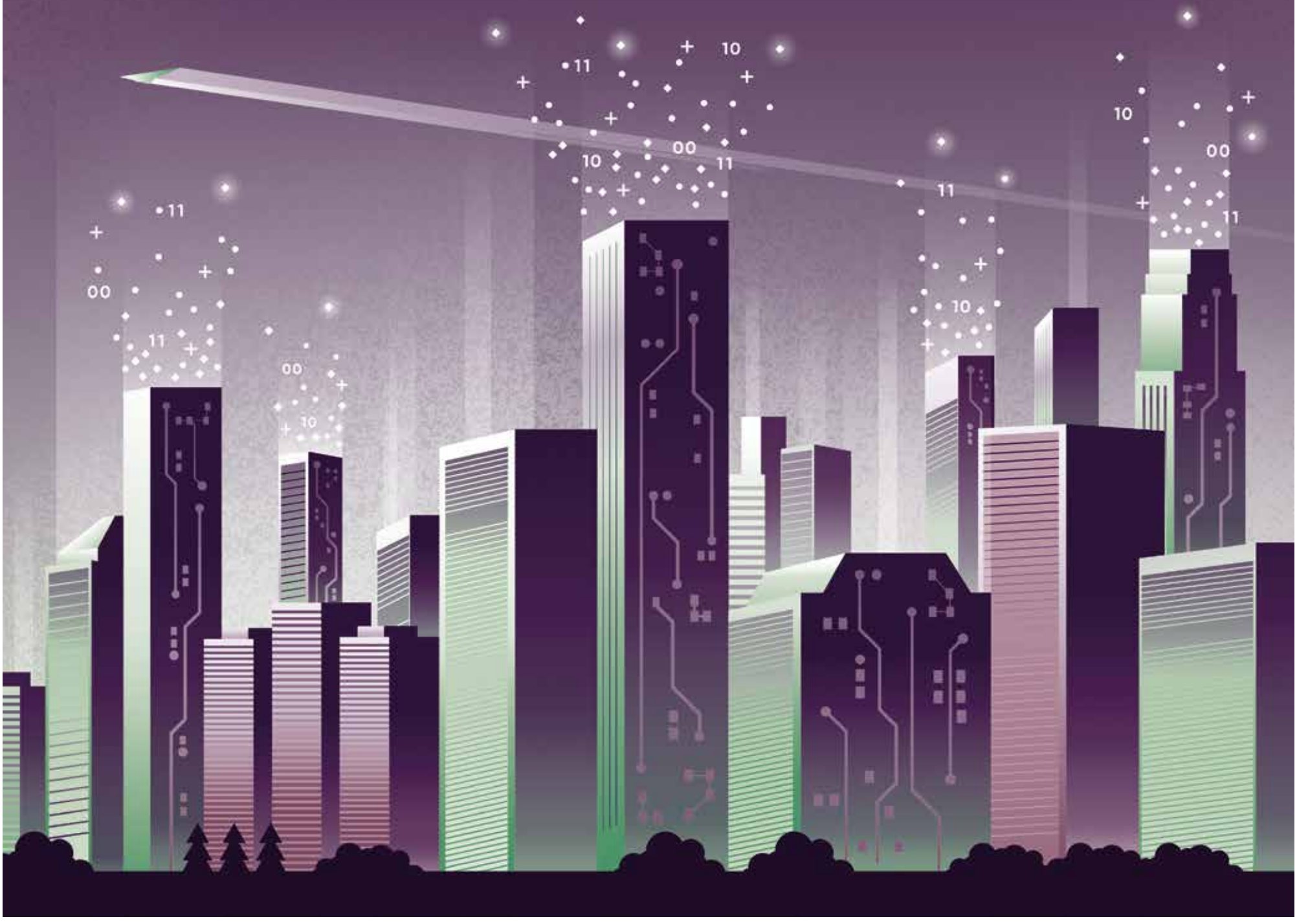
DIGITAL TRANSFORMATION



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OVERVIEW

Resolving tension among the bosses

Committing to change isn't the same as committing to the consequences and digital transformation can yield many

THOMAS BROWN

What are the top digital priorities for your organisation? Do you have a fit-for-purpose strategy for navigating this era of disruption and uncertainty? Where might your business need to pivot its operating model or reallocate investment to counter risk and capitalise on opportunity? What changes will a digital transformation involve for your role and function, and are you comfortable with the sacrifice and compromise this might require?

Even if you can confidently answer each of these questions, ask yourself have they been given sufficient consideration among your total leadership team? And would the answers from each of this team be consistent or lack congruence?

Few, if any, executives would dispute the profound and pervasive nature of digital on their organisations, and most leadership teams may believe they have collective commitment to a strategic response to the threat and opportunity of digital.

Yet for many, the questions of what such a response means, what's really needed to position the business for success and where the real priorities are, can become sources of disagreement and conflict.

Steven Zuanella, newly-appointed group chief digital officer (CDO) at RSA Insurance and a veteran of several complex digital transformation undertakings, reflects on three common sources of tension facing digital leaders embarking on such a journey.

"It's taken me between six months and a year, and sometimes failing altogether, to get consensus around a digital transformation agenda," he says. "The reason this can sometimes be so difficult is that firstly everybody has a different view of what digital transformation actually means and quite often that view is quite firmly held. The second common source of tension comes when individual board members suddenly realise that genuine digital transformation might actually be a threat, certainly to how they do things, if not to what they do.

"Lastly, is when the CEO is either not clear or not supportive of getting clarity on the agenda and leaves it to the individual executive committee members to get clarity, which can quickly descend into anarchy."

So where do you start? Where is conflict and tension most likely, and who among a leadership team should be most supportive of a digital transformation agenda?


Breather/Unsplash

The natural starting point in an effort to build executive alignment would seem to be the chief marketing officer (CMO) and chief information officer (CIO). After all, these two leadership roles are together responsible for an organisation's technology agenda and for its customer experience agenda, central to any digital change journey. Moreover, these two should have the most proximity to the fast-changing digital landscape, and its impact on customer behaviour and expectations.

Yet counter-intuitively, these two roles can also be the source of most tension. Among the legacy of boardroom politics, the CIO and CMO communities have both been leading proponents for taking ownership, or at least, leadership, of their organisation's digital agenda. But as organisations increasingly face up to the cross-functional, broad nature of digital transformation, functional leadership can in fact become limiting.

Hence the rise of the new power-player in the C-suite, the CDO. Often heralded as something of a digital saviour, accompanied by great expectations but also a limited or inconsistent understanding among peers of what's really needed to be successful, the CDO role might actually be viewed as something of a poisoned chalice.

An executive that challenges the traditional command-and-control mentality which has dominated functions and profit and loss for so long. One charged with bringing answers to questions which may be ill-defined or not yet realised. And one often carrying the weight of responsibility for something so ubiquitous and so critical that it cannot truly reside on the shoulders of one individual.

Once the echo of the chief executive's mandate has faded into memory, however, a CDO can find themselves facing a group of executives with widely varying expectations and levels of support. Too often a combination of instinct and pressure can lead the CDO straight into tackling fires or seeking out low-hanging fruit to build credibility. Instead, to avoid greater pain down the line, it's crucial to invest time up front to spotlight potential conflicts among executives with theoretical support, and to build consensus, commitment and, frankly, conviction among senior leaders.

"Obviously the CEO's mandate is critical, but the way to make change happen is not through the CEO alone, but through the other board members, the people who have execution responsibility," says Mr Zuanella. These include the CMO and the CIO as well as the chief financial officer, but also, depending on how the business is structured, the profit and loss owners. "And it's this latter group who have great responsibility around driving income and costs, and those are the people that I try and focus on, primarily, because they are the ones who show the results," he adds.

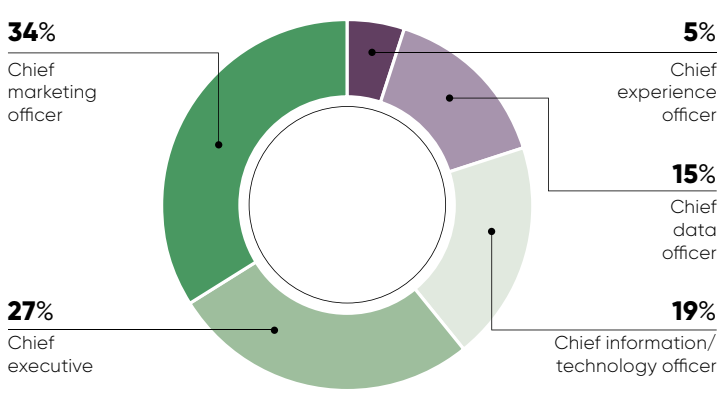
Mr Zuanella highlights two important early-day roles for a digital leader seeking to build consensus for a digital transformation agenda. "I talk to executives individually to try and understand both concerns and priorities, and see where we can plug those gaps. And collectively I try to play more of a facilitator role, to let those differing views come to the surface and see where, together, we can find alignment."

Better communication. Open dialogue. The importance of relationships. These may seem somewhat rudimentary conclusions to tackling competing boardroom priorities, but for many organisations, caught up in chasing the art of the possible, they can easily be overlooked.

Ultimately, whatever conflicting ambitions or opinions exist today, they exist because transformation, as the term suggests, involves change, ambiguity and risk. And the best, or perhaps only, defence is dialogue. As Mr Zuanella concludes: "The one thing about digital transformation that's certain is that there is a high degree of uncertainty."

DIGITAL TRANSFORMATION LEADERSHIP

EXECUTIVE LEADING DIGITAL TRANSFORMATION IN GLOBAL CORPORATIONS



Altimeter 2016

COMMERCIAL FEATURE

Getting the intelligent edge

There's always talk of a new revolution in IT. However, there's a trend which genuinely merits the word, says **David Chalmers**, vice president and chief technologist, Hewlett Packard Enterprise, Europe, Middle East and Africa

The hottest thing in computing right now is "the edge" also called "the intelligent edge". I know many readers will be scratching their heads. The edge? Let me explain.

Think of the edge as the galaxy of sensors being deployed across industry and society. There are sensors in public dustbins to trigger collection when they are full or traffic lights which use sensors to regulate flow. Buildings are studded with sensors to track meeting room usage, light, temperature and all sorts of other things. The Deloitte office in Amsterdam has 30,000 sensors.

The key thing is that vast amounts of sensor data have to be processed locally, near the data source. When there's no time to send data to the cloud and wait for a response, then the work must be done on site. That's why it's known as the intelligent edge.

Autonomous vehicles (AVs) are a terrific example of why this technology is so badly needed. As an AV weaves down a city street it needs to make decisions in milliseconds. Break, swerve, accelerate; it's a job to keep on the road. If the AV waits for a transmission to arrive from a remote data centre, it'll wind up bonnet deep in a brick wall. Not even the forthcoming 5G networks, with their ultra-low latency, are going to be enough. The AV needs to have the computing power to process all the data either on board or it has to be nearby at the roadside. It's the only way. This is possible with the intelligent edge.

There's also the bandwidth issue. The explosion in sensors is generating huge volumes of data. For example, Walmart is the world's largest retailer and its entire transaction database contains 2 petabytes of data. One self-driving car will generate that in a single year. That's just one car. There will be ten million of them by 2020. And there will be many billions of sensor-equipped devices of all kind in a few years. There's no way existing networks can handle that volume of data.

Computing the data locally is the best way of avoiding clogged networks. Sensor-equipped devices can talk to each other through direct local connections; this is known as mesh computing. It's a solution to an urgent real-world problem.

So that's what the intelligent edge is. Here's why it's so exciting. Edge computing means we put intelligence where the action is. The effect can be startling.

For instance, HPE equipped the Levi Stadium, home to the San Francisco 49ers football team, with a range of edge technologies. Imagine this. As you drive to the stadium, you are told where the best parking space is; no driving around lost. As you walk to your seat, live data on your smartphone directs you with minimal delays. If you want food, the stadium knows where you are. A hot dog and drink can be brought straight to your seat. When you need a comfort break you'll know which convenience has the shortest queue.

Sensors are picking up activity, turning the entire stadium into an intelligent infosphere. This is what happens when the edge is scaled up. And it's a reality. The concept received a fabulous reception at last year's Super Bowl. The intelligent edge in action.

This is just the beginning. We are going to see edge devices appear across society. Offices will use sensors and location-based services to optimise desk usage. Just sit down at any terminal and it will be configured for you, ready to use. Need a meeting room? Sensors will detect which room is free. The business model is obvious because desk space can cost £10,000 a year. The return on investment is going to be rapid.

The cost of edge devices is plummeting. I love to collect examples, and I own an internet-connected toothbrush and spoon. They monitor how you use them. Yes, the devices are a bit silly. But they illustrate the economics. Sensors are so cheap they can be installed in a toothbrush or spoon without raising the price.

Naturally companies want to know what's going to happen with the edge. For example, will it replace data centres? I don't think so. Instead it's clear that certain tasks are best suited to specific technologies. The edge is ideal when time and bandwidth are tight. When information is sensitive, then an on-premises data centre is the right place to store and process it. And for big-volume work, the cloud will also remain relevant.

This last point needs stressing. The data generated by edge devices is going to be immense and incredibly valuable. Companies will need to aggregate the data and then interrogate it to find insights. Edge devices can do the preliminary work, generating metadata and so on, but the data centre or the cloud is where the intensive machine-learning and data analytics can be done.

