DIGITAL TRANSFORMATION

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How to make the journey to digital business

Everyone talks about "being digital", but defining what this really means for your business is critical to a successful transformation

OVERVIEW

THOMAS BROWN

Digital transformation: the process of getting an organisation fully ready to operate in our changing digital environment and preparing it for continuous change ahead.

Few terms in today's business vernacular are met with as much confusion and apprehension. And it's easy to understand why.

Firstly, digital is daunting. The pace and scale of change we've seen over the last decade is both unprecedented and unrelenting. Regardless of your industry or your geography, no organisation can claim immunity from the disruptive nature of new digital and mobile technologies, and this level of change is only set to continue.

From how we shop to how we travel, how we choose where to eat and holiday to how we manage our health and finances, there are few aspects of our lives or society as a whole that have escaped the ubiquity of digital.

And it's not just consumer industries witnessing this revolution. The use of cloud technologies, advanced analytics, new enterprise applications and digitisation are fundamentally reshaping industries as diverse as law, real estate, manufacturing, financial services and more.

Secondly, transformations are tough. They can be complex, costly, unsettling and are generally quite difficult feats to accomplish. When faced with hundreds or thousands of employees, legacy business models, established ways of working, existing products and services, and an organisational design from a past era, any executive can be forgiven for moments of anxiety.

> Digital transformation isn't optional – it's a strategic priority for any leadership team because the reality is this era of change isn't going away, it's accelerating

The reality, however, is digital transformation isn't optional – it's a strategic priority for any leadership team because the reality is this era of change isn't going away, it's accelerating.

Consumers' control of their interactions with brands and organisations will continue to grow, as will their expectations from those entities. Competitive forces will continue to intensify as new generations of talent and startups challenge accepted market dynamics and upend incumbent players. And technology will continue to evolve – consider that even in 2016 we've barely scratched the surface of technologies such as virtual and augmented reality, artificial intelligence, connected living, autonomous vehicles, smart homes, big data and robotics.

So where should you start? Before rushing headfirst into a digital transformation initiative, forming a project team or writing your plan, it's essential to understand what your organisation and its leaders think a digital transformation might involve, and then working to align leaders around a common definition and focus.

Ask ten people in your organisation what digital means to them and you're likely to get eleven answers. Unless you secure a shared under-

DIGITAL TECHNOLOGIES HAVE THE POTENTIAL TO FUNDAMENTALLY TRANSFORM THE WAY PEOPLE IN OUR ORGANISATION WORK

PERCENTAGE OF RESPONDENTS WHO AGREED

Source: Deloitte/*MIT Sloan Management Review* 2015


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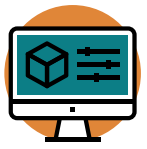
standing of what "being digital" means for your organisation and commitment to what a transformation will entail – resources, decisions and risks – you're likely to experience tensions further down the line.

To start this sort of debate internally, it's important to recognise that digital doesn't respect functions, silos or hierarchies. Digital permeates throughout an organisation, so when defining what transformation means for you, this must be elevated from a single team or priority, starting with the question, "How do we transform our organisation from an organisation which does some digital things, into a truly digital organisation?"

Starting with this macro question will enable your organisation to explore digital priorities, risks, threats and opportunities across four core areas in which digital transformation manifests itself.

The first is operations and efficiency. This involves exploring how new technology applications, and the digitisation of processes and platforms can yield resource savings or reduce service times. Examples include replacing call centre operations with customer service through live chats and social media, or digitising invoicing and billing.

The second is business model innovation. This involves rethinking your entire way of doing business and exploring how digital technology can unlock new ways to create value and deliver growth. Contemporary examples include in-car black box devices to improve insurance risk profiling or using data from wearable technology in healthcare to identify new services and improve customer targeting.



91%

of companies believe digital technologies have the potential to fundamentally transform the way their organisations work

Source: Deloitte/*MIT Sloan Management Review* 2015

The third is technology innovation. This involves exploring how new developments in digital can reduce costs, mitigate risk and improve integration across an organisation's core technology systems. Examples include implementing cloud-based systems to enable greater workforce mobility and real-time information.

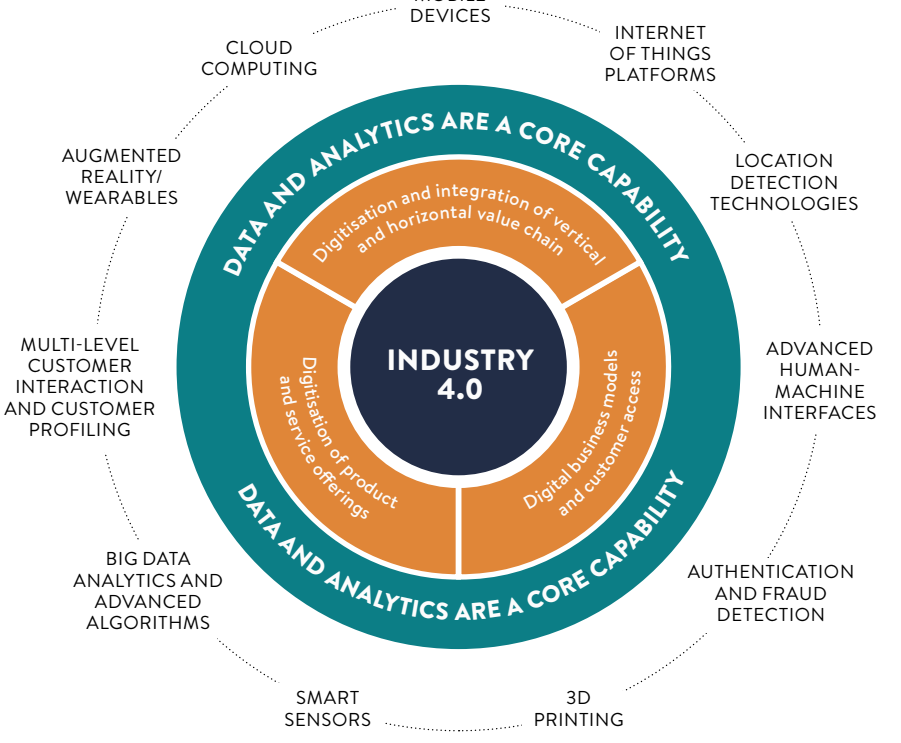
The fourth and final core area is customer experience and engagement. This requires a meaningful understanding of customer journeys and purchase behaviour, and identifying how and where digital can improve how customers experience your brand, either through simplifying key touchpoints or identifying new ways to add value and build greater engagement and affinity.

The right questions are the building blocks of a digital transformation. Knowing where your leaders are now, gaining consensus on the priorities for your organisation and securing collective agreement to what needs to change, in what order and the desired impact will move a digital transformation effort from an aspiration to a reality.

An aligned leadership team that all start from the same place and are committed to what digital transformation really means for your organisation will help smooth the already difficult path ahead.

INDUSTRY 4.0 FRAMEWORK AND CONTRIBUTING DIGITAL TECHNOLOGIES

Industry 4.0 stands for the fourth industrial revolution, or industrial internet, which focuses on end-to-end enterprise digitisation of all physical assets and integration into digital ecosystems with value-chain partners



Source: PwC

7 TRAITS OF EFFECTIVE DIGITAL ENTERPRISES

01 BE UNREASONABLY ASPIRATIONAL
Make someone accountable at board level; create ambitious targets; measure digital value, not digital interactions

02 ACQUIRE NEW CAPABILITIES
Buy scarce talent en masse; hire for digital skills, not industry experience; move into adjacent markets

03 RING-FENCE AND CULTIVATE TALENT
Protect digital talent from business as usual; don't rely on existing human resources models

04 CHALLENGE EVERYTHING
Don't accept historical norms; questions the status quo; create a plan covering every function, product, business unit and location

05 BE QUICK AND DATA DRIVEN
Continually evolve your value proposition; embrace live testing; create a data-based view of each customer

06 FOLLOW THE MONEY
Create a zero-based tech budget aligned with value at stake; invest across the value chain; scale successes rapidly

07 BE OBSESSED WITH THE CUSTOMER
Learn from every interaction; relentlessly evolve and improve the customer experience

Source: McKinsey

Transformation needs a culture change

The best strategy in the world is doomed to fail unless leaders create an environment and shape the culture in which it can succeed

CULTURE

THOMAS BROWN

Culture eats strategy for breakfast. While this may be something of an overused cliché, when it comes to digital transformation, nothing is closer to the truth.

If you're looking to re-orient your organisation for success in our constantly evolving digital world, chances are you're not a new tech startup. It's more likely you're an established organisation that's recognised the need to change.

And with established organisations comes legacy business models, enshrined processes and ways of working, and a culture – whether implicitly or explicitly defined – that supports how you operate.

The trouble is transformation means change – usually lots of it. And that means culture – the sum of the values, behaviours and "norms" of those in your organisation – which supports you today may end up inhibiting you tomorrow.

Any successful digital transformation requires a coherent vision, articulated in a way that gives meaning to all employees and rallies them around the upside potential of the change envisioned.

But what good is a vision and eloquent storytelling if, when your workforce returns to their desks, they're confronted by ways of working that get in the way of the proposed change, rather than enable it?

It's not enough for leaders to set the vision. If they don't create the environment for it to thrive, your workforce won't adapt. That means missed opportunity, wasted effort and a disengaged workforce. This is where culture truly comes into play. And culture isn't something you change by decree, but by changing the prevailing conditions within the organisation that will, over time, lead to a culture evolving.

A number of imperatives have emerged for those hoping to influence cultural change in support of a digital transformation initiative.

