that the fridge can access. What happens if the fridge is able to buy your milk for 1p a litre cheaper than you have budgeted? Perhaps it is able to join with other networked fridges to buy in bulk, lowering the price. Or its ability to search hundreds of thousands of prices allows it to do some bargain hunting. The milk account grows a surplus. But is this money yours? As the owner of the fridge you would assume so. But is this always clear? What if you do not own the smart fridge, but rent it? Or if it has been supplied to you, free of charge, by its manufacturers or by the dairy? Who owns the surplus then? Would it be like the deals some solar panel companies offer, where they install the equipment for free on the understanding that they keep the money from any electricity generated? At the very least, you will need to read the ownership contract carefully. And what happens when the artificial intelligence capabilities of appliances increases markedly and the fridge is capable of making more complex decisions? What if, rather than keeping the milk funds in the prepaid account, it connects to an online stock market trading site, invests the money and makes a profit? It still buys the milk, but I bank, therefore I am?: a still from the science fiction film 'I, Robot'

now there is an extra £20 in the prepaid account. Does that belong to you? Will there be anything to stop an advanced, AI-enabled fridge opening a online bank account and depositing the money there without your knowledge? Should banks have a “humans-only” policy to stop this happening? And what would a rich machine buy? A group of Swiss artists have experimented with this idea, creating the Random Darknet Shopper, an automated online shopping bot that was given an allowance of \$100 a week in bitcoin and instructed to make one random purchase a week from an online marketplace. The items were displayed in an exhibition at the Kunst Halle in St Gallen. To the consternation of the performance artists — and the Swiss police — the purchases included 10 ecstasy pills and a false Hungarian passport. This prompted debate over who was liable when a robot broke the law on its own initiative, a debate the police sought to clarify by seizing the contraband goods. The idea of the shopping robot adds another dimension to the discussion about what a robot-filled future will be like. Last month, an open letter, signed by scientists and entrepreneurs including Stephen Hawking and Elon Musk, urged us to begin considering some of the ethical dilemmas and potential dangers posed by artificial intelligence. Who is liable if a robot has an accident, for example? How will a self-driving car choose what to do if the only way to avoid a head-on collision is to veer on to a crowded pavement? Scientists at places such as the Future of Life Institute based in the US, the Centre for the Study of Existential Risk at Cambridge university and the Machine Intelligence Research Institute in California (yes, these really exist) are also considering what might happen if we are eventually able to create machines far more intelligent than humans — superintelligences that may break out of the bounds of their programming and begin to disregard human controls. In science fiction, this scenario — called “singularity” or “transcendence” — usually leads to robot versus human war and a contest for world domination. But what if, rather than a physical battle, it was an economic one, with robots siphoning off our money or destroying the global economy with out-of-control algorithmic trading programmes? Perhaps it will not make for a great movie, but it seems the more likely outcome. After all, the financial crisis of the past decade has shown us how easily it could be done, even by dumb humans.