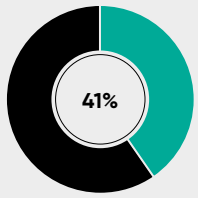
The potential of the intelligent edge will be determined by our imaginations. As a company we're working on a number use cases, including predictive maintenance, asset management and tracking, intelligent spaces (buildings and venues), healthcare, future cities and connected vehicles. We can create health sensors for the elderly in retirement homes or monitors for heart conditions and other time-sensitive maladies. In India, there is a need for better ante-natal care. Intelligent sensors can help doctors in another part of the country offer a diagnosis.

The intelligent edge will connect industries. The supermarket industry needs to think about how it can make the most of the connected car. How about sending a discount to a car as it arrives? This is the sort of proposition retailers and manufacturers are facing.

This a new era. We are opening the box on a technology and exploring what we can do. The edge can make our world more efficient and effective, and create a more pleasing, greener environment. The word revolution gets used a lot. This time it's deserved.

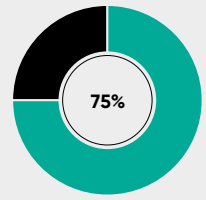
To find out more please visit www.hpe.com/uk/en/solutions/internet-of-things.html

> The potential of the intelligent edge will be determined by our imaginations

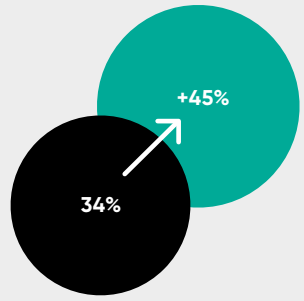


of devices connected to business networks use internet of things (IoT) technology

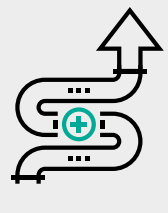
62% of respondents in the industrial sector have already implemented IoT



of business leaders believe that IoT will transform business as we know it

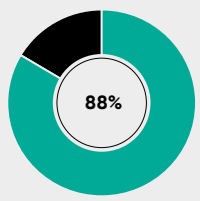


- return on investment within the healthcare industry
- increase in IoT devices in healthcare – patient monitors, power generators and meters, and imaging/X-ray machines – expected in the next two years



OVER 80% of businesses across all verticals have seen notable increases in business efficiency and innovation as a result of IoT adoption

Retailers worry about keeping their network and customer data safe amid IoT-related breaches



of retailers said that IoT has increased business efficiency and has allowed greater engagement with shoppers

40% return on IoT investment from more than half of respondents in retail

80% have found improved visibility across the organisation

83% report increased business efficiency across the sector and another 80 per cent have found improved visibility across the organisation

Enterprises adopting IoT technology

HPE

45% of IoT-created data will be stored, processed, analysed and acted upon close to, or at the edge of, the network by 2019

IDC research

8.4bn connected things will be in use worldwide in 2017, up 31 per cent from 2016, and will reach 20.4 billion by 2020

Gartner Inc

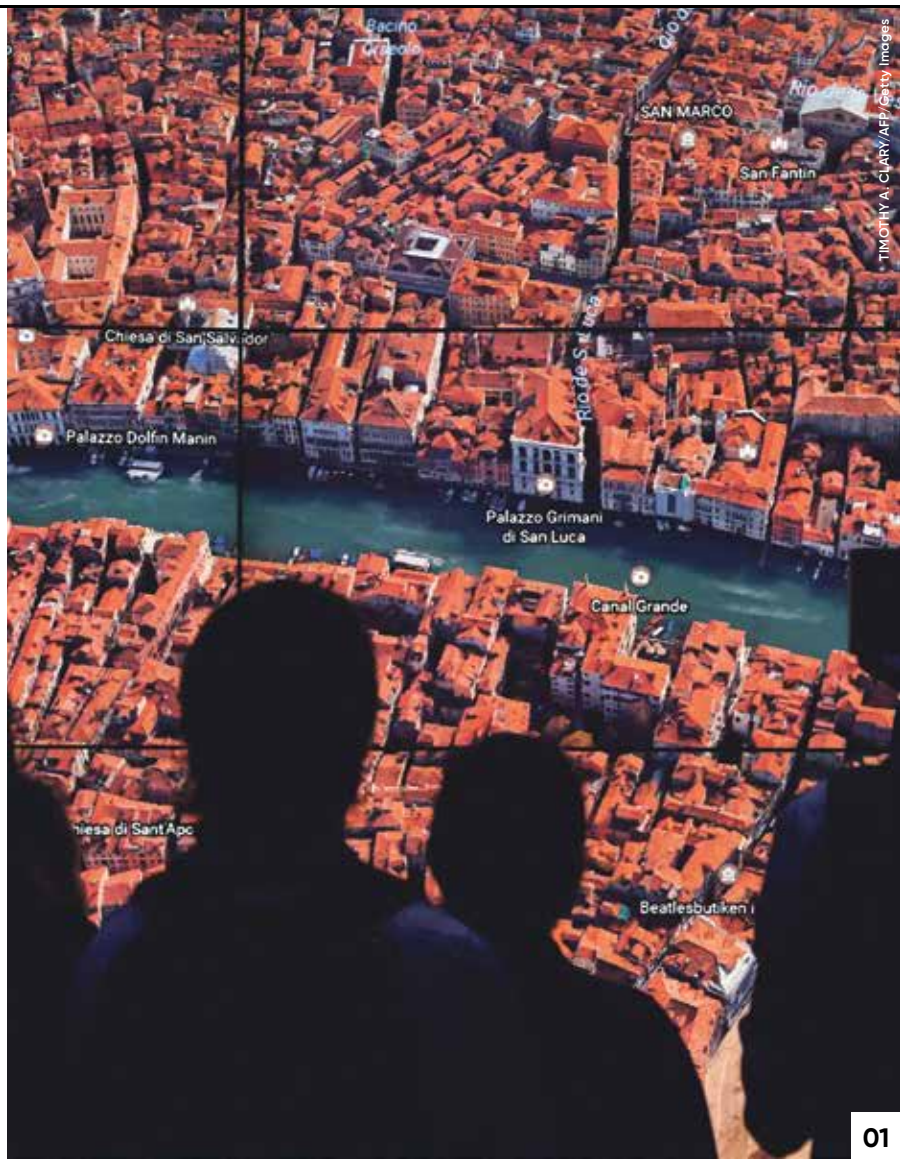
$2trn total spending on endpoints and services in 2017

Gartner Inc

PLATFORM ECONOMY

Launching business from a platform

From music to the news, taxis to merchandise and accommodation to food deliveries, platforms are at the apex of the economy



TIMOTHY A. CLARY/AFP/Getty Images

01

DAVID BENADY

The platform economy has transformed our world in a few short years. Online marketplaces are storming market after market, connecting buyers and sellers, and taking the friction out of commerce.

With a few thumb strokes on a smartphone, a cornucopia of goods and services becomes available from Google, Amazon, iTunes and other platforms such as Uber, Airbnb and Hotels.com.

This age of the platform has changed the way businesses think about innovation. "It is really polarising once you get into this platform mentality," says Lorenzo Wood, chief innovation officer at marketing and technology agency DigitasLBi. "We talk to clients about what they're doing and this phrase 'become a platform' keeps coming up. The advantages of platforms are huge because you have lots of control, though equally you need big scale and market share and lots of service support to achieve it," he says.

Only platforms which bring together vast numbers of providers and consumers offer massive and increasing returns on investment. The providers, from Uber drivers and hotel chains to Spotify artists and resellers, risk getting squeezed. They face massive competition on the platforms, pay a proportion of their revenue to the platform owners and are obliged to give them access to their data.

But there are opportunities for those willing to work under the shadows cast by the platform giants. New eco-structures of business opportunity are being created with benefits for small and medium-sized businesses. Independent restaurants are boosting sales through home delivery platforms such as Deliveroo, while art platform Etsy connects millions of buyers with independent artists.

Hotels.com president Johan Svanstrom says that online travel agents (OTAs), such as Hotels.com, platforms which unite travelers with empty hotel rooms, bring huge benefits to both sides of the equation.

> "You are not a platform unless you are part of the value chain

"It is clear to me that OTAs play an important role for users and partners alike, otherwise the OTAs simply wouldn't have grown to this size. It's value creation 101," he says. He points to research from Phocuswright showing that OTAs such as Hotels.com contributed around $99 billion of worldwide hotel reservations in 2016.

"Any individual OTA doesn't have more than a small minority market share globally and several large hotel companies are of a similar size. That means there will be a lot of continued competition and marketing, while investment in technology is soaring," he says, adding that in 2016 Hotels.com parent company Expedia spent $1 billion on technology. This investment potentially benefits hotels, which can make use of innovations such as revenue management tools, guest communications platforms and flight package booking engines.

"Market forces set the value of distribution costs on the OTA platforms, and that value is naturally related to all that reach, development and investment done by the OTAs," says Mr Svanstrom.

"In other words, we can help to power the industry in many ways and that smarter demand generation leads to more customers for hotels. Who can argue against the win-win opportunity here?"

Meanwhile, Dominic Preston, partner in the technology group at Grant Thornton, says platforms are redefining the relationships between buyers and consumers.

But he warns that some of the mega-platforms have the capacity to dominate markets. Once they assume a powerful position, they can hike rates and further squeeze the content providers. While there may be regulatory levers against the vast size of the platforms, Mr Preston adds that "there is a kind of self-correction in the world" as executives leave these organisations to form new disruptive platforms to challenge the established giants.

Companies need to adapt their strategies to the platform economy and make sure they are connected to as many platforms as possible. Essential ingredients of the platform economy are application programming interfaces (APIs), a type of software which allows providers to plug their services into the platforms. For instance, APIs allows Uber to plug into the Google Maps platform and enable platforms to receive online payments from customers.

Ross Mason, founder of MuleSoft which helps businesses with their APIs, says: "The way companies drive competitive advantage is not the applications that they run, but the way they can connect, compose and recompose their digital assets and capabilities into new products and services."

He says the modern economy is based on the idea of value chains. "Instead of vertically owning everything end to end, you are now plugging in to different pieces of the value chain through APIs to deliver a new product or service to the consumer. That is critical to the platform economy because you are not a platform unless you are part of the value chain."

Mr Mason gives the example of Atom Bank, a startup which offers mobile banking. It has worked with MuleSoft to use APIs to connect into the various steps of offering a mortgage. It can handle a mortgage application "in a matter of minutes". This involves talking to more than 30 different systems such as credit ratings agencies, using APIs. This shows how APIs help services morph into platforms.

He says there is a winner-takes-all mentality in the platform economy: "The second player is far behind."

Entrepreneurs creating new business models don't necessarily need to be the next Amazon. Finding ways to plug their services into the eco-system of platforms, as Atom Bank has done, is another route to success. Simply being a provider on someone else's platform can be positive for smaller businesses in particular. But the phrase ringing loudly in every entrepreneur's ears these days is, "Be the platform not the product."

Antonio Gravante/Shutterstock

02

01 Application programming interfaces or APIs allow companies to plug into other platforms such as Google Maps to use their solutions

02 Uber is one company whose business model is dependent on the Google Maps API

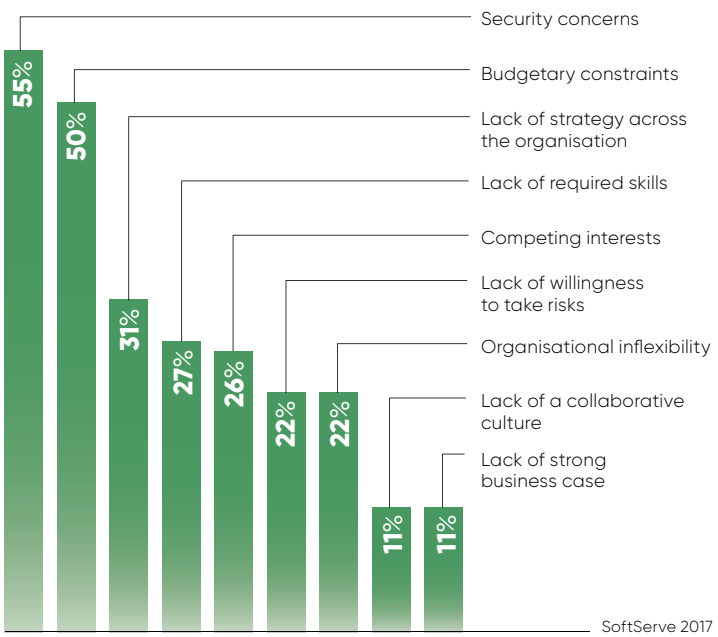
PLATFORM CATEGORIES AND COMPANIES

SECURITY


srfparis/Pixabay

TOP CHALLENGES IMPEDING ORGANISATIONS FROM TAKING ADVANTAGE OF DIGITAL TRENDS

CROSS-INDUSTRY SURVEY OF UK AND US DECISION-MAKERS



SoftServe 2017

Design security in and keep the hackers out

In an increasingly connected digital world, the opportunities for cyber crime are multiplying making security a central issue

EMMA WOOLLACOTT

Digital transformation is revolutionising business, with technologies such as mobile computing, big data analytics and the internet of things (IoT) entering every aspect of an organisation from customer service to high-level decision-making.

However, Gartner predicts that by 2020, 60 per cent of digital businesses will suffer major service failures due to the inability of IT security teams to manage digital risk.

The more connected devices an organisation uses and the more data it collects, the greater the possibilities for a breach and the bigger the incentive for hackers.

> When undergoing a digital transformation project, always involve security people from the very start

Meanwhile, by its very nature, transformation is ripe with the possibility of unforeseen effects, so security should be central from the outset. It's not something that project teams will necessarily be keen on, as there's a common perception that focusing on security too early can cause delays and put too many constraints on a project.

In fact, though, the opposite is more likely to be true, as an early focus on security can save project teams from going down the wrong path.