Bureaucracy: the real-time nature of digital initiatives means organisations are empowered to make changes after minutes and hours, not days or weeks. Typically, however, established organisations suffer from layers of approval processes and sign-off requirements that fly in the face of the opportunity to pivot based on real-time intelligence. Leaders need to challenge "decision rights" and empower those with the insight to take choices in the here and now, not in three weeks after submitting a report.

Iteration: traditional software development has favoured waterfall development, where teams work tirelessly to get a product or service to a point of perfection before release. In today's world of rapid prototyping and immediate feedback, it's often better to release something quickly with a test-and-learn mentality. You can then garner immediate feedback to help iterate, rather than spend months in development only to find yourself outplayed by a competitor or dealing with failure after a long timeline.

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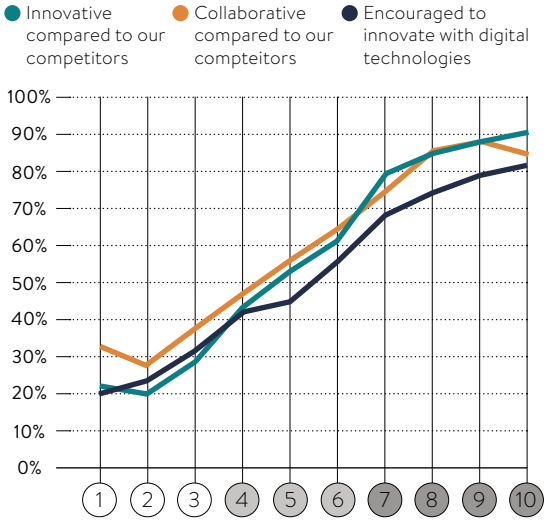
> Culture isn't something you change by decree, but by changing the prevailing conditions within the organisation that will, over time, lead to a culture evolving

HOW DIGITAL MATURITY CORRESPONDS WITH COMPANY CULTURE

Global companies ranked their digital maturity on a scale of one to ten: early (one to three), developing (four to six) and maturing (seven to ten)



Source: Deloitte/*MIT Sloan Management Review* 2015

Agility: established organisations are accustomed to monthly and quarterly performance review cycles, yet this creates a time-lag which undermines the immediacy of digital activity. When something works well or underperforms, the notion of waiting for the next monthly committee meeting to analyse performance is anathema to a digital workforce.

Collaboration: digital doesn't respect functions, silos or organisational hierarchy. It permeates an organisation and demands that people in different teams work together to make progress. Regrettably, many organisations suffer from politics and fiefdoms which make this challenging to accomplish in practice.

Shared ownership: re-orienting an organisation to our digital world often brings tough choices. Cannibalisation, trade-offs and conflicts around objectives are all too common, but can be overcome by translating an organisation's digital imperatives into shared purposes across leaders and functions. Digital transformation shouldn't be the preserve of a digital director or department; if it's truly an organisational priority, this has to be reflected in how all leaders and functions are focused.

Failure: there's a stigma around failure or underperformance in most organisations. Launching something only to pull it from the market shortly afterwards has traditionally been seen as a sign of weakness. The pace with which an organisation can launch a campaign, app, service or product is part of what makes digital investments compelling propositions, yet we continue to vilify those who fail rather than embrace them. As Edison famously said, "I didn't fail 10,000 times. The light bulb was an invention with 10,000 steps."

Environment: it may seem glib to suggest that any organisation undertaking a digital transformation should put fussball tables in the employee lounge, but environment has an important impact on culture. Established organisations of all sizes are competing for talent with supposedly cooler firms such as Silicon Roundabout startups. The culture and environment in these organisations is generally accepted as more appealing to millennial-minded individuals, so how can large, supposedly boring corporations compete? In reality, the working environment needs to reflect the stated cultural intent of an organisation and shouldn't be overlooked as a gimmick.

Translation: lastly, there's a need for mutual re-education within organisations. As the complexity of digital technology has increased exponentially, the need for non-technologists to understand, or at least appreciate, its function and impact has also increased. Most technology presentations in board meetings go unchallenged, as the majority of non-technologist people simply take it on good faith that the experts know what they're talking about. But to enable organisations' leaders to make informed collective decisions, the leadership team need to understand the language of the technology community better and vice versa.

Importing the very best of what makes Shoreditch or Silicon Valley's digitally native startups successful isn't an overnight endeavour. It can't happen with a rallying cry or leadership mandate alone.

It requires leaders to endorse and actively champion efforts to work root and branch through an organisation to change things that get in the way and conflict with a pacey, entrepreneurial, digitally confident and nimble organisation.

As in nature itself, when the prevailing conditions are right, anything can happen. When they're not, life fails to flourish. This makes culture a prerequisite for the success of digital transformation, not a feel-good factor or afterthought. It's tough, but the rewards of an attempt far outweigh the risk of inaction.

VIEWPOINT

Kirstof Fahy, chief marketing officer at Ladbrokes, with previous leadership roles at Telegraph Media Group, Yahoo! and William Hill, tells how to be digital

"From my experience leading digital transformations, I've seen two common stumbling blocks which, if tackled up front, can make a meaningful difference to building a digital culture.

The first is about customer orientation. Nobody wakes up in the morning and thinks to themselves, 'You know, what? I'm going to have a mobile experience while I'm lying in my bed, having a cup of tea. And then I'm going to have a desktop experience while I'm at work. And then I'm going to probably have a retail experience at lunch time.'

Real customers don't see the world in this way. For a business to be truly digital, it needs to stop thinking and organising itself around the channels it historically operated in, and start thinking about how it can be there for the customer when and how they want them to.

The second is leadership understanding. It's easy for leadership teams to sit and talk about 'being digital', but I think it's incredibly important for us first to be honest with ourselves about our gaps in knowledge and understanding.

Think about the typical composition of a board or executive committee. How many of these people truly live as many of our customers do?

Understanding our own limitations, as leaders, in terms of our real experience of what our customers are doing every day is essential. We can then find ways to increase leaders' exposure to customer realities, bring meaningful insights to the top table and connect our leaders with talent in our business who can help close these gaps."

COMMERCIAL FEATURE

CLOUD VERSUS ON-PREMISES IT: GETTING THE BEST OF BOTH WORLDS

Cloud computing is disrupting every sector and heralding new entrants into every market. It's also presenting challenges to long-established companies. But rather than feel a need to make a rush for the cloud, they should consider other options

Netflix, Uber, Airbnb, the list of exciting, fast-growing new businesses that are disrupting their industries and leading, as much as responding to, customer demand seems to grow every week. Meanwhile, many will remember names such as Kodak, great brands that didn't react quickly enough to technological change and the evolving requirements of consumers and suffered as a result.

Who will be the next Uber and, just as importantly, who will follow Kodak? Long-established businesses are currently looking at their legacy IT systems and trying to work out how quickly, smoothly and cost effectively they can migrate to the cloud. This new technology offers companies agility, scalability and reduced costs and it is, therefore, driving many of these dynamic, disruptive businesses. But should everyone be part of this rush to the cloud?

Ross Fraser, vice president and managing director in the UK and Ireland at EMC, a global leader in enabling businesses and service providers to transform their operations and deliver IT as a service, advises companies to take a more holistic view and consider all their options. IT departments can and should be taking a lead on this strategy rather than simply executing the decisions handed down by the board, he argues.

"People assume that because of this all companies have to move to the cloud and that's not necessarily the case," he says. "Many, especially when they get to a certain size, find that it's more cost effective to base some of their IT infrastructure on-premises. One size doesn't fit all."

Mr Fraser gives finance and retail as two examples where this is particularly true. Customers might be increasingly banking and shopping online, but most banks and retailers have extensive legacy IT structures and they're trying to reduce costs associated with these older systems in order to invest in new technology.

He points out that even some tech-based startups are taking the view that the cloud alone is not the only answer. "Groupon, for instance, has benefitted hugely from public cloud, but they've become sufficiently large that they're not getting value for money with a pure cloud solution and so they're now deploying their own data centres," he explains.

Along with others, the company has developed a hybrid approach that provides the affordability, simplicity and scalability of public cloud without compromising safety and compliance, as business-critical applications remain in-house. "There are others that have grown and now also want control of their own IT rather than outsourcing it entirely because it's an intrinsic part of their business," says Mr Fraser.

EMC is finding that more companies with proactive, forward-looking IT departments are choosing its hybrid cloud/on-premises approach to transform their legacy infrastructure. They're discovering they get the same agility and cost effectiveness offered by the cloud combined with the benefits that on-premises brings.

"They tell us that it's a great option because some applications, such as latency and security, are best held closer to the user-base, whereas there are others with which you can burst out into the cloud, such as big data projects and archives," he says. "In effect, they're getting the best of both worlds."

He advises companies to start by identifying their business goals rather than assuming their objective is cloud computing itself. "They need to have an open discussion," he says. "For example, we have cloud offerings that are on-premises and others that are off-premises. A cloud vendor will tell you that everything needs to be on the public cloud and the premises vendor will say the same about on-premises."

> Some applications, such as latency and security, are best held closer to the user-base, whereas there are others with which you can burst out into the cloud, such as big data projects and archives

ABOVE
The Land Rover Ben Ainslie Racing team practise ahead of the America's Cup

LEFT
Ross Fraser, UK and Ireland country manager, EMC

SAILS DATA

In February, EMC announced it had been chosen as the official IT storage supplier for Land Rover BAR, the British sailing team conceived by Sir Ben Ainslie to win the America's Cup and bring it home to Britain for the first time in its 167-year history.

"Our primary goal at Land Rover BAR is to win the America's Cup and we are focused on making the boat go faster. The ability to have all our experts, wherever they are in the world, quickly analyse our testing and race data is a key part of achieving that. EMC's immense heritage in helping companies squeeze every ounce of value out of their data will make us more competitive," says Sir Ben, team principal and skipper of Land Rover BAR.