"When undergoing a digital transformation project, always involve security people from the very start – it saves a lot of pain and backtracking later on," says Owen Connolly, Europe, Middle East and Africa vice president at research firm IOActive. "We really do like to do the blue-sky thinking too and we actually have ideas to contribute."

As Simon Leech, chief technologist on Hewlett Packard Enterprise's digital solutions and transformation team, points out, the widespread adoption of IoT has already provided examples of what can happen if security isn't properly considered in the design phase.

"The recent *Mirai* botnet preyed upon IoT devices, including IP cameras and home routers, infecting those with default passwords and outdated Linux kernel versions. Infected devices were added to a botnet which was then controlled to launch DDoS [distributed denial-of-service] attacks," he says.

"It would have been fairly trivial to include controls at the design stage to enforce users to change default passwords and deliver system updates, but alas these devices are typically built to a budget and too often there is not enough budget to take a mature approach to risk assessment."

Gartner predicts that 8.4 billion connected devices will be in use worldwide in 2017, rising to 20.4 billion by 2020. And according to Cisco, these devices will generate more than 400 zettabytes – 400 trillion gigabytes – of data every year by 2018.

It's a huge challenge for security professionals, for whom traditional perimeter protection is no longer enough.

60%

of digital businesses will suffer major service failures by 2020 due to the inability of IT security teams to manage digital risk

Gartner

"Digital transformation inevitably adds more devices and ways to attack the business," says Piers Wilson, head of product management at Huntsman Security. "Blocking every possible attack route is impossible. Instead, concentrate on knowing what 'normal' behaviour looks like, so security teams can spot and address suspicious activity instantly."

Adaptive, self-defending systems are coming into their own, exploiting machine-learning and real-time analytics capabilities. They can autonomously identify intruders and detect unusual access to data and systems from inside the network. Role-based controls limit the user's access to data by job role and two-factor authentication double-checks identity.

But it's important to note that effective security is a continuous process, and this is particularly the case in a digital organisation, which is far more likely to be making business changes rapidly and all the time.

"To really address the security risks in business transformation, it's necessary to consider the organisational risk position throughout the life cycle of the transformation exercise," says Mr Leech.

New risks need to be identified on an ongoing basis, and agile systems put in place for patching and remediation, as well as monitoring that systems are working swiftly and effectively.

Partly for this reason, digital transformation must bring with it a changed business culture, with cyber security, applications security and IT teams working more closely with operations staff, and often this will mean accepting a certain level of risk.

"Organisations will learn to live with acceptable levels of digital risk as business units innovate to discover what security they need and what they can afford," says Paul Proctor, vice president and distinguished analyst at Gartner. "Digital ethics, analytics and a people-centric focus will be as important as technical controls."

INSIGHT

EXPERT TOP TIPS

HAVE VISIBILITY

Rapid change need not reduce security. In fact, the most agile solution for digital transformation, an application network, is inherently more secure than today's software sprawl. When you create digital systems as networks of applications, with APIs connecting them, you end up with more layers of defence, not less.

The best security comes, counterintuitively, from visibility – making explicit what data and changes are allowed at each layer, and which ones have actually occurred…

Uri Sarid
Chief technology officer, MuleSoft

DON'T OVER-CONTROL

Security can be a competitive differentiator, so leverage the expertise available and turn it into part of your product offering. It can actually be the reason why people will choose you over your competition.

Don't over-control. Too many companies get obsessed with having controls on controls to satisfy audit requirements. This leads to a situation where people will actively circumvent controls to be able to do their job effectively. There's only one thing worse than no control and that's an ineffective control, as it gives the illusion of security…

Owen Connolly
Vice president, Europe Middle East and Africa, IOActive

CONSIDER ALL RISKS

As we start to see business transformation expanding into the area of autonomous devices, for example self-driving cars, the impact of security vulnerabilities starts to threaten our own wellbeing. So to address the security risks in business transformation, it's necessary to consider the organisational risk position throughout the life cycle of the transformation exercise…

Simon Leech
Chief technologist
Hewlett Packard Enterprise's digital solutions and transformation team

OPINION COLUMN

‘The real benefit is to prove to your people that agility, creativity and data can succeed over legacy businesses’

JOHN STRAW
Enterprise entrepreneur

Digital transformation – I think and hope we are beyond the “why” stage and moving into the “what” stage. What does a digitally transformed company look like? That’s a question with a thousand answers. As an entrepreneur and investor, I get a multi-dimensional view of the landscape. Here’s how it looks...

Firstly, you have to ask yourself are we in business as a renovator or an innovator? A renovator in the sense of a continual quest to make things better or an innovator who is doing something completely new and radical. Both can have digital root structures, but the cultures are entirely different.

For an established business, transformation should not mean any shocks, good or bad. It’s business as usual (BAU), but moving to digital business as usual (DBAU). Culturally this is normally a renovation approach and the most critical element from a transformation perspective is to get the enthusiastic buy-in from senior middle managers who are often resistant to change.

This can be done from a top-down or bottom-up approach. One tactic I saw work well was having a 30,000-strong workforce formally asked to help identify and document website bugs. The whole exercise was gamified and was viewed by the company board as being a great success in internal digital engagement.

For the innovator, a key lever to success is the “prototype” culture, the startup mentality of “we’ve got a great idea, let’s go and build it and get it to MVP (minimum viable product) to test” attitude, normally at odds with the renovator mentality which takes a serial approach to ideation and can get stuck in the mire of endless PowerPoints.

I was tasked some years ago to build a totally new insurance website with some radical functionality. My initial take was that after getting through the political minefield of stakeholders and the IT development waterfall, it was going to take 14 months to get to market. So I took a £5,000 internal budget, found an external web developer and built a working MVP in six weeks, to the business’s total astonishment. And the lesson I learnt? It’s a lot harder for a political stakeholder to kill a prototype than it is an idea – that’s a key lesson in digital transformation.

I want to deal with the big data issue that digitally transformed businesses know what big data is. I frequently speak at conferences and when I ask “who knows what big data is?” I get the universal show of hands. When I ask “and what can it be used for” there is normally a sea of blank faces. For a transforming board to look at this, it is looking not at big data, but “layered data”. Overlaying many sets of data to identify new customers’ segments is a given for startups. They know how to take Facebook data, layer it on to geographical and weather data, to work out there’s a new revenue opportunity selling rain capes to 24-year-old Glastonbury audiences. There’s money in Venn diagrams.

The common question I get from boards is “should we be investing in startups to help the culture of our own transformation?” Certainly, having crazy startup chief executives pop up and be disruptive inside your own business has benefits aside from regular injections of passion, enthusiasm and brain power. But the real benefit is to prove to your own people that agility, creativity and data can succeed over legacy businesses, preferably your competition, and provide confidence that DBAU is a realistic goal.

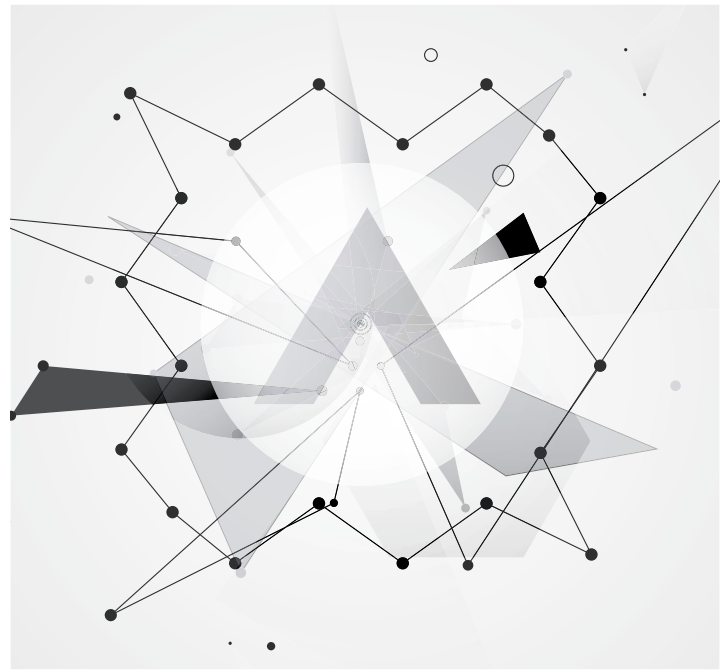
Finally, it is often obvious to see from the outside whether a business has been digitally transformed. If you want to see that in action, search for “kern, the gnome experiment” and see a business that has learnt to go from something possibly in the boring quadrant to something which delights the world by being digitally centred.

COMMERCIAL FEATURE

Positive disruption: reimagine your business now

Despite the economic and political uncertainty that has gripped the UK over the last few months, companies can seize the initiative and completely reimagine themselves and the role technology plays for them

advanced



The economy is going through an unprecedented level of disruption. The surprise result in the general election, increased uncertainty over the Brexit negotiations and fears about a downturn in the economy have left many business leaders concerned about where their companies should go next and how best they can prepare to weather the storm, even turn it to their advantage.

Technology no doubt holds some of the answers. Making the right technology decisions can create a business platform that embraces an uncertain world and gives organisations choices and new ways of doing business, as well as numerous benefits, not least significantly lowering the cost base. However, throw into this mix growing fears about cyber security – an example being the recent Wannacry ransom attacks – and it is understandable that some are feeling wary.

One person who is optimistic in these uncertain times is Jon Wrennall, chief technology officer (CTO) at British software provider Advanced and previously CTO of Fujitsu. “Thousands of British organisations of all sizes, but especially small and medium-sized businesses, have dared to disrupt the norm and they’re realising the benefits already,” he says. “Now is the time for others to do the same.”

As evidence of this positive, upbeat stance, Mr Wrennall points to exclusive research among 500 businesses commissioned by Advanced, which the company unveiled at a recent CBI medium-sized business summit. It reveals that although most organisations surveyed are concerned about security (82 per cent), remarkably 80 per cent are still not put off making the shift to the cloud.

“British businesses want to take control themselves and accelerate the adoption of new and established technologies, such as the cloud, to ensure they can respond quickly to changes in the business landscape and take advantage of all the benefits it offers,” says Mr Wrennall.

> “To be fully digital, organisations need to ensure that they’re rethinking their existing business models

However, according to the company’s survey, 83 per cent of organisations want to see cloud providers do more to build confidence among those looking to adopt a digital transformation strategy, to which the cloud is fundamental.

“We’re seeing the same concerns about security and data protection reported over and over again,” says Mr Wrennall. “It’s time for all of us as cloud service providers to give our customers clear guidance on how their data is being secured in the cloud.”

But he lays down a challenge to companies too. “They’re making a mistake if they think they can focus purely on technology to ensure that their digital transformation projects are successful,” he says. “This kind of transformation also requires a change in culture, structure, processes and even personnel. To be fully digital, organisations need to ensure that they’re rethinking their existing business models.”

Advanced know this from their own experience. As one of the UK’s largest providers of business software and services, with a £220-million turnover, employing 2,000 people and serving 20,000 customers, chief executive Gordon Wilson is leading Advanced through what is perhaps the largest transformation of any UK company.

At its heart is a single, integrated cloud-based information system that has created productivity gains, increased visibility of business information, and supports consistent and pro-active decision-making – no more rear-view mirrors.

The company took a similar approach to help client Clifton St Annes, a residential care home service based in North Yorkshire, where it led with a series of practical innovations, including the introduction of mobile working.

“We saw a range of impressive care-planning solutions running on tablets, which looked very easy to use,” says Lou Squires, managing director at Clifton St Annes. “We decided to move ahead with Advanced, as we were very happy with the solution and adding the mobile system would give us the smooth transition we required to manage care plans digitally.”

Mr Wrennall concludes: “A major re-imagining of a business is intimidating enough and with the current economic background it might seem even more so. But now, more than ever, is the time for business leaders to exploit the full potential of technology such as the cloud to positively disrupt their businesses and prepare for whatever might come.”

For more information please visit www.oneadvanced.com/cloud

CONSTANT TRANSFORMATION

Business is a constantly evolving system

The need for constant change to stay ahead in business means the term "digital transformation" may give way to "digital evolution"


Joloncici/Shutterstock

STEPHEN ARMSTRONG

Digital transformation is a little bit like *The Matrix*. At the start, Keanu Reeves is noodling around with a couple of PCs, a consultant enters his life and encourages him to see the world as a huge technical matrix. Understanding this system properly will give him great power. He fumbles it. A lot. But finally, he grasps his place and he's permanently at the heart of the constantly evolving system.

Given the rapid speed and evolution of disruptive technologies, even digital-born organisations feel a little bit like Reeves' character Neo, having to continually transform to stay up to date.

"Over the last seven or eight years the rise of digitally native user-focused businesses like Amazon and Uber means customers now expect every company to interact with them in the way they interact with Amazon or Uber," explains Perry Krug, principal architect, strategic accounts at big data integration company Couchbase. "Human beings are trained to want constant improvement, iteration and change."

But do these digital-native companies actually view it as transformation? Yes and no. "Natives building stuff from scratch do have a different culture from the outset, although some have taken off-the-shelf tech to get to market quickly," says Oded Karev, vice president at data technology developer NICE.

"If you use off-the-shelf systems, you end up similar to digital migrants, enterprises that know they need to transform, but don't have the tech to manage that transformation. In fact, in that scenario, legacy enterprises have the largest resources available, so if they can overcome the challenges, they have a head start."

Indeed, the gap between legacy enterprises and digital natives is decreasing, says Mr Krug. "Retailers like Tesco are as cutting edge as any online-only business," he argues. "The biggest challenge is analysis paralysis... the desire to boil the ocean and be revolutionary, but not knowing how to get started. That can be true of both groups. The most successful enterprises are the ones that start small in one area and constantly iterate."