EMC has delivered a converged cloud/on-site infrastructure for the team so that all this data can be downloaded on shore and analysed. "There are so many calculations from hundreds of gigabytes collected from data points around the boat that they need to do quickly themselves rather than sending them off somewhere," says Ross Fraser, vice president and managing director in the UK and Ireland at EMC.

"We've also given them the ability to burst into the public cloud should they need to. Companies can do the same."

Companies' needs and priorities change, and so EMC acts as a consultant, helping them to manage that change, rather than just as a vendor. IT departments must start being more proactive, says Mr Fraser. "They should aim to be seen as an innovation centre and not simply as a cost centre," he says.

As Uber and Airbnb grow, he predicts they may well move towards a hybrid strategy. "Who knows who the next generation of these market disruptors will be, but having both a cloud and on-premises system can offer them the best of both worlds, as it can for existing companies with legacy IT that want to be able to compete with them and secure their future."

To find out more about digital transformation please visit uk.emc.com

EMC²

On the road to more tech innovation...

Further along the road than other sectors, car manufacturers are blazing a technology trail for others to follow

01

AUTOMOTIVE INDUSTRY

CHARLES ORTON-JONES

Some industries are early adopters. Others wait late. The health sector, for example, takes an aeon to authorise new tech. Doctors can't cause patients to keel over and chalk up the deaths as useful data. Banks too. A single wrong transaction and a bank can lose its reputation. So they stick with what they know.

At the other end of the spectrum is automotive. It's the early adopter par excellence. If you want to see the future, this is your sector – it's a decade ahead.

Just look at automation. The automotive industry pioneered factory production and then robot automation.

Now we have driverless cars about to hit the roads. Ford chief executive Mark Fields said at the Consumer Electronics Show this year that we'll see the first self-driving car on the road in 2020.

Farmers are already using them. John Deere and Kinze offer farmers driverless tractors. A John Deere 7930 tractor fitted with an autonomous system by 3D Robotics can bring in a harvest and move grain by plotting location with GPS. The steering, brake, accelerator and gears move as if by magic. The routes are inch perfect, reducing overlap by 90 per cent.

The Spirit electric-diesel hybrid tractor even does without a cabin. Made by the Autonomous Tractor Corporation, the Sprint navigates by lasers and transponder radio signals. The *Farmers Weekly* review enthused: "So for $100,000 (£63,000) you can potentially get yourself a 200hp tractor, 24-hour farming and a lot of free time."

In computer-aided design (CAD) automotive always leads. This is down to the vast budgets of car companies, plus the connection to motor sport. For example, in 2010 Virgin Racing became the first Formula 1 team to produce a car entirely using CAD. The wind-tunnel aerodynamic work was modelled computationally. No wind was used.

The work was done by Nick Wirth, founder of Bicester-based Wirth Research. He honed the technique on the Acura ARX-02 race car which won the American Le Mans Series in 2009. The saving? The Williams F1 team at the same time spent tens of millions of pounds on two wind tunnels.

And now? Formula 1's governing body feared the growing power of computational fluid dynamics so this season is restricting teams to 25 teraflops of number-crunching a week. "It appears this teraflop restriction has pushed the engineers, as usual, to go to the limit of the regulations and we basically had to use some old chips," according to McLaren racing director Eric Boullier. "The consequence of this is we are not using the latest technology in terms of computing."

03

HITTING BACK AT THE CAR HACKERS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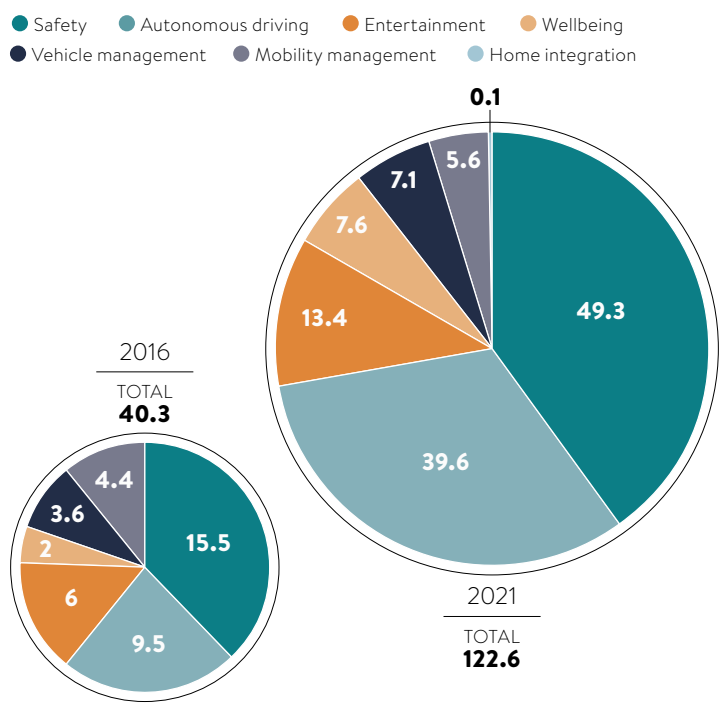
A clever bit of investigative journalism by *WIRED* magazine in 2015 triggered mass panic in the car sector. *WIRED*'s Andy Greenberg agreed to drive a Jeep Cherokee in downtown St Louis, while two security researchers, Chris Valasek and Charlie Miller, tried to seize remote control of the vehicle via its internet connection.

Mid-journey, Mr Greenberg lost control of the car. "I spun the control knob left and hit the power button, to no avail," he wrote. "Then the windshield wipers turned on and wiper fluid blurred the glass." Soon the hackers cut the power to bring the car to a halt. "The experiment had ceased to be fun."

The industry was also unamused. The hack triggered deep musings on the future of the industry. What does it mean when a malefactor with a laptop can seize control of a car, potentially turning it into a guided missile?

US defence agency DARPA has demonstrated precisely how it can weaponise hacked cars. So far there has been no real-world hacking. Solutions to hacking may include frequent over-the-air security updates, bank-level encryption and manual overrides. Until the industry proves it can deliver security from hackers, the digital transformation of the industry could be put on hold.

MARKET FORECAST FOR CONNECTED CAR TECHNOLOGIES (€BN)



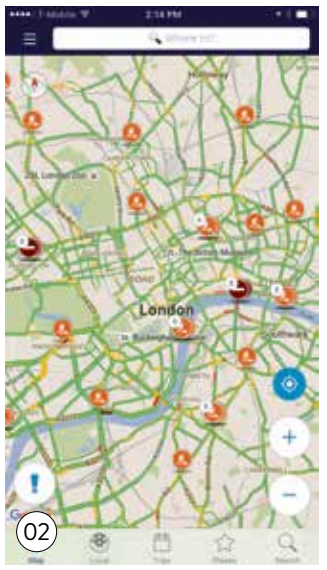
Source: PwC 2015

The latest hyped technology is the internet of things (IoT). Consumers now have internet-connected kettles and fridges. In the car world, the IoT has been around for years. BMW and Volvo pioneered the use of mobile SIM cards to connect cars to the internet. When cars crashed, a signal was pinged to the manufacturer or emergency services.

Now the European Union is mandating all cars come with an internet connection. By 2017 every new car sold in Europe will have a SIM card able to call emergency services. And most will come with a dashboard console with downloadable apps. Consulting firm Analysys Mason forecasts that 89 per cent of new cars will be app-enabled by 2024. The research suggests revenue from embedded connectivity in passenger cars will rise from $1.3 billion in 2013 to $31 billion in 2024.

Digitising of cars will change the way traffic is routed. The UK Highways Agency is a pioneer in the adoption of big data analytics techniques to smooth the flow of traffic. The agency uses a service


INRIX




ATC

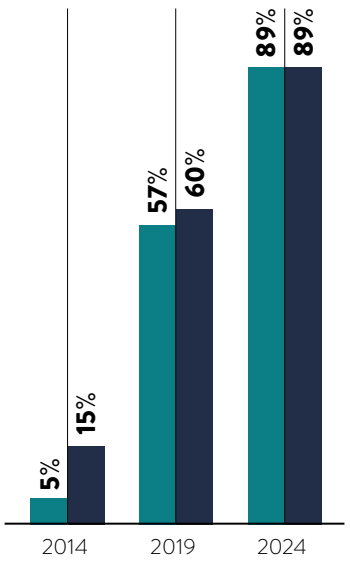
01
OpenCar technology, owned by INRIX, gives car makers the ability to customise their own application platform

02
INRIX Traffic app learns driving habits and personalises routes, alerts and destinations

03
Spirit, a hybrid, driverless agriculture vehicle by the Autonomous Tractor Corporation

AUTOMOTIVE CONNECTIVITY SOLUTIONS

Global percentage of new cars sold that include a connectivity solution by type



Source: Analysys Mason 2014

offered by a company called INRIX. Cars fitted with an INRIX satnav, supplemented with smartphones running an app, gives INRIX a near-perfect picture of traffic flow as it moves around the country. Within a 15-second window, it is possible to see which roads are clogged and which are running smoothly. Thus when a driver asks for the quickest way from A to B, they can be given the optimum route.

Only it's far cleverer than that. The INRIX system incorporates more than 100 other sources of data into the equation. Event listings are factored in. If Leicester City have a Champions League game against Barcelona at home on a Wednesday night, the system will anticipate the flood of traffic exiting the King Power stadium at 10pm. Weather reports, emergency services data, construction works and even Twitter chatter is included. If "M11" and "oil spill" flash up on Twitter, the system will know what's going on.