Michael Allen, vice president, Europe, Middle East and Africa, at app performance platform Dynatrace, says: "The culture of constant transformation should be at the heart of digital-native companies, but that's not always so – sometimes cultures have to change."

> "We're now in a constant change environment – large enterprises need to rethink processes constantly

Two to three years ago, Dynatrace released new versions of its software twice a year. "But people use our tools to be more agile, so we had to change culturally," he explains. "We now do 250 software deployments a day with one major release offering new functionality every two weeks. We run 35,000 automated tests an hour on stuff our developers build; it's tested within an hour of developing and then it's out there."

And while a lot of the press coverage about digital transformation focuses on retail, Colin I'Anson, chief technologist for internet of things at Hewlett Packard Enterprise (HPE), points out that every business would benefit. He cites a recent client, Kaeser, that makes high-pressure pumps for delivering compressed air to power tools in factories. HPE combed through all of the company's available data and realised that by measuring a pump's performance they could predict its behaviour.

"Looking at indicators like vibration and bubbles getting into fluids, we set up an algorithm that predicts how much longer this pump is going to survive," Mr I'Anson explains. "By understanding common failures, Kaeser could plan which spare parts were needed nearby, rather than having all spare parts in stock at all time. They made a saving of $10 million while, by anticipating failures, reducing failure rate by 60 per cent."

Eventually the data showed that Kaeser's business would improve if it loaned or rented out it's compressors and charged for the air, like a mobile phone company with free handsets and voice, text and data charges. "Kaeser can now change compressors according to what the factory needs," says Mr I'Anson. "And blowing compressed air reliably and continually, like electricity, makes it harder for competitors to replace Kaeser."

So digital transformation means total business transformation. There is some lag, however. Dynatrace recently commissioned an independent global survey of 1,239 IT and business professionals and found that 75 per cent of respondents had low confidence in their ability to resolve digital performance problems. Some 48 per cent said digital performance challenges were directly hampering the success of digital transformation strategies in their organisations.

The rise of artificial intelligence and machine-learning can help as technology solutions themselves can transform as they learn, says Mike Hobday, cognitive automation practice leader at IBM. The company's Watson supercomputer thinks like a human; it can understand intent, handle most of the standard functions of an IT help desk, including lost passwords, with chatbots and structured or unstructured data analytics.

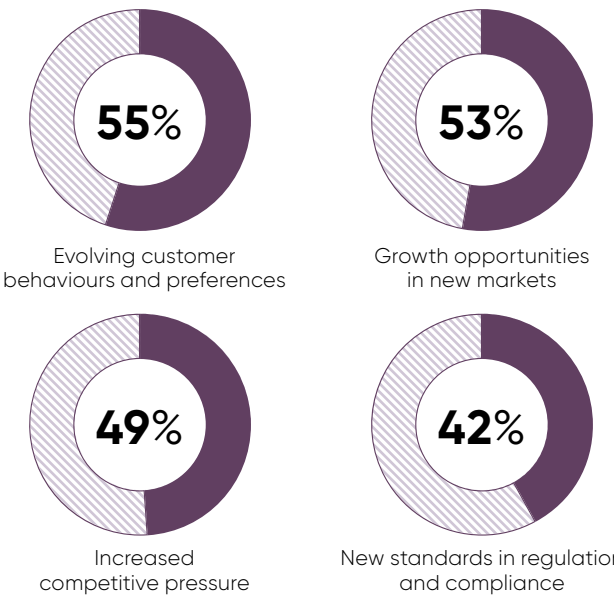
"There is effort involved in training your solution," he explains. "But after that it can make judgment calls like a human. You can set levels of confidence – if the bot is 90 per cent sure, go ahead; if 70 per cent sure, go to a human adviser. It frees up staff to interact with users in ways that can drive revenue growth."

This level of transformation is much more complex than simple "if... then..." data-processing. And further change is on the way as enterprises struggle to incorporate new technology such as blockchain into supply chains. Indeed, the term digital transformation itself is starting to fall out of favour, giving way to digital evolution, says Anand Birje, global head of digital and analytics practice at HCL Technologies.

"Transformation implies that there is an end goal – a place the company is heading to," he explains. "In fact, we're now in a constant change environment – large enterprises need to rethink processes constantly. Do they have the right strategy? How can they better serve the user? How can they secure and improve their asset life cycle? Digital transformation has been seen as a topic companies had to deal with. Now it's just the way we do business."

TOP DRIVERS OF DIGITAL TRANSFORMATION

GLOBAL SURVEY OF DIGITAL TRANSFORMATION STRATEGISTS AND BUSINESS LEADERS



Altimeter 2016

COMMERCIAL FEATURE

The digital race to transform is on

A new breed of software that enables people without traditional coding skills to configure enterprise-grade solutions and apps can remove the barriers to digital transformation

A recent report[1] has highlighted the top three hurdles which slow down digital transformation projects. Digital experience professionals have underlined incompatible legacy technology, skills shortages and ineffective collaboration as their top issues.

Winners will be well on the way to the digital maturity finishing line, having already built solutions that use social media channels, provide self-service through web and app, offer personalised experience, integrate digital voice and text, unify omnichannel support, and exploit artificial intelligence and analytics-driven automation.

But for many businesses, transformation lacks pace and, for some, even getting the right team in place is a challenge. Some are forced to turn to external consultants but, for all the expertise and clarity they can deliver, turning it into working solutions is far from easy. With the new EU General Data Protection Regulation (GDPR) coming into play as soon as May 2018, this approach may leave businesses trailing further behind the pack.

One of the latest organisations to hit the headlines for failing to protect data is the University of East Anglia. More than 300 students were accidentally sent a spreadsheet containing highly personal details of extenuating circumstances affecting their studies. The breach, which led students to feel "sick" and "humiliated", was the result of an innocent mistake.

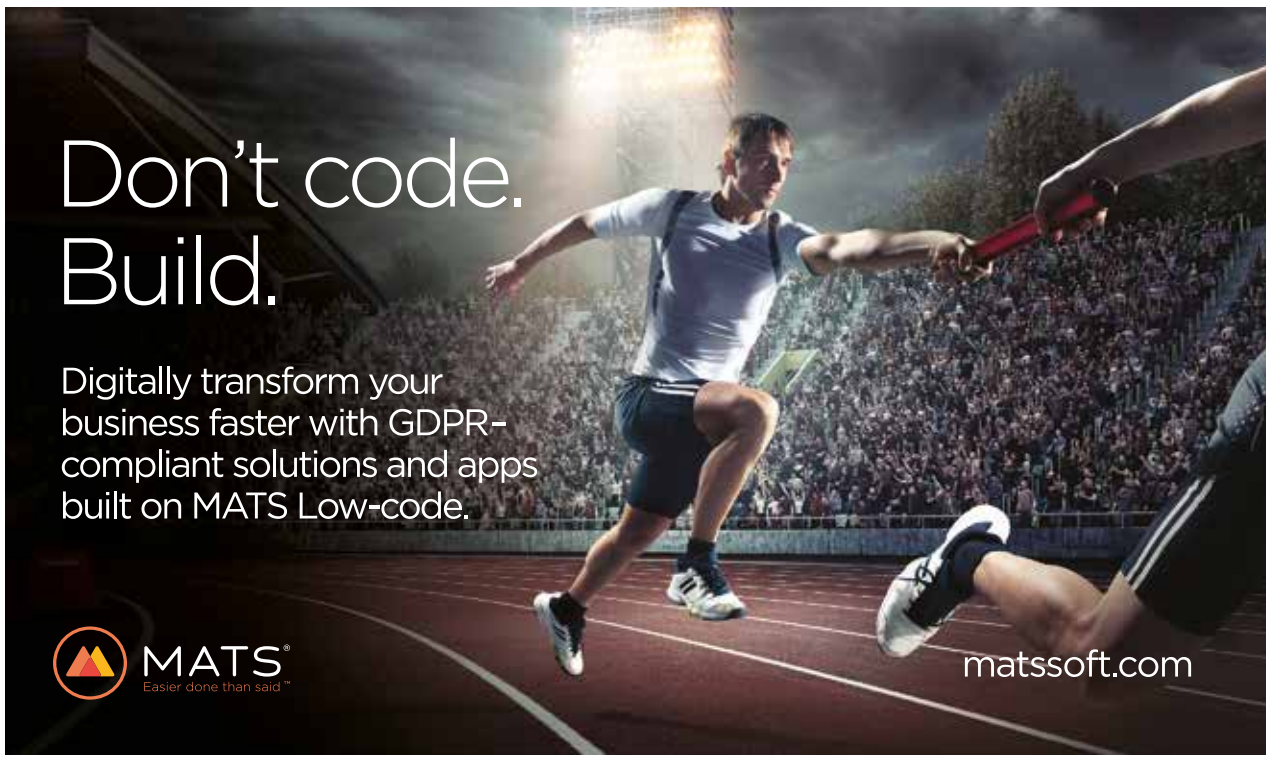
The case highlights one of the biggest issues facing digital transformers in the run up to GDPR compliance next year. Solely prioritising transformation projects on upgrading or replacing legacy systems is not enough. These projects must be broadened to include all the ad hoc databases and spreadsheets built to support the manual workarounds that have kept such legacy systems in business.

One way to accelerate plans and deliver results is through Low-code and No-code platforms. Low-code, originally labelled by global research and analyst firm Forrester Research[2], describes a new breed of software that enables people without traditional coding skills to configure enterprise-grade solutions and apps.

Low-code completely changes the rules, by removing the barriers of cost, time, risk and resource needs. It lets teams outside the IT department quickly build the solutions they need and it supports the creative, collaborative methodologies required for rapid digital innovation.

"Traditional IT projects consist of nine or so phases and are significantly hampered by all the zig-zagging between departments. With Low-code, it's possible to adopt a more agile approach, using prototypes to generate feedback and iterative improvement, reducing the cycle to three phases. It's a technique which finally enables seamless collaboration across the business and it's widely recognised to use five to ten times less resource than traditional methods," says Martin Scovell, chief executive of MatsSoft.

> Turn to Low-code and remove the hurdles to true GDPR-compliant digital transformation



Getting the right Low-code platform to improve your team's performance is critical. Considerations should include asking Low-code vendors to demonstrate how Low-code or No-code their technology actually is as it varies very widely. Ask at what point does code need to be written or manipulated by a specialist coder? How long is the training requirement for a non-coder to be able to build Low-code solutions? How future-proofed is the platform and is it easy to integrate applications?

Challenge the vendors to present their approach to a specific problem you wish to solve. Have a list of solutions you want to build and a plan that covers who owns them internally. Decide whether you want to outsource the build or have your own team trained. And define how you'll measure the results of the project.

Ensure your IT team is brought into the Low-code plan. Ideally, select a Low-code platform that provides all the tools and governance IT needs to oversee projects, even if the development is completed in the wider business.

Look for a Low-code platform that can ensure GDPR compliance in any solution or app you build which is affected by the new regulations.

Turn to Low-code and remove the hurdles to true GDPR-compliant digital transformation.

THREE LOW-CODE USE CASES

Replace legacy systems with distributed digital services

Digitise manual processes that rely on ad hoc databases and spreadsheets

Build experimental prototypes to test innovation hypotheses and launch the best ones straight into full usage on the same Low-code platform

For more information please visit www.matssoft.com/learnmore

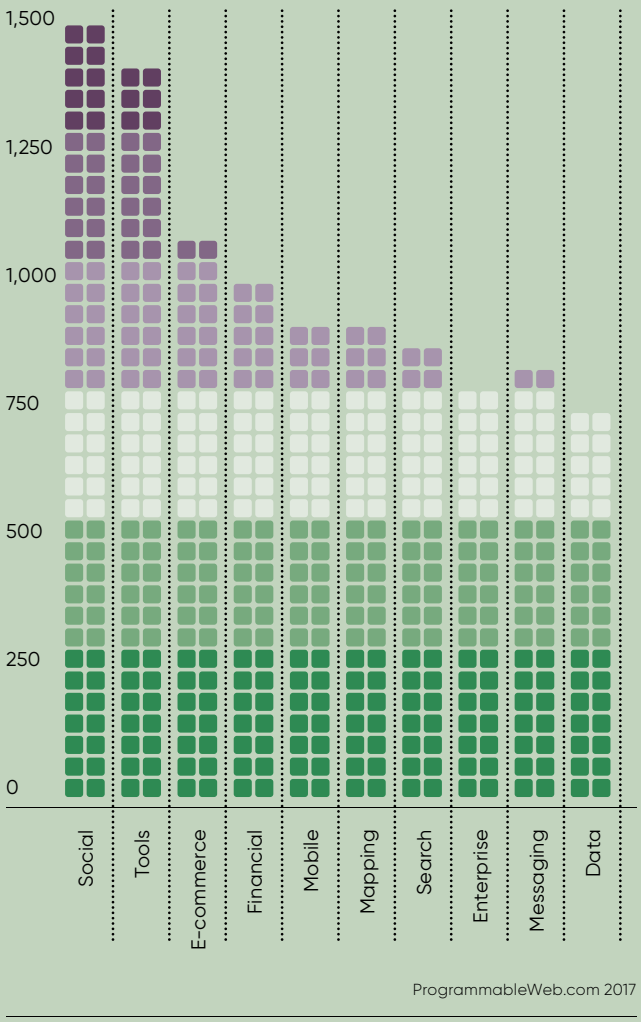
[1] Forrester Research: *The State of Digital Experience Delivery*, 2017. [2] *The Forrester Wave™: Low-code Development Platforms*, Q2 2016; Forrester Research: *New Development Platforms Emerge for Customer-Facing Applications*, 2014