The power of this sort of technology prompted Google to splash a billion dollars on Waze, an Israeli traffic-mapping service. Now other industries are piggy-backing on traffic mapping. The advertising market, for example, relies on counting "eyeballs" passing each street billboard. How to calculate this? The solution is to use traffic apps to see vehicle movements in real time. Thus, billboard owners can charge for each car that passes.

Rio de Janeiro in Brazil is using data from Waze to adjust public transport routes. The technology means it can understand journey planning in a way which old-fashioned car counting never could. And we are seeing estate agents use true-life journey times to market houses. It is more helpful to say a property is 20 minutes away from a train station than 12 miles. Traffic data can ensure the claim is accurate.

The automotive sector has vast revenues – global sales hit $3.3 trillion in 2014, according to consultancy Oliver Wyman – and relentless pressure to innovate. These dynamics will ensure it leads the digital world. New entrants may push the industry even further. Apple is rumoured to be launching an electric car. Tesla founder Elon Musk says it's an "open secret", adding: "It's pretty hard to hide something if you hire over a thousand engineers to do it."

> If you want to see the future, this is your sector – it's a decade ahead

Digital engineers in all sectors will be closely watching the automotive industry for many years to come.

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Digital leader can inspire, tra

Organisations are increasingly appointing a chief digital officer to help them go digital, reap the benefits of

CHIEF DIGITAL OFFICER
DAN BARNES

If digital is a revolution, the chief digital officer or CDO is a revolutionary. Mobile connectivity and real-time data updates have created an always-on, ever-changing electronic environment. It is fundamentally different to the information technology revolution of the 20th century, which automated existing process. It is also a change that is affecting every organisation, from the government's Department for Work and Pensions (DWP) to financial services firms.

Mayank Prakash, director general for digital technology at the DWP, says: "To give you an example, carers need to meet us, but time is a luxury they cannot afford. So we have turned that interaction into an online digital service which means they can interact with us whenever they want. That often means outside the classic nine-to-five boundary, and not from PCs but from tablets and mobile devices."

Philippe Denis, CDO at BNP Paribas Securities Services, says the financial services provider is looking at robotics, natural language processing and artificial intelligence as three key game changers.

"What are we going to give our employee of tomorrow to be more efficient?" he asks. "Across industries, implementation of new technologies is typically six years. Some things are going to pop up quickly, six months for a prototype, six more months to one year for implementation. These are new transforming topics. The chief executives and chief information officers (CIOs) of this world cannot add this to their plate. That is why the new world of the CDO has been created."

In its report *Adapt, disrupt, transform, disappear: The 2015 chief digital officer study*, consultancy PwC found that business-to-consumer (B2C) firms were the most likely to have someone in the post of CDO, with firms in communications, media or entertainment (13 per cent) topping the list, while business-to-business (B2B) firms such as automotive, engineering or machinery (3 per cent), or metal and mining (1 per cent) were the least likely. The *2015 Harvey Nash CIO Survey*, published in association with KPMG, supported this dynamic, noting that manufacturing and utilities were three times less likely to be disrupted by digital technology than broadcast media.

The overall number of CDOs has grown considerably over a short space of time. The Harvey Nash report found that 17 per cent of CIOs worked with a CDO in 2015 up from only 7 per cent in 2014. Some 5 per cent of CIOs were reported to be hiring a CDO in 2015.

"If you looked at a lot of those CDOs, they were not technologists, they were business individuals," says Lisa Heneghan, partner in the KPMG CIO advisory practice. "I think the role is a balance. Some organisations will bring in business-focused individuals and drive most of the technology components down a level within the organisation. Others will bring individuals who embrace the business dynamic and build on their technology background. I don't think one or the other [is right]. It depends on the organisation."

Being a head of digital does not always require the CDO moniker, but it is crucial that the process is managed at a senior level. Claire-Louise McSherry, managing director of executive search firm McSherry Brown, reports there has been an upsurge in requests for CDOs where chief information and technology officers had traditionally been sought.

> The tasks of the digital chief are balanced across changing process, technology and culture

"When the landscape changes, people can be more comfortable creating a different label," she says "A chief digital officer can look across an organisation and bring it forward to meet its current needs."

The tasks of the digital chief are balanced across changing process, technology and culture. Mr Prakash identifies two streams, that of "going digital" which is focused on working with customers online using digital channels so they have greater control over the interaction with us, and "being digital" by using better automation to make an organisation more efficient and thereby provide better services.

Darren Price, chief information officer at insurer RSA, is responsible for digital within his company. He recognises those two streams and believes each requires the head of digital to address specific challenges.

"The first is how to drive commercial and business outcomes through digital," he says. "How do you get the digital agenda to the top of the business list? That drives customer service and retention. The second piece is internal digitisation. How do we provide a quality end-to-end service for our customers internally around work flow and standardisation?"

DRIVERS OF DIGITAL TRANSFORMATI

ORGANISATION'S DIGITAL MATURITY LEVEL

GLOBAL SURVEY OF SENIOR BUSINESS LEADERS

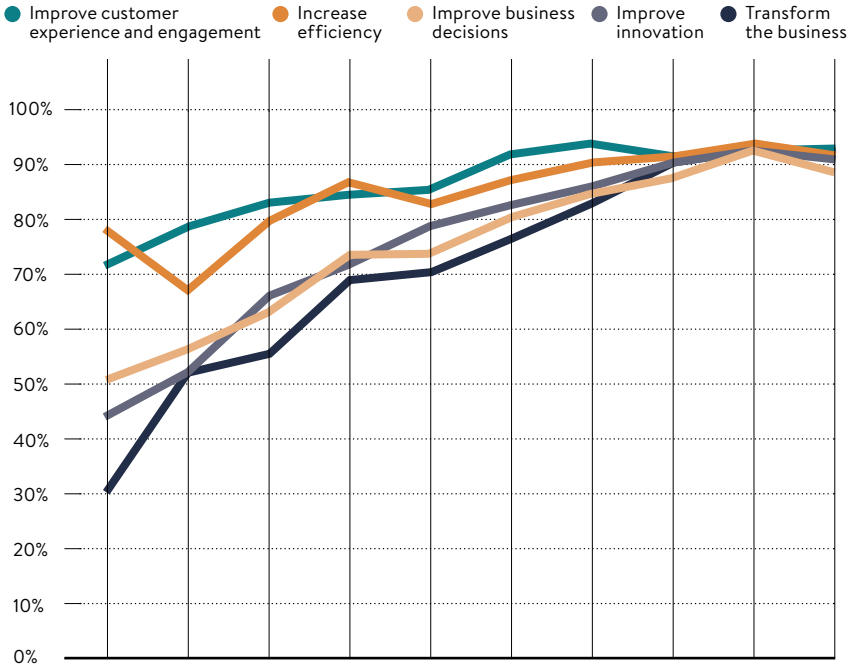
Ranked from one to ten

Early · Developing · Maturing

1	2	3	4	5	6	7	8	9	10
3%	8%	15%	14%	14%	17%	15%	9%	3%	2%

OBJECTIVES OF DIGITAL STRATEGY

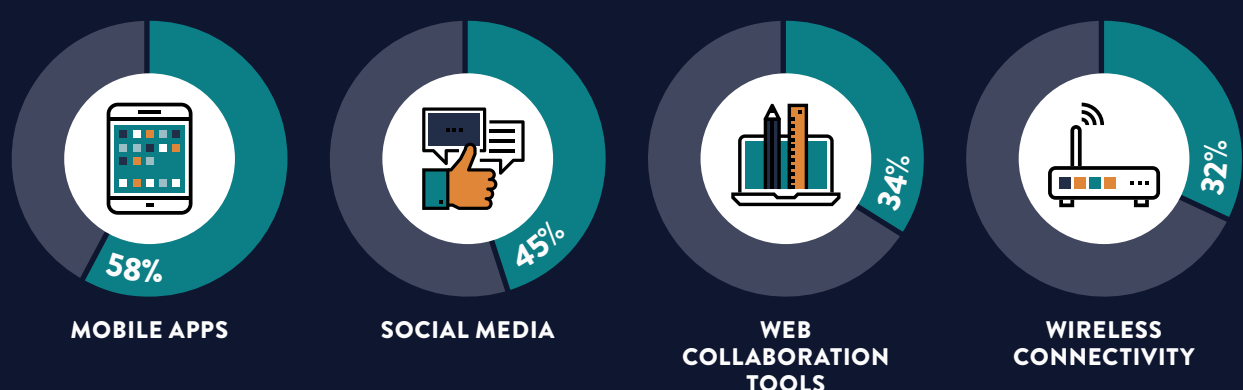
PERCENTAGE OF GLOBAL SENIOR BUSINESS LEADERS WHO AGREE WITH THE FOLLOWING



Source: Deloitte/*MIT Sloan Management Review* 2015

WORKPLACE-CHANGING TECHNOLOGIES

SOLUTIONS COMPANIES ARE CONSIDERING IMPLEMENTING OVER THE NEXT THREE YEARS



PERSON RES
Sets the digital

CHIEF EXECUTIV

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ORGANISATI
GLOBAL SURVEY
Strongly agree

My organisation vi
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My organisation vi
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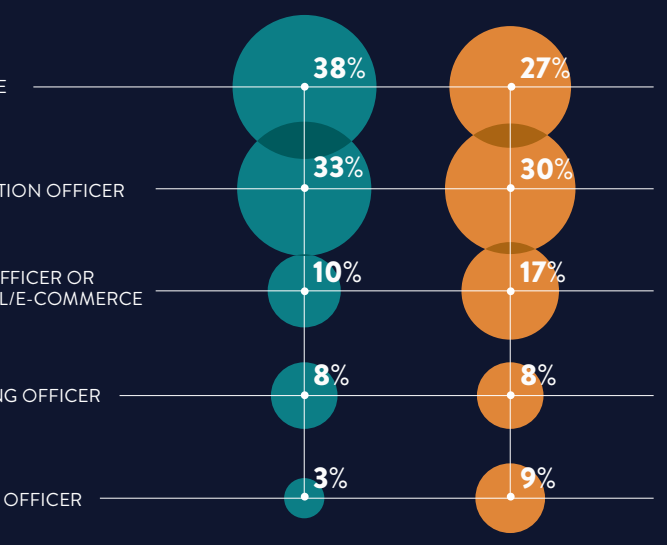
nsform and build business

expanding their business and provide added customer satisfaction

ON

PONSIBLE FOR DIGITAL VISION/STRATEGY

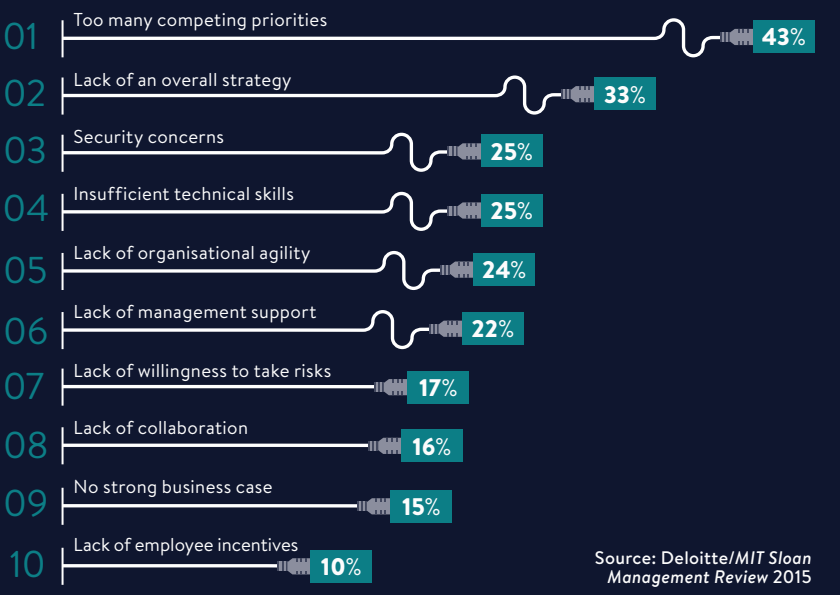
vision/strategy Ideally should set the digital vision/strategy



Source: Forrester/Accenture 2015

TOP 10 BARRIERS TO DIGITAL TRENDS

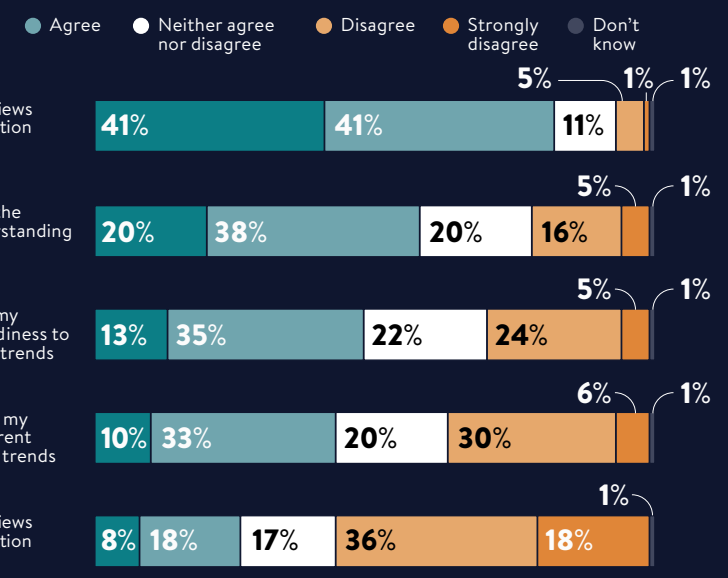
GLOBAL SURVEY OF SENIOR BUSINESS LEADERS



Source: Deloitte/*MIT Sloan Management Review* 2015

ONAL CAPACITY FOR DIGITAL TRANSFORMATION

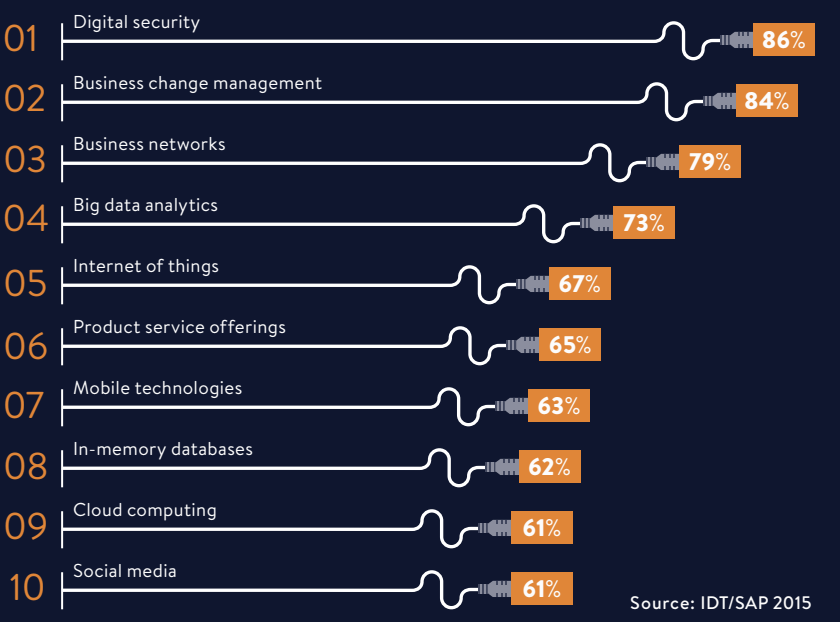
OF SENIOR BUSINESS LEADERS



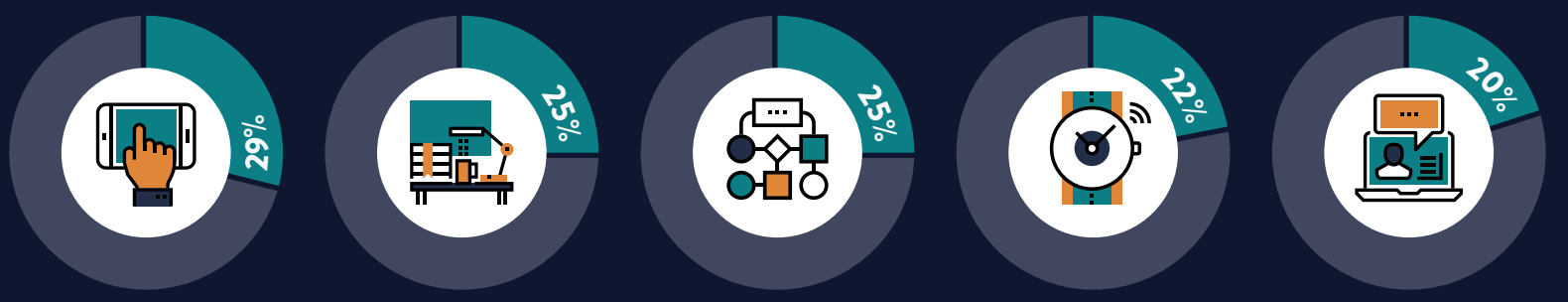
Source: Deloitte/*MIT Sloan Management Review* 2015

TOP 10 SKILLS NEEDED FOR DIGITAL TRANSFORMATION

GLOBAL SURVEY OF IT DECISION-MAKERS



Source: IDT/SAP 2015



Source: Raconteur/Google 2016

He also identifies an important third element that must be addressed – innovation. Failing to innovate can be very expensive, especially when other firms are able to step in and disintermediate. Some industries, including music and media, have seen profits decimated by the effect of digital on distribution. As the head of digital at a large wealth manager noted: "In the early-2000s, Sony owned a huge portfolio of music licences and portable music technology, yet Apple is the firm we talk about dominating music downloads."

Online allows new businesses to break down established relationship networks. From iTunes to Spotify to Amazon, the traditional chain of intermediaries is being pushed to one side, and publishers and producers have seen margins slashed. Other industries are looking at that effect closely and working out how to avoid a similar fate.

"For many organisations the interesting issue around data is how they can monetise it," says Ms McSherry. "They have a lot of information, but many do not understand the intelligence this can give them."

Key to that is the capacity for a company and its staff to change with the times. Intrinsic within that is how best to manage the skills gap. Depending upon the sector, different organisations can find themselves severely challenged in attracting the top talent.

Boston Consulting Group, which describes the new digital industrial transformation as "Industry 4.0", found in a recent study of German and American businesses across industries that 38 per cent of firms considered the lack of qualified employees as a big or very big challenge to adopting Industry 4.0, some 30 per cent rated it as an intermediate challenge and just 11 per cent thought there was no challenge.

The DWP's Mr Prakash says his organisation is uniquely positioned to attract talent, likening it to a massive startup. In part he believes new employees are interested in working in the public interest that the DWP aims to deliver and in part due to the scale of its business, which gives even people working for the big digital native firms a suitable challenge.

He says: "We process £170 billion in payments every year, we manage £1.7 trillion in pension funds, on an average day we share ten million data records with over 400 organisations, so the size of what we do is off the scale for any other industry."