API ECOSYSTEM

Application programming interfaces or APIs are the linchpins of the platform economy, enabling business everywhere to embed the software capabilities of other platforms within their own apps or websites. APIs have facilitated entirely new business models across nearly every industry, allowing companies to latch on to and customise existing platforms, algorithms and resources to create new services and entice new customers

TOP API CATEGORIES BY API COUNT

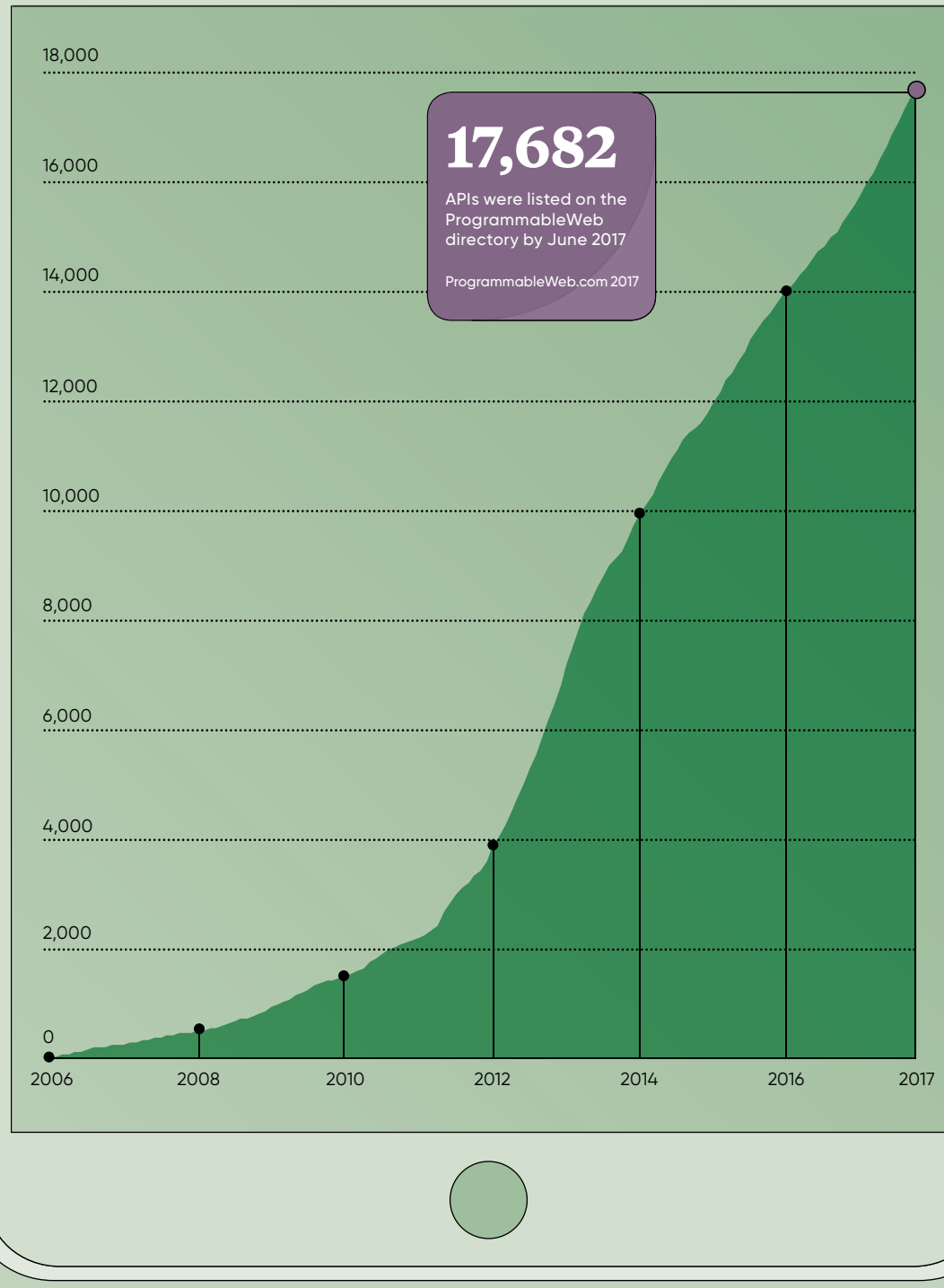
Includes categories listed as both primary and secondary



ProgrammableWeb.com 2017

TOTAL NUMBER OF APIs WORLDWIDE

By the first quarter of 2017



BRIEF HISTORY OF WEB APIs

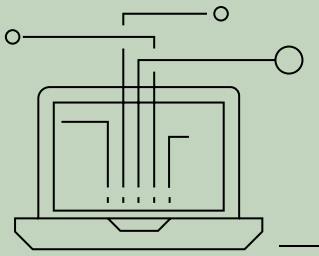
salesforce	ebay	amazon	flickr	amazon web services	facebook
2000	**2000**	**2002**	**2004**	**2006**	**2006**
Salesforce launches and APIs were part of its internet-as-a-service solution from day one, as customers need to share data across their different business applications	eBay rolls out its API to selected eBay partners and developers "to revolutionise the way people do business on eBay"	Amazon launches so-called Amazon.com Web Services, allowing third parties to incorporate Amazon.com products and features into their own websites	Flickr creates its API, which enables it to become the image platform of choice for early blogging and social media	Amazon Web Services is formed as the cloud computing platform we know today and launches an API to give developers access to inexpensive data storage infrastructure	Facebook launches its API, allowing developers access to Facebook friends, photos, events and profile information

API BUSINESS MODELS

API IS THE PRODUCT

When an API is your product, not an extension of your product, and is the primary source of revenue

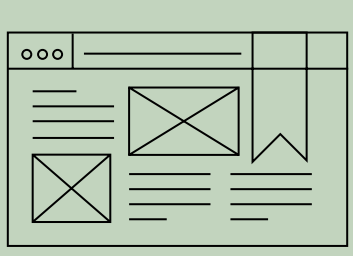
Amazon Web Services, Skype



API PROJECTS THE PRODUCT

When an API is a means for partners, mobile apps and third parties to experience your product and integrate it

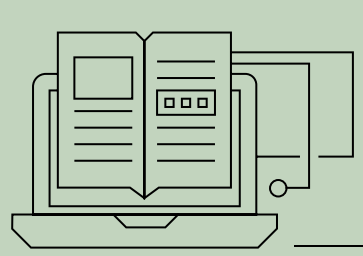
eBay, Spotify



API PROMOTES THE PRODUCT

When an API advertises your product using different channels and/or allows third parties access to data used to generate interest in your product

Amazon.com, Vimeo, Netflix



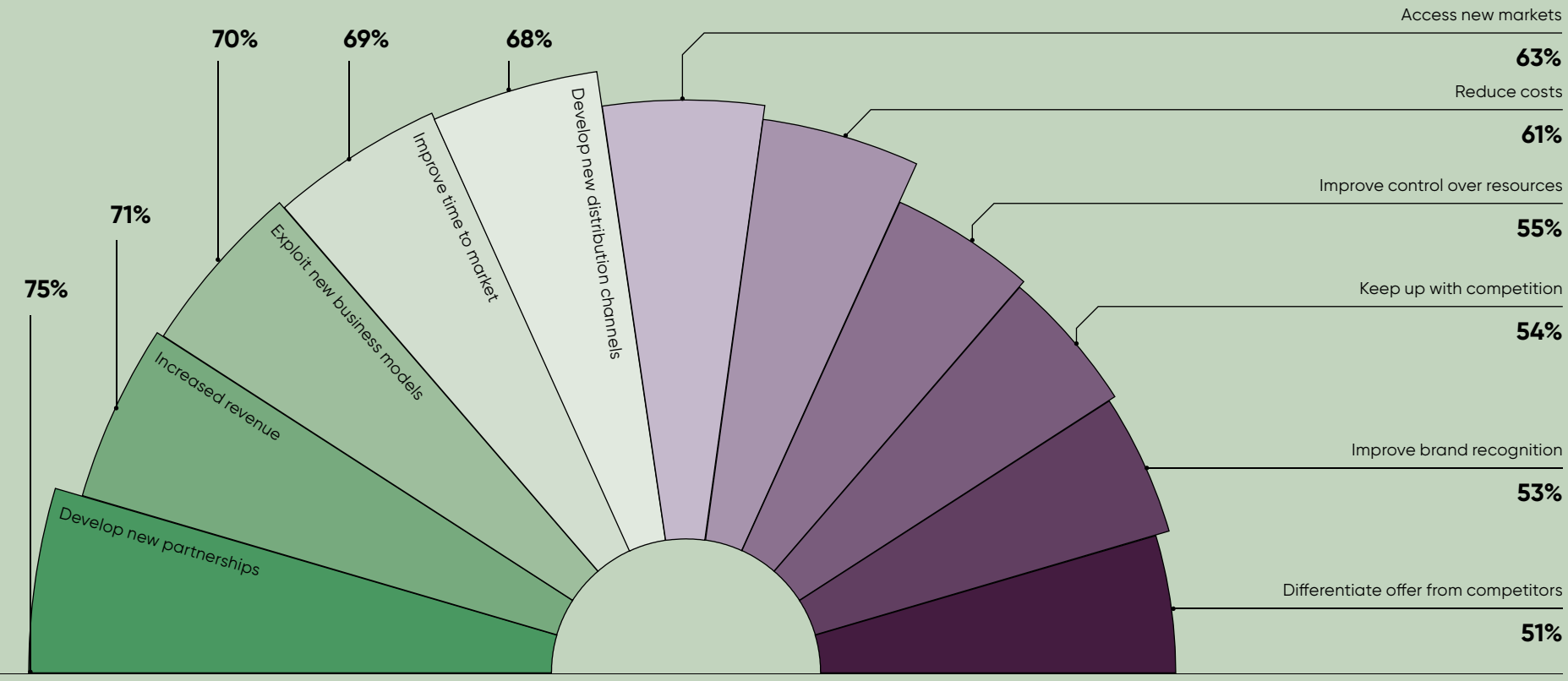
API POWERS THE PRODUCT

When an API is a channel to get new content/value into the business; the API continually receives new content which is used to make up part of your service

Facebook, YouTube, Twitter

ProgrammableWeb.com 2017

KEY BUSINESS DRIVERS BEHIND APIs



Cutter Consortium/Wipro

2006

Twitter launches its API in response, much like eBay, to a growing number of people creating their own rogue APIs

2007

Google Maps creates its API ahead of the launch of the Google Maps app, enabling businesses to embed maps of their locations on their own websites

2009

Apple launches the App Store, opening up a new world of mobile apps through which APIs would be the driving force

2011

Instagram releases the official API for its photo-sharing app, asserting itself as one of the defining players in mobile API history

2011

Fitbit's API enables third parties to build data from the fitness tracker into their own apps and services, showing the potential for partnerships with APIs and connected devices

2011

Apigee, the developer of API-based software platforms, floats on the stock market in a significant milestone for the industry; it was later acquired by Google in a deal worth $625 million

API Evangelist

COMMERCIAL FEATURE

Digital tax transformation: disruptor and enabler

Digital transformation is forcing tax professionals to rethink the way they work while offering exciting new opportunities

EY Building a better working world

Having long been regarded as essential but rarely at the cutting edge of new technology, tax departments and tax authorities are suddenly undergoing enormous change as digital technology revolutionises the way they operate.

Digital technology in tax is rapidly moving up the boardroom agenda as it affects organisations both internally and externally. As businesses become more digital, governments and tax authorities are having to change the way they collect taxes. As the tax authorities themselves also adopt disruptive technology, including advanced data-driven auditing techniques, they're forcing organisations to respond.

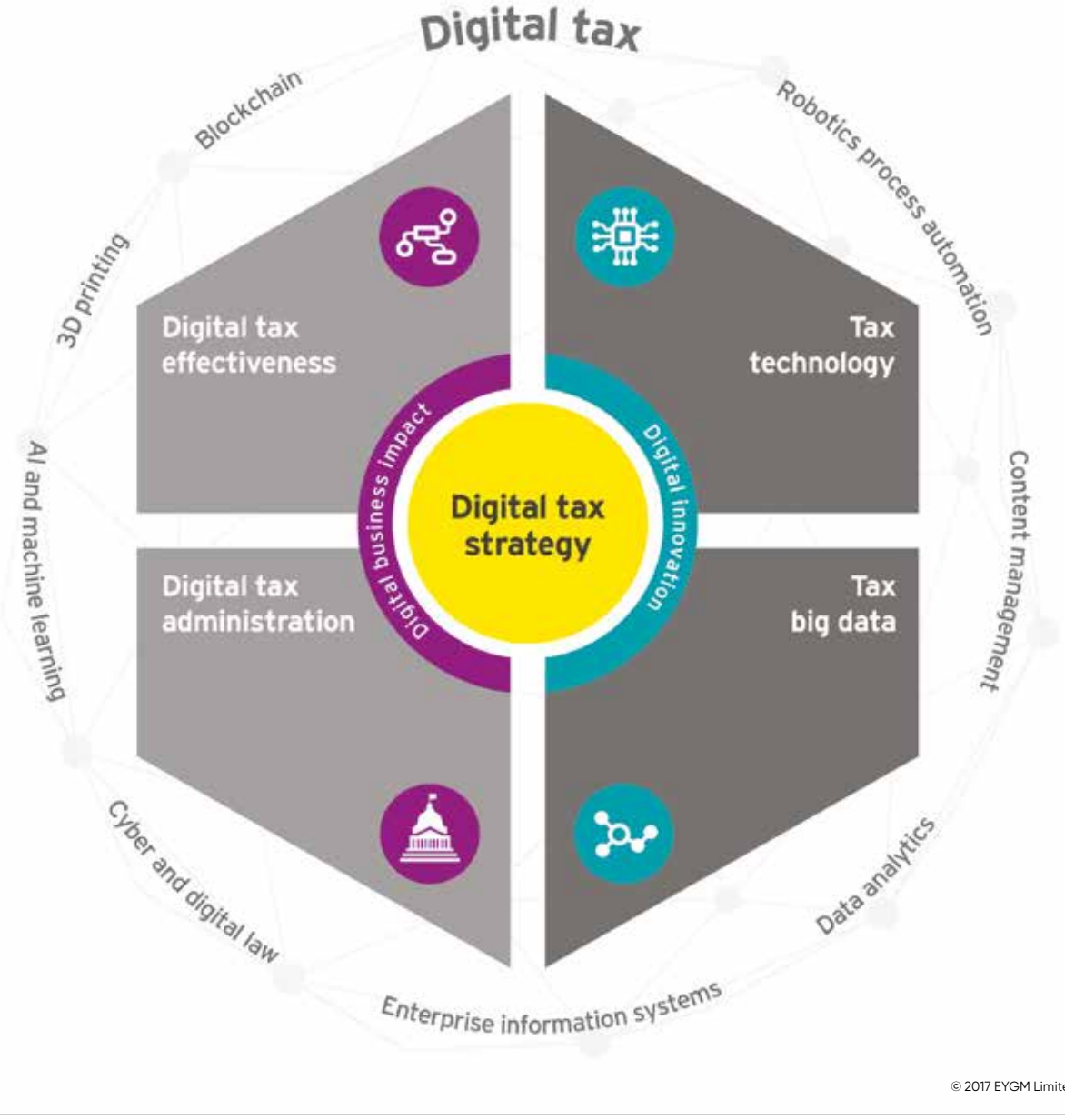
Meanwhile, organisations' finance and tax functions are using recent advances in technology to improve management of their tax affairs and obligations. They're taking advantage of robotics process automation and machine-learning applications to improve greatly the accuracy and efficiency of their accounting and tax compliance activity, while at the same time achieving a significant reduction in costs. Leading organisations are also extending their big data strategies to the world of tax, using real-time analytics to understand both their global tax position and how they manage their tax risk more effectively.

"We've seen an explosion of new technology over the last six to twelve months alone," says Tim Steel, UK and Ireland tax markets leader at EY, a global leader in assurance, tax, transaction and advisory services. "Digital transformation in tax is moving up the boardroom agenda rapidly because it's no longer an option – companies need to get ready for it now. As well as technology, another big driver for boards is cost. Organisations are under cost pressure and the use of these disruptive technologies is a great way to drive down costs.

"In the past, tax has often seemed to lag behind other areas of the finance function, so tax professionals need to ensure that their department keeps pace. They also need to get ready because of the digital transformation of tax administrations worldwide."

Tax authorities around the world are investing in new technology and developing new capabilities that allow them to look at taxpayer data in a new way. This presents a challenge for corporate taxpayers since authorities now demand more data and they want it quicker than ever.

"There's a move towards real-time reporting," says Charles Brayne, UK and Ireland digital tax leader at EY. "A growing number of tax authorities are moving away from periodic, summarised filings in favour of much more extensive data requests. If, as an organisation, you can't satisfy these increased demands by the authorities, you're more and more likely to be subject to investigations and possible fines."



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> The speed of change is accelerating, particularly as tax authorities adopt disruptive technology, so it is imperative that businesses are in a position to respond

Financial services as a sector has been at the sharp end, driven by the demand for increased transparency and reporting responsibilities. Banks and other financial institutions in particular have been forced to invest in their digital capabilities.

In the UK, HM Revenue & Customs has a stated ambition to make tax digital by 2020, but other countries around the world, including Mexico, Brazil, India and China, are already further advanced in this journey. "The direction of travel around the world is clear – with new technology there is greater capability to analyse taxpayer data more comprehensively, accurately and quickly than ever. UK firms that trade globally are already exposed to these rapid developments," says Mr Brayne. "They have to keep pace with the fastest-moving territories in which they operate."

The speed and scope of these changes has caused some businesses to make mistakes as they try to adapt quickly. In particular, they often try to solve problems in isolation.

"You might find, for example, a multinational with headquarters in the UK and offices globally trying to handle the changes in the tax administration in Mexico with a purely local solution and without thinking globally. This means that they can't scale up or standardise," says Mr Brayne. "In other cases they simply aren't aware of the tax requirements globally across their various offices and have little or no understanding of the risks and liabilities they're exposed to."

Organisations, Mr Steel says, need to have a clear digital roadmap covering the next three to five years, but they also need to look to identify quick wins in the short term. "We're working with many companies that are already deploying robotics and artificial intelligence to handle the process-driven activities that are part of tax compliance, for instance making sensible tax decisions about allowable and disallowable items." EY has built a pattern data machine-learning engine that can analyse thousands of lines of data in a few seconds, learning as it goes.

But with so much focus on technology and machines is the tax professional an endangered species? Not if they adapt, says Mr Brayne. "We're seeing very different skillsets emerge. Digital tax professionals or tax technologists understand how to standardise processes and embed tax rules within automated systems. They are confident with data and comfortable with the high degree of automation achievable through the latest technologies," he says.

There are other opportunities as more routine tasks, especially those relating to compliance, are undertaken by machines. Mr Steel adds: "Tax professionals need to move up the value chain. They have to focus on areas that require human judgment and interaction, for example partnering with the wider business and demonstrating their commercial judgment. Rather than just looking at the numbers, their work will be more about innovation, relationship building and providing advice on complex matters, and generally making a greater contribution to the business."

The tax landscape will continue to become more complex, but technology will handle an increasing amount of this. "Meanwhile tax professionals can become involved in more interesting work," says Mr Brayne. "Those organisations that use this new disruptive technology effectively will increasingly see the more routine elements of the tax professional's responsibilities undertaken by machines, allowing them to enjoy the more interesting and challenging elements of the job."

Mr Steel concludes: "The speed of change is accelerating, particularly as tax authorities adopt disruptive technology, so it is imperative that businesses are in a position to respond."

For more information please visit ey.com/digitaltax

CHARLES BRAYNE
UK AND IRELAND DIGITAL TAX LEADER
EY

TIM STEEL
UK AND IRELAND TAX MARKETS LEADER
EY

FINANCE

Finding the best way to transform business finance

Digital technology is not only automating finance functions, but also has the potential to grow business using artificial intelligence

FINBARR TOESLAND

Digital innovations are causing major disruptions at many established companies and forcing all aspects of an organisation to modernise quickly or face being left behind. From the advent of advanced artificial intelligence to cloud computing and blockchain, the finance function is ready for transformation.

As part of this process business leaders are recognising the importance of using automation solutions to transform finance functions. Most financial executives currently expect automation to cut costs and reduce the need for laborious manual data entry tasks, but intelligent automation technologies can go further to create value and add to the top line.

> It is vital that any transformation project involves the finance department early on in the planning process

"Financial professionals will start to look more closely at the vast potential for business growth created by the use of robotic process automation to capture data and intelligent analytics to interpret it," says Carole Murphy, head of business process outsourcing business transformation services at IT consultancy Capgemini.

"This will include using data to get closer to the supply chain – automation can allow a finance professional to identify trends in customer profitability for example, and use this to both better understand their challenges and provide educated counsel," she adds.

As digital solutions become further ingrained in the finance function, cyber security should be accepted as a high priority in all firms to ensure risks are kept to a minimum. Attitudes towards the finance function will need to change as adoption of a new digital ecosystem will require the cyber-security and finance functions to speak the same language.

"The technical language of security teams often goes over the head of the finance department and they need things explained in a way which easily translates into their risk-modelling processes," says Matt Middleton-Leal, regional vice-president UK, Ireland and Northern Europe at CyberArk.

As long as employees who are responsible for digital security can speak the language of finance chiefs, according to Mr Middleton-Leal, they can operate within frameworks, which they understand, and make sure any transformation programmes are fully protected against a range of cyber threats.

"Equally, CFOs [chief financial officers] and FDs [finance directors] must take the time to engage with security teams, to ensure that they understand the risk profile of any business changes," he says. "Whatever the initiative, it will undoubtedly have cyber security at its core, because finance and cyber-security functions are now so closely intertwined and critical to sustaining business operations."

Technology certainly plays a central role in transforming an organisation's finance function, but without considering the impact of corporate culture on transformation projects they are doomed to fail.

Kathryn Moran, partner and head of outsourcing at chartered accountancy firm haysmacintyre, says a fear of change is usually present around the adoption of anything new and it is vital that any transformation project involves the finance department early on in the planning process.

"Their views and opinions should be listened to and they should be among the first people in the organisation to be briefed on the opportunities such a transformation offers them in terms of development of new skills and profile within the organisation," she says.

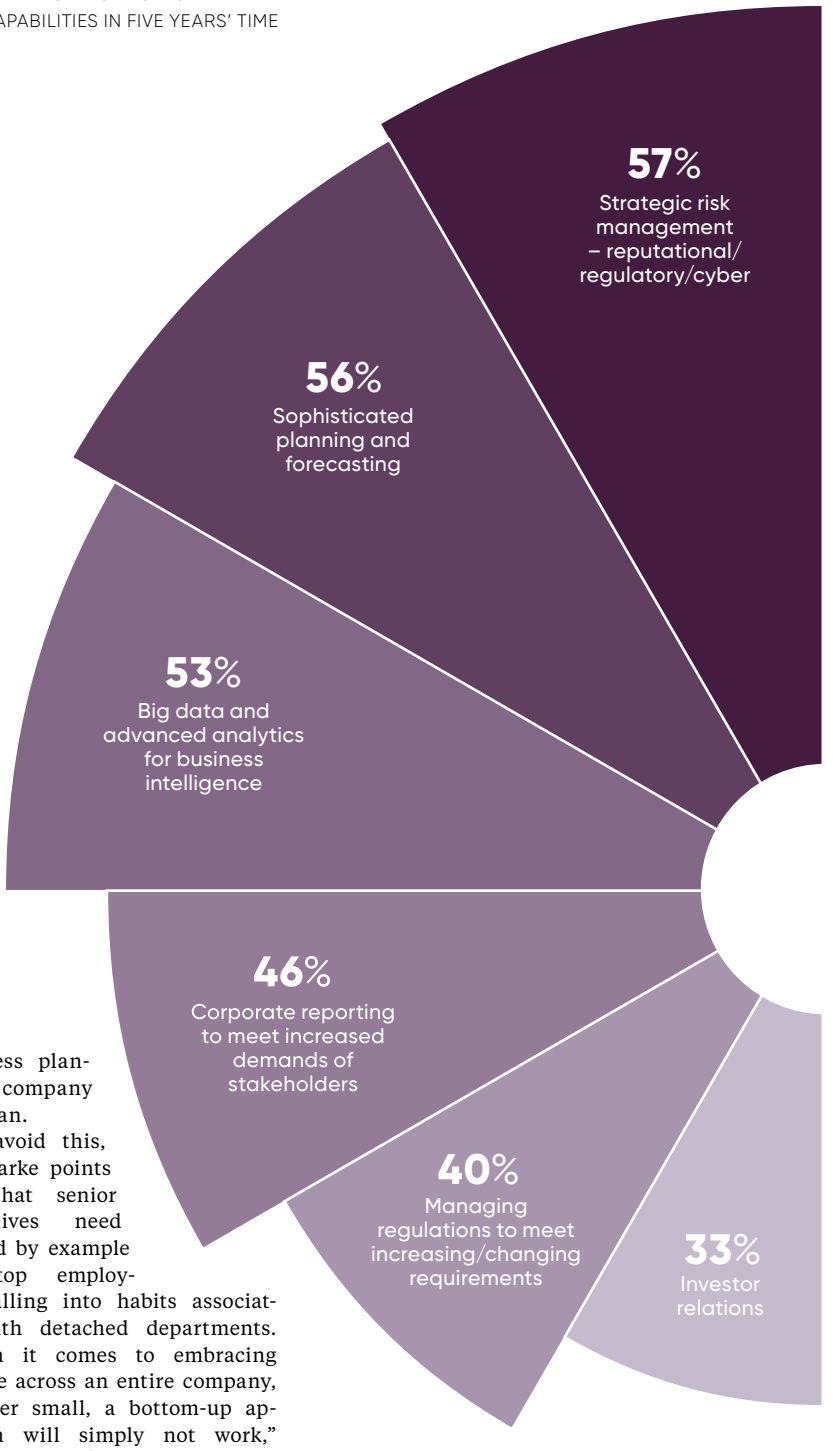
Developing the finance function takes more than just the finance department. Encouraging collaboration between employees in different sections of the workforce can help connect the finance function with the wider business and stop finance existing as a walled-off, isolated division.

"Introducing this transformative finance function is by no means an easy task, particularly for older businesses with defined processes in place. Factors such as lack of leadership endorsement or absence of incentive for employees to buy in to a new culture can hold back success," says Karen Clarke, Northern Europe managing director of business planning company Anaplan.

To avoid this, Ms Clarke points out that senior executives need to lead by example to stop employees falling into habits associated with detached departments. "When it comes to embracing change across an entire company, however small, a bottom-up approach will simply not work," she concludes.