COMMERCIAL FEATURE

AGILITY IS KEY: REMODELLING I.T. FOR THE DIGITAL ENTERPRISE

Companies that embrace digital transformation as an opportunity to stand out from the pack must consider the critical role their SAP systems will play

basis
A faster, better way

The process of digital transformation represents a genuine opportunity for companies across the globe to turbocharge their business by delivering faster, more engaging products and services of the kind customers are increasingly demanding.

Big data, mobile commerce and the internet of things (IoT) are just some of the options that organisations are already using to differentiate themselves. Some aircraft engine manufacturers, for example, are using the IoT to transform their product portfolios, aiming to enable airlines to improve operational performance by tracking the health of thousands of engines worldwide through on-board sensors and live satellite feeds.

"Agility is a fundamental requirement in the digital economy and organisations that choose to ignore this fact run the risk of becoming irrelevant," says Darren Thorpe, chief technology officer of Basis Technologies. "The multinational companies that we work with, both business to business and business to consumer, understand that an organisation's fortune is increasingly dictated by its ability to adapt quickly to new market conditions."

However, as firms become increasingly reliant on software that integrates with or enables almost every part of their business, it is vital that these systems are also in a position to support new digital business requirements. SAP applications, for example, are the backbone of many companies, helping them to run operations such as sales, logistics, manufacturing, finance and human resources, while also powering customer-facing functions like e-commerce.

Businesses are already recognising this need, according to data from Forrester Research presented in a recent Basis Technologies webinar. Some 75 per cent of software decision-makers surveyed believe that modernisation of key legacy applications is a critical or high priority, while 68 per cent see the update to a new release of packaged applications, such as SAP, in the same way.

So the need is understood, but what about the practical realities? Change can be difficult, particularly in complex, business-critical software environments such as SAP. Even firms that see the logic of developing and updating their systems may be reluctant to take on transformation initiatives, which have in the past been regarded as disruptive projects, potentially loaded with risk.

That's where approaches such as Agile and DevOps – increasingly commonplace ways to develop and deliver new features and services – come in. They replace traditional monolithic projects, focusing on collaborative methods and high levels of automation to achieve a faster time to market, higher quality, lower costs and reduced risk. Adoption of DevOps has been seen to increase software delivery speed by up to 1,600 per cent.

Basis Technologies' DevOps suite enables companies to adopt these approaches across their SAP development processes, allowing them to accelerate the delivery of business value by transforming the way they manage change.

"It has become critical for SAP teams to have the ability and flexibility to change at the speed the wider business needs. But there must also be confidence in the process, culture and tools so that this can be achieved without compromising stability," says James Roberts, head of product management at Basis Technologies. "Our tools, along with a breadth of knowledge that comes from years of working with large organisations, can deliver SAP change more safely, quickly and cheaply, so businesses can be more successful."

> Businesses that invest in the right software tools today will steal a march on their rivals thanks to their ability to direct technical expertise sooner towards activities that generate real value

The Basis Technologies team have learnt that successful change is not just a question of putting the right software tools in place, but also about changing culture and leadership so management and business work closely with the IT functions of development, testing, operations and security throughout the entire process.

"It's important to get rid of team silos, so the business understands what is being built for them, and can steer and adjust along the way, rather than have IT delivering something many months later that doesn't do the job," adds Mr Roberts.

SAP has itself been at the cutting edge of technological changes and six years ago introduced its HANA database, utilising super-fast in-memory technology to process massive amounts of data in real time. Last year it launched S/4HANA, the latest suite of SAP products designed to give users a slicker, simpler experience to exploit better the opportunities created by the IoT and big data.

The shift to HANA is the cornerstone of digital transformation for SAP users, not only making their business more efficient, but also reducing costs by replacing what may be a cat's cradle of existing applications and multiple versions of SAP, a relic of historic mergers and takeovers.

Basis Technologies works with clients to introduce more automation into the process of system consolidation, allowing changes to be made more quickly, without the mistakes that people and manual processes can introduce.

"Over the next five years the world will experience an exponential increase in the replacement of manual labour with automation tools, robotics and cognitive computing; nothing will be left untouched," says Martin Metcalf chief executive of Basis Technologies. "Businesses that invest in the right software tools today will steal a march on their rivals thanks to their ability to direct technical expertise sooner towards activities that generate real value."

As the pace of business and corresponding volume of software change continue to increase, testing will become evermore important. A critical process that ensures the safety and stability of SAP systems, testing is already a hugely complex, labour-intensive bottleneck for many firms. Basis Technologies sees this as a crucial issue and is excited about the prospects for a new product that it is soon to launch, which will automate as much as 90 per cent of regression testing without the need to record and update test scripts manually.

Mr Roberts explains: "Testing has always been a costly exercise that may involve hundreds of people. We see this new product as a game-changer in the way companies approach SAP system testing."

Tools are available now to help firms manage change quickly and safely. It may be understandable that some companies shy away from transforming the way they run their SAP systems, but as digital transformation becomes more and more widespread, the risks of doing nothing are potentially enormous.

For more information please visit www.basistechnologies.com

DevOps creates an automated software delivery pipeline, enabling organisations to achieve:

Up to **1600%** faster software delivery,

50% faster time to market and

50% reduction in cost and effort due to process automation

60x fewer failures

128x faster recovery from failures

Twice as likely to exceed their profitability, market share and productivity goals

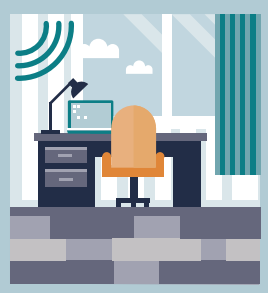
Here's the top tech the boss should know about

The technological landscape is changing shape faster than ever and it can be hard to navigate, so here's a helpful guide to the future...

TEN TOP DIGITAL TECHS
CHARLES ORTON-JONES

01 FACIAL RECOGNITION

A new app took Russia by storm this year. FindFace compares photos of people with the database on the social network VKontakte to identify them. Cute girl in the coffee shop? Bingo, you know her name, her likes, her friends and all sorts of other personal information about her in seconds. For retailers this sort of technology means the ability to recognise customers the moment they walk in the store. Adverts can be tailored to passers-by. The ethics? It's a touchy subject. Consent and the law permitting, we'll see everywhere from doctors' surgeries to betting shops using facial recognition.



02 PROJECT TANGO

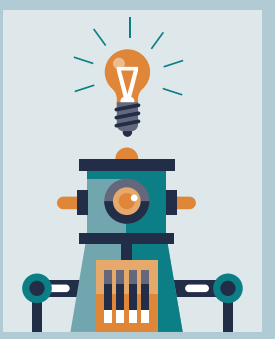
Google Earth gave us the ability to see the world from space. Google Street View let us see buildings from the outside. Now Google's Project Tango is adding the inside of buildings. A Project Tango phone scans the environment around it, adding a quarter of a million 3D measurements a second. Just wave the phone and it scans as it goes building a detailed picture of the surrounding world. Why? A computer game could generate a new level based on your home. Interior designers can work with perfect measurements of your residence. The blind can walk with audio cues guiding them round obstacles.

03 IoT EXPLOSION

The internet of things is only getting started. Yes, we've seen wi-fi kettles and cars which report back to the manufacturer when they crash. But most companies haven't begun to contemplate the possibilities. Latest breakthroughs? The Brita water filter jug now orders replacement filters from Amazon automatically. Salted Ventures, a spin-out from Samsung, has created smart shoes, which report on pressure, balance and weight shift for athletes. The Bill & Melinda Gates Foundation is working on an implantable birth control chip, which can be switched on or off remotely. The digital world is going to be transformed by the data flowing from IoT sensors.

04 EVERYDAY AI

Artificial intelligence used to be available only to chief information officers working at Fortune 500 companies. Yet now even small firms can turn to cyber intelligence when they need. Super-computing power is available on demand. IBM Watson leads the field. It shot to fame winning the TV show *Jeopardy!* Today it powers the mundane, such as Mattel's Hello Barbie doll, to more profound things, such as development of Standard Bank's customer relationship management. Rival offerings such as Hewlett Packard Enterprise's Vertica and Microsoft's Azure Machine Learning will bring AI to all enterprises.



05 BLOCKCHAIN

You've heard of bitcoin. Well, the technology behind it is the blockchain and it's suddenly overtaking bitcoin for hype. In a nutshell, the blockchain is a public record of transactions, which anyone can possess a copy of. All versions of the ledger are updated simultaneously. Today there are more than 220 blockchain startups. The Bank of England held a contest last year to find the best application. The winner tracks blood in the NHS. IBM and Goldman Sachs are pouring money into the technology. And don't worry if you are a bit baffled – even the developers aren't totally sure where blockchain will end up.

06 NATURAL LANGUAGE GENERATION

When will computers learn to talk? The answer is that they pretty much do. The Met Office weather reports online are entirely written by a natural language engine developed by AIM-listed Arria. Reuters uses a computer to turn financial data into prose. Hospitals are using the tech to write patient reports. Mechanical devices such as wind turbines are writing status reports for engineers in plain English. On the flip side, language engines are getting better at understanding human communication too. Companies such as Spotter offer "sentiment analysis" across social media, so brands can track what consumers are saying about them.

07 PREDICTIVE ANALYTICS

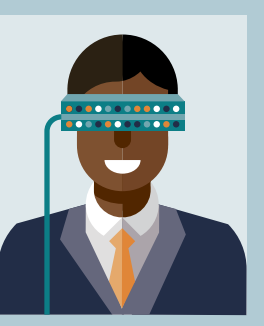
How does a supermarket know how many cabbages to stock each day? The decision used to be done by a human with a spreadsheet. Today it's automated by an algorithm. The weather, sales of related products, the day of the week are all factored in. Then buyers are given a probability density curve. This illustrates that there's a 10 per cent chance of 20 cabbages being sold, a 30 per cent chance it'll be nearer 40 and so on. German predictive analytics company Blue Yonder helps Otto's Market supermarkets and Lufthansa airline set prices and procure stock. Predictive analytics is a complex science, but is the future of procurement.