FUTURE CAPABILITIES FOR THE FINANCE FUNCTION

CHIEF FINANCIAL OFFICERS RANKED THEIR TOP CAPABILITIES IN FIVE YEARS' TIME



EY 2016

CASE STUDY

FORD

Car manufacturing giant Ford approaches transformation of its finance function differently than the norm. Rather than viewing finance transformation projects as a one-time event, Ford uses its One Ford initiative to standardise processes across the organisation, so the finance function works in a united front.

When former Ford chief executive Alan Mulally investigated profit-forecasting systems at the company, he found the metrics were calculated differently in each region, leading to a fundamental change in procedure. While the company believes that innovative technological solutions are vital to make financial transformation a success, they also consider effective governance to be essential.

Kathryn Moran, of chartered accountancy firm haysmacintyre, agrees that implementing new technology will often require a cultural change too. "Internal communication is crucial, both to the finance team and the rest of the business, around the adoption of a new digital ecosystem and also beyond. Communication about what the system does, why it has been put in place and how it should be used should be clearly articulated," she says.

"Businesses should also consider identifying champions at all levels who are enthusiastic about the new digital ecosystem. These champions can be key to the success of a business transformation."

INDIA

Digitally transforming a whole economy

The potential of a digital economy in India, the planet's second most populous nation, is enormous with benefits for business and citizens alike

NICK EASEN

Results of the Indian census in 2011 were telling. The United Nations heralded it as a revelation that far more people had access to a mobile phone than a toilet. The signs that the country was transforming digitally were evident then.

Six years on and the gap has widened. Even more households – 88 per cent – now have access to digital devices, according to the *ICE 360° Survey*, that's still a lot more than have running water or decent sanitation.

Whether you're living in a high-rise block in Bangalore or a smallholding in Manipur, getting hold of a smartphone is easier than ever as the price of handsets and tariffs are both falling. It's no wonder that access to 21st-century technology has been called "the great leveller for the citizens of India", by Dinesh Malkani, president of Cisco India.

The Indian telecoms market is now the second-largest in the world after China in terms of subscribers, which is why there's been a huge rush towards creating a digital ecosystem for its citizens.

It's also been backed by prime minister Narendra Modi and his so-called Digital India campaign. The idea is to improve digital infrastructure and internet connectivity in a bid to offer better government services, education, finance and geographical information systems to name a few of the services being rolled out.

"The most dramatic achievement of the current government has been to increase the number of people with a bank account and if the same political heft is put to increasing internet access, particularly smartphones, it's possible," says Gareth Price, senior research fellow at Chatham House.

However, the challenges are vast, accessing remote regions from the high Tibetan plateau in the north to the low Sundarbuns in the east with broadband or mobile signals is no small feat. Out of a population of 1.3 billion people, fewer than 400 million have access to the internet, according to the Telecom Regulatory Authority of India. More than 75 per cent of these connections are in the top 30 cities. Penetration is certainly patchy.

> The Indian telecoms market is now the second-largest in the world after China in terms of subscribers

"Around 50,000 villages in India still do not have reliable mobile phone access or broadband; connectivity in rural areas is still a work in progress," says Neel Ratan, partner, government and public sector, at PwC India.

"The challenge around connectivity, literacy and many regional languages also presents a huge opportunity to bring a vast majority of India's population into the digital fold. However, this large population, when empowered digitally, could help India take the winning leap from being a developing economy to a digital leader."

Considerable progress has been made in certain areas and one scheme that's the poster child for a digitised India is its biometric ID card or *aadhaar*. More than 1.1 billion IDs have been issued so far, to 86 per cent of the population. This framework can support many official applications, especially when combined with smartphones.

More than 285 million bank accounts are now linked to an *aadhaar* number. "This is a solid foundation for a digital economy. The consumption of services has seen a threefold jump over the last two years. More than 100 billion digital transactions for government services were recorded in 2016," says Mr Ratan.

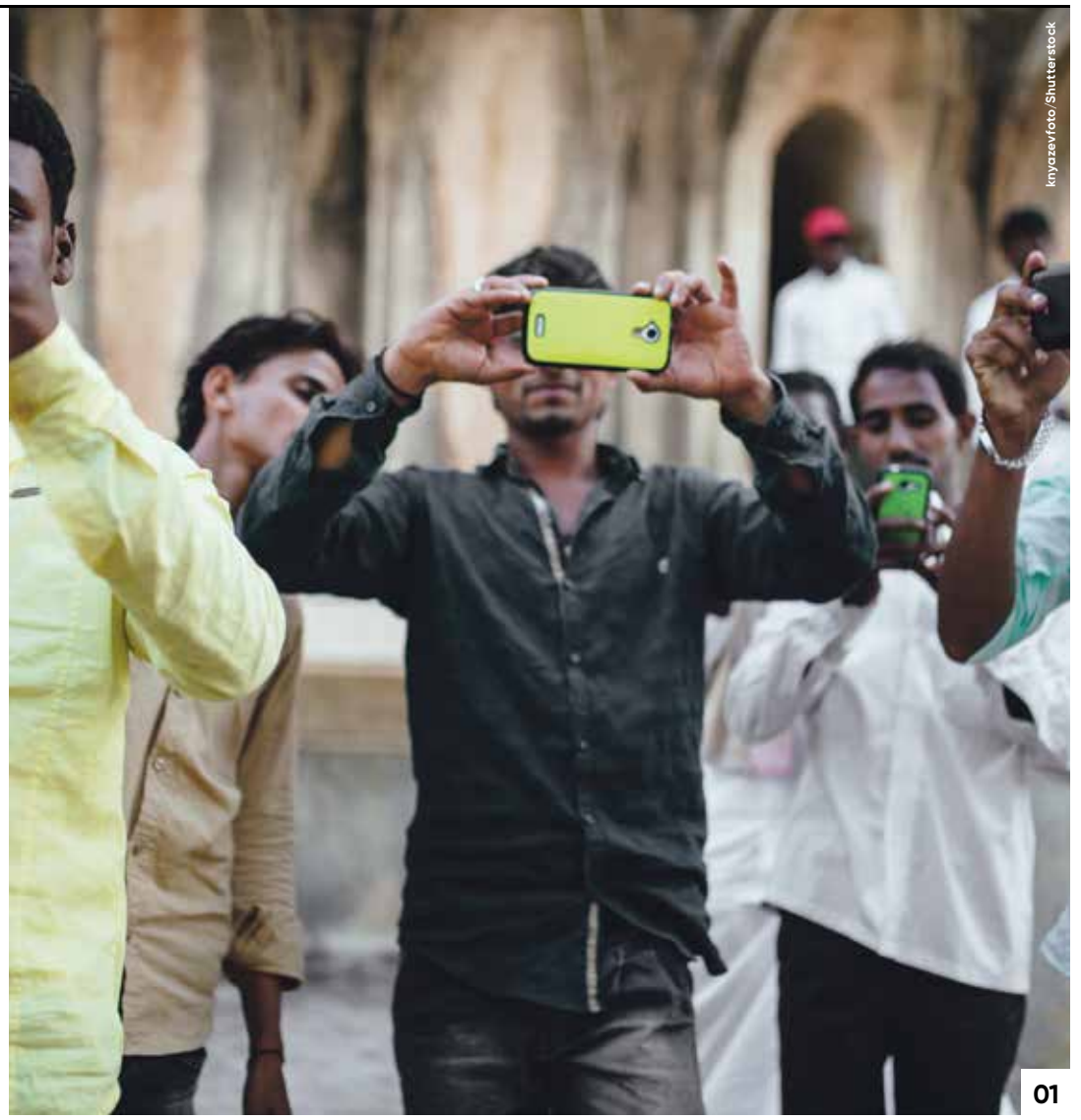
All that India has to do is look at China to see the potential. Here 450 million people can now use their phone as a digital wallet and such services were accessed more than a billion times last year. It has transformed banking and purchasing behaviour. Now financial technology or fintech in China is moving into investments, lending and insurance.

"The most significant area for me would be the apparent attempt to shift India towards a cashless economy, given the recent demonetisation initiative," says Mr Price. "If the government is intent on shifting towards a taxed, cashless economy then this could transform government revenues since digitisation should serve to reduce the potential for corruption."

Help is on its way from the commercial sector. China's innovative fintech

Sushil Kumar/Hindustan Times via Getty Images

02



knyazevfoto/Shutterstock

01

companies, such as Ant Financial and Alipay, are expanding into the Sub-Continent.

"We have seen both companies focused heavily on India, on the e-commerce side, on the payment side as well. They're flushed with cash and they're increasingly looking at overseas markets," says Zennon Kapron, founder of Kapronasia.

Ant Financial is valued at $60 billion, about the same size as UBS, Switzerland's biggest bank. The first mover advantage will certainly come from China into South Asia.

The digital tide is turning in India, albeit slowly. The biggest winners will be its citizens able to use a whole raft of new services. Four of the top five financial technology firms are in China. Expect developments in India too. The sums add up.

Dhiraj Singh /Bloomberg via Getty Images

03

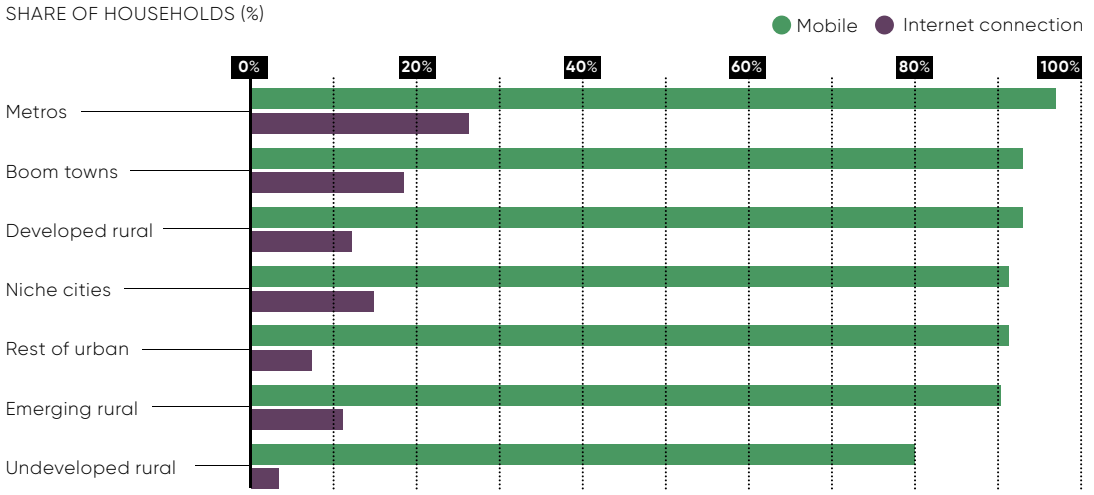
01
Mobile penetration is expected to rise to 68 per cent by 2020, according to GSMA

02
Prime minister Narendra Modi's Digital India campaign faces serious challenges, such as poor digital infrastructure in remote regions

03
Aadhaar biometric ID cards have now been issued to 86 per cent of the population

MOBILE AND INTERNET PENETRATION IN INDIA BY ECONOMIC CLUSTER

SHARE OF HOUSEHOLDS (%)



ICE 360° Survey, People Research on India's Consumer Economy 2016

HEALTHCARE

Digital transfusion to transform the NHS

Suffering the strain of rising demand from an ageing population and government cuts, the NHS must implement efficient digital systems

DANNY BUCKLAND

The NHS is powered by a £117.2-billion budget and more than one million staff, who deal with one million patients every 36 hours and a mosaic of almost 150,000 hospital beds. From the operating theatres through to outpatient units, it is an organisation ripe for transformation.

A host of digital innovation promises swifter, more targeted treatments and better outcomes for patients, but the pace of change is glacial.

More than half (51 per cent) of NHS trusts, which control hospitals and community healthcare, run at a deficit despite making efficiency savings of £2.9 billion over the last year. It is easy to see how the prospect of spending money on digital innovation may get washed away as the NHS creaks along like an old galleon constantly mending leaks rather than stopping for a refit.

The tectonic plates of locked-in delivery practices and disruptive technology are grinding away at each other while the pressure from an ageing population with chronic co-morbidities keeps rising.

Care is being reshaped away from expensive hospital admissions to at-home condition management using wearable technology and remote monitoring. But many innovators are still some distance from satisfying the high requirements of healthcare systems with multiple stakeholders and high data security values.

A report for the World Economic Forum by consultants Accenture highlighted the potential gains across anything from genetic sequencing to regular GP check-ups, but warned: "A big gap exists between where chief executive officers are now and where they want to be. More than 90 per cent wanted to change their technology investments or find better ways of harnessing big data, but only a third had actually upgraded their technology or analytics capabilities."

> The NHS is getting better and the policy direction is to provide more funds for investment in schemes

That view is echoed by Professor Joe Harrison, chief executive of Milton Keynes Hospital NHS Foundation Trust. "The difficulties are obvious," he says. "The outpatient department where two thirds of patient interactions take place in hospitals is the same now as it was in the 1980s. It is easier for you to book a taxi, hotel and flight to Australia than it is to change your outpatient's appointment.

"We traditionally throw more people at a problem. As demand has increased over the years we have grown our workforce to the point where I employ more than 100 people here to manage the outpatients' system."

Milton Keynes is a single-site 400-bed acute hospital employing 4,000 staff to treat a population of 320,000 and deals with a procession of almost 350,000 outpatients every year.

"There are so many areas of the NHS where we don't know we have a problem. You have all these brilliant companies out there saying they can fix this or that, but half the time we are not aware we have a problem because we have always done it that way," adds Professor Harrison. "This is the stuff that banking went through 20 years ago yet we can't overlay that on our mindset or our ability to deliver within the NHS and it could be worth tens of millions."

He is fairly typical of chief executives wrestling with pressing budgets, but he has negotiated a trial of the medical booking system Zesty, which has developed a sophisticated app with one million users across the UK and Europe, and a number of


Africa Studio/Shutterstock

partnerships with NHS trusts.

Significantly both its founders, James Balmain and Lloyd Price, come from e-commerce backgrounds and used their business experience to shape how they built a system that delivered efficiency and savings to a healthcare setting.

"We didn't compromise our products to sync with the NHS, we enhanced them," says Mr Price, who has worked in online sectors from retail to dating. "The three main areas we had to work on were security, workflows, and winning hearts and minds. The other important factor is the uniqueness of the NHS. You have two masters to serve: the NHS which pays you for the service and the patient who uses the service. It is a challenging business idea."

The Zesty team had to understand the idiosyncratic rhythms of the NHS to ensure its product helped clinicians, nurses and support staff.

> There are so many areas of the NHS where we don't know we have a problem

"Technology companies need to build products and services that remove friction for the user, the patient, and then create new habits and behaviours so they can adapt to the changes easily," he adds. "Trust is key to digital transformation within healthcare because the nature of data collected, transmitted and shared in healthcare is very sensitive."

Earlier failures of big IT projects have created a risk-averse structure riveted by plates of bureaucracy, but Professor Harrison sees progress.

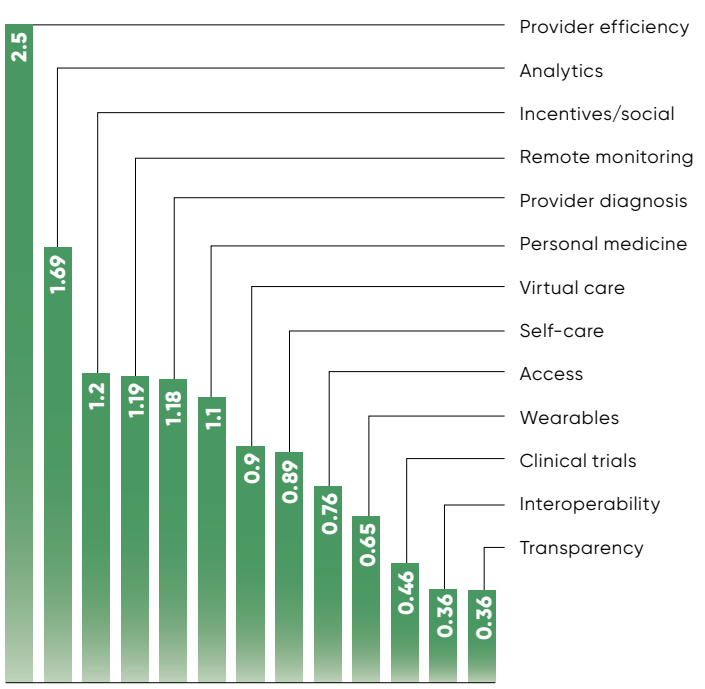
"The NHS is getting better and the policy direction is to provide more funds for investment in schemes such as this," he says. "It is easy to criticise the NHS, but I don't think the private sector has been that smart in targeting areas in the system that may have funds. There is little point going to a trust that is under the cosh. Some of their research and understanding prior to a business approach is not consistent."

Dr Paul Tunnah, chief executive of content and communications company pharmaphorum, which connects the pharmaceutical industry with the broader healthcare ecosystem, says new companies face an uphill struggle to find an access point to the NHS that operates in silos.

But he adds the NHS Innovation Accelerator and other government initiatives are encouraging "a more nimble, digital-savvy NHS to emerge in the face of urgent necessity to manage spiralling costs".

GLOBAL DIGITAL HEALTH FUNDING BY CATEGORY ($BN)

COLLECTIVE FUNDING FROM 2009 TO 2015



Accenture/World Economic Forum 2016

PUBLIC SECTOR

Citizens want e-government as a service

In times of government spending cuts, public sector bodies face an uphill climb to digitise services, but the rewards can be worth the struggle

Mary Turner via Getty Images

Digital transformation isn't cheap and finding the necessary funding to start a new project is always a challenge in the public sector

PAUL CONNOLLY

Digital transformation is forcing businesses from all sectors to rethink their customer relationships and how to meet their needs.

The smartest organisations realise that digitalisation is not about technology, but evolving customer behaviour.

So customers are coming to expect a certain level of digital interaction with all organisations and that includes public sector bodies.

Even the most innovative private sector companies face problems when trying to transform digitally.

Enterprises struggle to balance current results and future investments, as well as swapping out established executives for newer management with the requisite competences to lead digitalisation.

It's even harder for public organisations. Public sector actors are attempting to make the move from opaque, top-down, bureaucratic and paper-based transactional models towards online, integrated digital services that promote a new kind of relationship between citizens and the state.

The public sector, generally a colossal organisational behemoth with the turning circle of a small planet, understandably finds it hard to be nimble and agile.

And it doesn't only face the obvious logistical and practical barriers to make this essential transition.

Digital transformation isn't cheap and finding the necessary funding to start a new project is always a challenge, especially at a time when central government is making deep cuts to public sector agencies' budgets.

Public sector organisations face a dilemma. They know they must digitally transform, but they have to do more with less while trying to meet new customer demands.

But public sector agencies know that when resources are invested in new, more efficient digital technologies, short and long-term costs are reduced for most processes.

Public sector bodies may be challenged by a variety of political pressures, but the opportunity to innovate is game-changing if they can get the funding to work on new digital initiatives.

What are the benefits of digitalisation and what would a fully digital public sector actually look like?

Among the benefits of digital transformation in the public sector are better ability to meet customer expectations; increased cross-collaboration between departments; higher levels of innovation across agencies; quicker strategic decision-making; and reduced IT and operating costs.

Sweden and South Korea, two countries at the forefront of public sector digitalisation, provide insights into how a digitalised public sector looks and how it can improve citizens' lives.

Per Dinborn, business strategist at Skellefteå municipality, a Swedish public authority at the vanguard of the digital transformation trend, offers an example of one of the benefits of providing a more nuanced, citizen-focused digital experience.

"One of the biggest challenges for organisations is to understand the needs of their users. This is particularly important for local authorities when it comes to representing the needs of their less vocal constituents. Their requirements can often be obscured by the voices of others.

"Skellefteå was worried that the voices of its less powerful residents were not being heard," Mr Dinborn continues. "The municipality set out to ensure that these people had an equal opportunity to influence the local government, and the digitalisation of many of our processes and the production of a smartphone app that allows people direct access to public servants, proved to be a huge success. We became more customer facing."

A fully digital public sector replaces traditional work silos, defined by organisational departments, functions and processes, with a citizen-facing, citizen-focused digital interface.

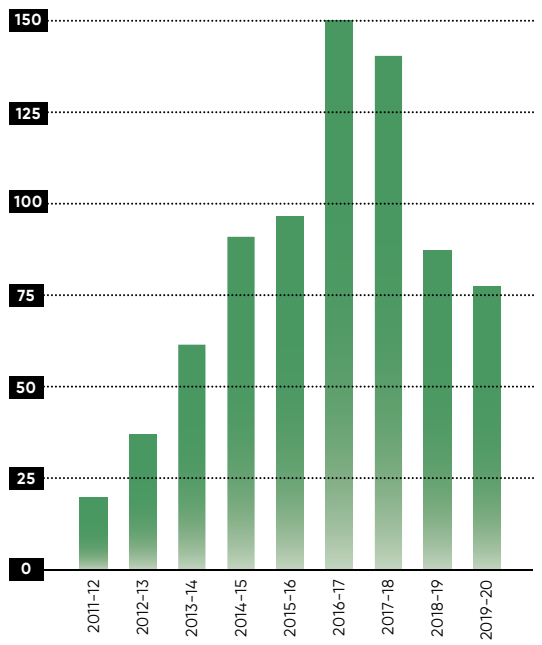
Such an organisation would be predictive, not reactive, and would have a responsive retail-like relationship with citizens, rather than a daunting monolithic bureaucratic experience.

If public sector bodies can obtain internal organisational support as well as the necessary funding, they will be able to make improvements that will not only yield short-term operating savings, but also lay the groundwork for the long-term transformation and success of public services.

BUDGET FOR THE GOVERNMENT DIGITAL SERVICE (GDS)

IN £ MILLIONS

The GDS is responsible for the digital transformation of government to make public services simpler and more efficient



National Audit Office 2017

CONSUMER OPINIONS

65%
of UK consumers believe online services from the government are lagging behind the private sector

40%
call for more online services in local government

45%
say that in no scenario would they be happy with having their data shared with or across areas of government or the public sector

BUSINESS IMPACT

33
days a year are spent by UK businesses struggling to navigate online services for relevant information

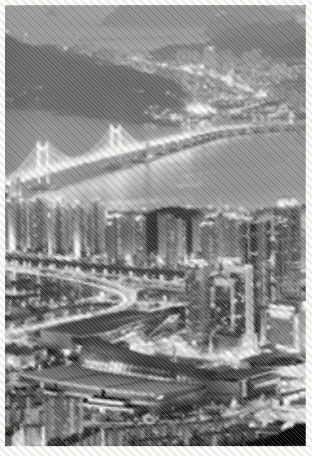
39%
of companies have demanded additional business support online

5
hours could be saved each week for businesses if public sector services were as up to date as the private sector

EMC

CASE STUDY

SOUTH KOREA



South Korea has long been a leader of public sector digitalisation. Earlier this year the nation's regime launched three groundbreaking e-government services for its citizens.

In healthcare, senior citizens living in remote rural areas are now able to monitor and share their vital signs, such as blood pressure and heart rate, through wearable devices. This data is transmitted to healthcare professionals.

A national search and rescue system uses a real-time mapping system to dispatch first responders and co-ordinate their work on missions.

And finally, a digital service alerts government officials to dangerous or illegal materials entering and leaving the country through imports and exports.

South Korea's pre-eminence in e-government is no fluke. The country prioritised the use of IT in government as a key component of its administrative strategy as far back as the 1960s.

Since then, South Korea has developed some of the most advanced e-government services and levels of e-participation in the world.

South Korea has centralised a significant proportion of government IT infrastructure into just a few datacentres to enable the co-ordinated provision of numerous e-government services to citizens.

To enhance the quality of public services, the government also introduced networked relationships, such as government to government which shares information among inter-government and agencies for e-government policy and projects; government to business which provides improved public services and easier access to government contracts for industry and companies; and government to citizens which provides services requested from citizens and offers them a tool to suggest improvements to the administration of government.

COMMERCIAL FEATURE

Catapulting innovation

In a world of fierce competition and constant change, driving innovation and efficiency has never been more important to the economy – and digital transformation is critical to achieving that goal

Applying digital technology across the UK economy could yield an extra £55 billion by 2020, according to research by Accenture and Oxford Economics.

The UK's creative industries such as film, TV, gaming and music are global leaders in digitalisation, but many areas like manufacturing, lag behind their international counterparts.

Helping early adopters go faster and bridging the gap with the remainder is a unique organisation, Digital Catapult, one of a network of Catapult centres backed by Innovate UK, the government's innovation agency.

Digital Catapult promotes the use of digital technology, applying leading-edge thinking from business and academia from the smallest startups to some of the country's largest corporations.

Digital Catapult works by providing commercial and technology expertise, helping companies test new technology applications and new business models.

Headquartered in London, there are also centres in Brighton, Yorkshire, the North East and Tees Valley, and Northern Ireland, working with local enterprise partnerships, universities and private companies across the UK. On average, they work closely with more than 400 companies a year. Focus is currently on the creative sector and manufacturing, but the organisation is also eyeing the potential for working in digital health and professional services.

Chief executive Dr Jeremy Silver says: "The UK is a brilliant source of new technology ideas and inventiveness. Our mission is to help develop new markets and accelerate opportunities for whole sectors of industry to apply those ideas.

"We're helping technology companies develop more rapidly and scale globally. As a country, we need more than ever to be thinking of global markets."

> "Our mission is to help develop new markets and accelerate opportunities for whole sectors of industry

Digital Catapult's work spans four areas of technology: data, including blockchain and cyber security; connectivity and infrastructure, including low-powered wide-area networks, the internet of things and 5G mobile; artificial intelligence and machine-learning; and immersive technology such as virtual and augmented reality.

Dr Silver believes that immersive content and applications is one area where UK companies are at the cutting edge, hence the opening of an immersive laboratory at Digital Catapult's London office, where products are showcased and tested. There are plans to open three more around the UK.

One of the companies currently showcasing its product is Smartify, which last year developed a solution that supports the creative industries. Harnessing augmented reality technologies, Smartify enables museum and gallery visitors to identify and learn about artworks, helping venues to reach new audiences and develop new business models at a time when funding is under pressure.

Museum visitors can use the free app at venues such as London's National Portrait Gallery and Amsterdam's Rijksmuseum to unlock the stories behind art and create a personal art collection.

Smartify began working with Digital Catapult in February, building up to the official product launch in March, benefiting from mentoring, networking and help with funding applications.

Anna Lowe, Smartify's co-founder, says: "Their support and access to world-class equipment, research and networks has been invaluable. We've also been able to plug into existing knowledge and expertise about the challenges many start-ups face, so we haven't had to keep reinventing the wheel."

Dr Silver concludes: "The UK is making huge progress in digital technology and there are areas where we are leaders, but there is still a long way to go. We don't just want to play catch-up with our international competitors, we want to leapfrog them.

"Cross-pollination of thinking, taking insight from one sector and applying it to another, is something we are getting better at doing. But now what the country really needs is to increase the pace of innovation, dramatically."

For more information please visit digicatapult.org.uk

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Stan Khatri
Head of IT Systems and Support
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