08 ULTRA-HIGH DEFINITION

Old-fashioned televisions had 576 lines of resolution. Then came high-definition 720 and 1,080. Now we are seeing 4K televisions, which confusingly have 2,160 lines as the measurement got switched from horizontal resolution to vertical. The next generation will have 4,230 lines or higher. We've already seen this arms race for higher resolution on mobile phones. What does it mean for businesses? The answer is an overhaul of all online imagery. Old logos will need revamping. Websites must be rethought. Users are already complaining about non-Microsoft applications scaling badly on Windows 10. On the plus side, retailers can now show off goods in razor-sharp definition.

09 VIRTUAL REALITY

The wait is over. VR is here. The HTC Vive and Oculus Rift headsets are going head to head, with Google-backed Magic Leap on its way. William Hill is working on an app to let punters watch races from the jockey's perspective. Construction firm Atkins is giving VR to engineers so they can immerse themselves in their models. Audi is offering consumers a VR tour of cars. Want a different colour? The VR will switch between any colour you want to examine, in an instant. Why buy a luxury property when a VR headset can turn a one-man bedsit into a Beverly Hills mansion?



10 ERP

In the old days the mention of enterprise resource planning sent a shiver down the spine of finance chiefs. They were vast, complex and unreliable software packages which took years to bed in. An ERP allows company chiefs to monitor every aspect of a business, from cash flow to inventory. Today? The next generation of ERP is upon us and they are a world apart. Cheap, quick to install and cloud based, these ERP tools are so simple even small companies can use them. There are project management-focused ERPs, such as Deltek, sales and management ERPs like Anaplan, and fulfilment packages including Trek Global.

‘Our machines won’t destroy the world’

For anyone trying to understand the past, present and future of artificial intelligence or AI, taking a look at Naveen Rao’s career would be a good place to start

INTERVIEW
EDWIN SMITH

NAVEEN RAO
FOUNDER AND CHIEF EXECUTIVE
NERVANA SYSTEMS

It was in 1996, part way through his undergraduate degree at Duke University in North Carolina, that Naveen Rao decided to take a course in artificial intelligence. That was also the year in which IBM’s Deep Blue became the first computer to defeat a chess grand master when it won a game, but not a whole match, against Garry Kasparov.

There was a buzz around the discipline at that time but, as Naveen says, it had “a very different flavour back then – I would describe it as ‘creative algorithms’.”

In 1997 Deep Blue managed to beat Kasparov over the course of a whole six-game match, but some things were still beyond the reach of AI. The game Go, for instance, in which the first move offers 361 possibilities, compared with 28 in chess, and can last for 150 turns, compared with around 80 in chess, was thought to require too many computations to be tackled to a high level by a computer.

“Go was too complicated,” says Naveen, who would go on to gain a PhD in neuroscience before founding his own AI company, Nervana. “It was something that we just didn’t touch. We thought, ‘Brains do something magical that we just don’t understand – we’re not going to go there’.”

But then, earlier this year, it happened. AlphaGo, a program developed by a London-based subsidiary of Google, beat the world champion Lee Sedol four games to one in a five-game match.

“Less than 20 years later [the problem] has been solved,” says Naveen. “That’s pretty huge to me.” The crucial breakthrough has been a result not just of increased computing power, although, of course, that has helped, but thanks to advances in a particular kind of AI, known as deep learning.

> We’ve discovered that brains aren’t that special; they do heuristics and pattern recognition very well – that’s ‘the magic’

“The method allows computers to process tasks through ‘neural networks’, systems that mimic the structure of the human brain in order to learn, improve and, in the case of AlphaGo, become capable of decision-making that resembles human intuition more than it does brute computation.

“We’ve discovered that brains aren’t that special; they do heuristics and pattern recognition very well – that’s ‘the magic’.”

But, of course, AI isn’t just about board games. Naveen points out that programs relying on deep learning are already commonplace. “It’s pervaded many experiences. Facebook has about 1.6 billion active users every month; every one of those people is taking advantage of deep learning in the news that’s fed to them and the auto-tagging capabilities [which recognise faces in photos].

“We almost take it for granted now and are surprised when it doesn’t work. That transition happened really fast.” Apple’s Siri and Google Assistant are among deep learning’s other everyday applications.

If the technology is pervasive in one sense, in another its use is restricted, often the preserve of Silicon Valley giants that have the resources and expertise to take advantage of it.

That’s why, since it was founded in 2014, Naveen’s company has set about using the $24 million of investment it has received to make the benefits of AI more widely available.

Nervana works with companies’ data science teams to provide them with access to its deep learning “cloud”, and to develop and run programs that make the best possible use of the reams of data they have accrued. The firm has helped various clients to make intelligent robots for farming, spot fraudulent financial activity or analyse photographs to pinpoint likely locations for oil deposits.

It’s crucial work, Naveen says, because it allows companies to get to grips with what he describes as “the biggest computational problem that we have today”.

“If we gave 100 megabytes to every man, woman and child every day, which is a lot, if it’s text, it would take us 30 years to get through all the data we have right now. And that problem is getting worse by the minute. In ten years we expect there to be 75 to 100 times the amount of data we have today,” he says.

Beyond giving companies access to Nervana’s neural network hardware and its expertise, Naveen is planning to provide a further solution by developing a computer chip that is specially designed for the demands of deep learning. By doing so, he posits that the time it takes to “train” a neural network to perform a certain task could drop by as much as tenfold, enabling a process that currently takes weeks or months to be completed within days or even hours.

Employees at Nervana’s San Diego office

Nervana

This, presumably, is part of the reason that Nervana was one of the first companies to be backed by Playground Global, the incubator-cum-workshop set up by the creator of Android, Andy Rubin, after he parted company with Google.

However, the pace of change in the field has also given rise to concerns. Elon Musk, the founder of Tesla and SpaceX, has likened the threat of uncontrolled advances in AI to “summoning a demon” and named it as humanity’s “biggest existential threat”, which sounds not unlike the dystopian “rise of the machines” scenario imagined in Hollywood’s *Terminator* film franchise.

Since making those remarks, Mr Musk has teamed up with Stephen Hawking and other leading scientists to pen an open letter about the potential dangers of AI and, last December, founded OpenAI, a research organisation that aims to develop the technology while taking careful steps to keep it under control.

“I actually talked with Elon about this and he’s a very thoughtful guy,” says Naveen. “The headlines can make out that he’s fearful of the future, but he is saying, ‘Well, let’s at least have a conversation and talk

$11.1bn

estimated size of the artificial intelligence market for enterprise applications in 2024, up from $0.2 billion in 2015

Source: Tractica 2015

CASE STUDIES: BLUE RIVER AND PARADIGM

Blue River Technology

Agriculture startup Blue River has taken advantage of Nervana’s deep learning cloud to improve the way it manages its crops.

The company used a system to “phenotype” plants, recording various pieces of data such as height and age which are reliable predictors of future development, to make instantaneous decisions about how to thin their fields to optimise yields.

However, the system was prone to errors because of complications that reduced the reliability of the computer vision systems within the machines used to perform the task. For example, weeds could not always be recognised by the system and so would often result in inefficiencies.

Nervana’s Neon deep learning system was able to pinpoint the single pixel within a 812 x 612 pixel image where the stem of a plant met the ground and, as a result, added a greater degree of precision to the crop-thinning process. Nervana says its methods were used to help Blue River improve yields by up to 10 per cent.

In another venture, Paradigm, which provides software solutions to the oil and gas industry, partnered with Nervana on an initiative that helped the business to locate viable sites through automated image scanning.

By processing a vast cache of 3D seismic images, the program was able to detect subsurface faults, folds and other geological features that tend to trap oil. Increasing the efficiency of image scanning has a knock-on effect that leads to more targeted drilling, which in turn leads to reduced costs.

“We approached Nervana Systems to explore ways artificial intelligence could help improve operational efficiency in oil exploration,” says Indy Chakrabarti, senior vice president of product management and strategy at Paradigm. “Nervana successfully built a deep learning-based solution on their cloud to detect numerous subsurface faults within three-dimensional seismic imagery without the need for manual intervention. Nervana cloud enables geoscientists to spend less time on repetitive tasks and become more productive.”

about the possibilities that could be bad for humanity and try to take actions now that will help us steer away from those things.' I think that's a very practical thing to say.

"We are working with OpenAI and thinking about the ethical implications, but most of the research is not about building a sentient computer or one that has desires. It's about better automating processes that humans have learnt to do, so it's still a tool under our control. If you take a machine that has been designed to learn from data and optimise complicated processes, it probably won't have the motivation to destroy the world."

But what about more prosaic concerns, such as the instability of the economy and labour market that could be caused by the automation of millions or even billions of jobs that human beings currently count on to earn a living?

> If you take a machine that has been designed to learn from data and optimise complicated processes, it probably won't have the motivation to destroy the world

Naveen doesn't deny the possibility exists but, understandably, would rather frame the shift in a different way. He says: "The fear is that they're going to take all our jobs away, but they're basically giving us bigger tools. It's like a bulldozer for data – I can make sense of much larger swathes of data than I could before and use that to be more competitive in my company."

Deep learning is already being used to create programs that exhibit "creativity", something that would have traditionally been considered the preserve of humans. An application called Jukedeck can create original, royalty-free music when given specifications regarding the length and style of the piece it is instructed to compose.

"But it's going to be hard for a machine to actually understand the experience of a human for a long time," says Naveen. So it'll be a while before Jukedeck will know whether it should be proud of its latest work.

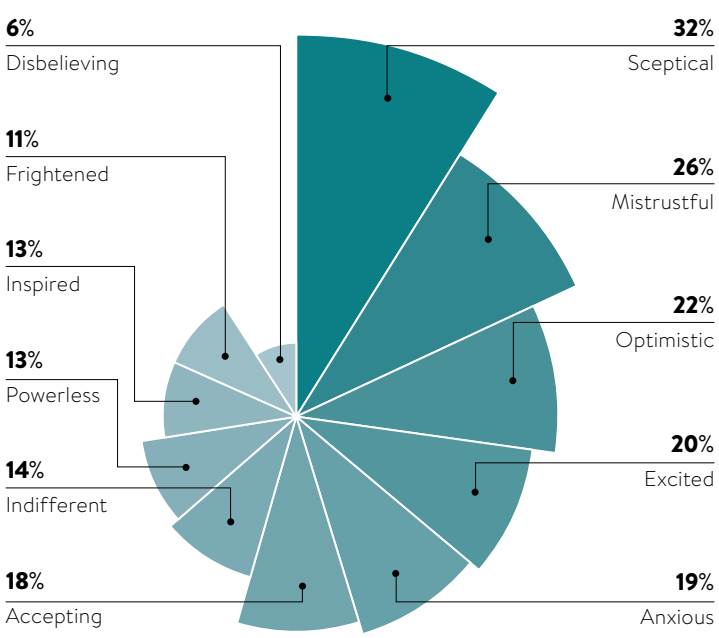
Naveen mentions Facebook, Google and Chinese tech giant Baidu, which he says has developed the best voice recognition software in the world for both English and Chinese, as some of the leading proponents of deep learning. Drones and automotives are, he thinks, among the most exciting areas, but he also name checks Swype, the app which allows users to write whole words on their smartphone keyboards with just one small continuous movement of their thumb. Conversely, he sees less practical value in the Swiss-based Blue Brain project, which seeks to create "biologically detailed digital reconstructions" of a human brain.

That raises a question. Looking to the future, is it possible that neural networks and AI, mirroring the structure of the human brain, will be surpassed by something else?

"Evolution works in layers; it doesn't come up with a whole new solution all at once," Naveen concludes. "As a neuroscientist studying the brain, you can see that it's basically a hack upon a hack upon a hack. At this point, the human brain is the best exemplar of a computer that we have in the world, but there are better paradigms out there."

Right now the next step might seem too far away to consider. But then, 20 years ago, the same could have been said about a computer beating the world champion of Go.

UK PUBLIC OPINION ON ARTIFICIAL INTELLIGENCE



Source: British Science Week/YouGov 2016

COMMERCIAL FEATURE

FOR SUCCESS WITH DIGITAL BE TRANSFORMATIONAL

Businesses are striving to increase customer value and generate growth in the digital sphere. But sometimes the quickest way is to step back and make a plan, according to growth-focused management consultancy ***Prophet***

More than a persistent buzzword, digital transformation continues to be on the top of the C-suite and boardroom agenda.

In fact, 88 per cent of companies are in the midst of such a transformation, according to a survey by Prophet's analyst arm, Altimeter Group. The problem is that when pressed only 25 per cent say they know why.

Though many businesses have invested in digital for more than a decade, they often have little to show for their investment and are paralysed by the array of options in front of them.

"We frequently find that companies have reached a point where they can't keep track of all their new channels and initiatives, and what they're delivering," says Paul English, Prophet's European head of digital transformation. "It's at that point we take a step back, assess the current state and move from there."

Prophet's head of growth Fred Geyer adds: "There is no cookie-cutter approach. Different companies are at different points on the digital maturity model. The road to success begins by understanding where exactly they are and then identifying where they want to go."

Mr Geyer is referring to the digital maturity model developed by Altimeter Group that serves as a basis for Prophet's Digital Transformation Diagnostic, a quick assessment of the current state that ends with a road map of opportunities. With its digital maturity road map in hand, a company can structure its transformation. Momentum is built through a rapid launch of quick improvements and the introduction of relatively easy-to-achieve new programmes.

"In the UK and EU, there's frequently an aversion to 'big bang' digital transformation," says Mr English. "Clients are more interested in transformative results at a number of points across the enterprise, justifying increased investment."

At the centre of every digital transformation is the need to build the right culture, with leadership from the chief executive, and to equip employees with the tools they need. Around it are four building blocks – bringing in and developing talent, improving processes, using the right tools, and carefully building teams.

Companies that thoughtfully and enthusiastically embrace transformation are achieving in-market impact. Domestic appliance giant Electrolux began by examining where it stood in comparison to the industry and where it needed to be. This led to groundbreaking innovation in social media, in-store experience and ownership, supported by extensive learning programmes for employees.

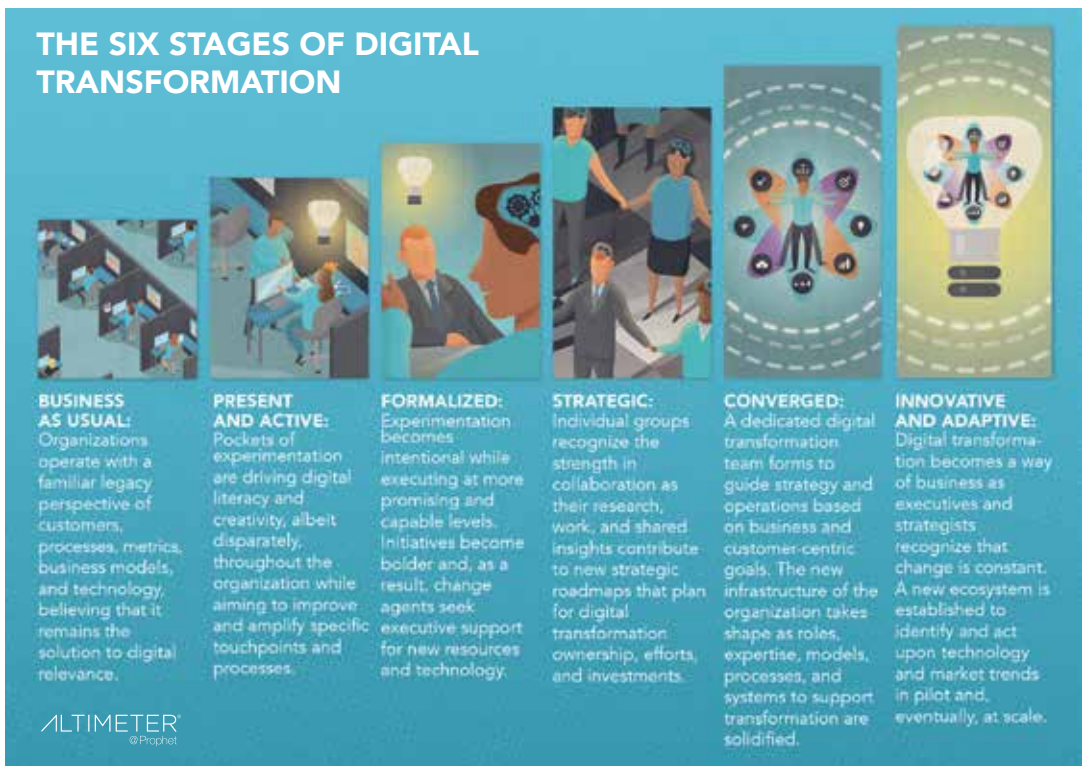
"Electrolux is a company that has embraced digital transformation at the C-Suite level, has worked hard to make it succeed and is now seeing bottom-line results," says Mr Geyer, who leads the Prophet team that have worked with Electrolux at each step in their digital journey.

Among Prophet's other digital transformation clients is Cisco, one of the first businesses to go beyond its success in using social media as a marketing tool. The company is making the successful transition towards social business, where new tools are used to drive the sales team, improve customer service and increase employee collaboration.

"Effective digital transformation is characterised by self-awareness, clear vision, careful structure and execution, collaboration, and proper measurement," says Mr Geyer. "Getting it right requires focused work, and offers businesses the ability to massively increase customer value and loyalty."

Mr English concludes: "Above all, successful growth-focused digital transformation initiatives will almost always start with the customer and they'll never put the technology before that."

For more infomation please visit www.prophet.com or call +44 207 836 5885



COMMERCIAL FEATURE

DIGITAL FOR ALL, NOW!

We are constantly hearing that companies need to embrace digital transformation to survive, but how can they make this an affordable reality?

econocom

In today's economy, digital transformation is unavoidable. The future no longer belongs to the best-performing firms, but to the most agile and innovative.

The digital revolution has seen the emergence of new entrants that are fundamentally changing their business sectors and this is putting the future of non-digitalised organisations at risk. Half a century ago, the shelf life of a firm in the Fortune 500 was around 75 years; today it's less than 15 years and declining, according to *Information Age*.

Digital has already proved itself as a profitable medium when it comes to return on investment. As a result of digital initiatives, *Information Age* says, 86 per cent of UK organisations say they have seen or anticipate seeing a growth in revenue, 85 per cent have seen improvements in customer retention and 68 per cent are now able to act more quickly on business opportunities.

What does a digitally transformed business look like? According to a 2015 MIT and Deloitte survey, it's an organisation, reimagined through digital and innovation, which is improving processes, engaging talent and driving new business models.

However, innovating and modifying an organisation is a difficult exercise for established companies constrained by history, legacy systems and culture. To stand out in the digital jungle, it is key for any business, regardless of its size and history, to take the risk of starting a deep change in its mentality and strategy to include new capabilities, without losing what makes it unique.

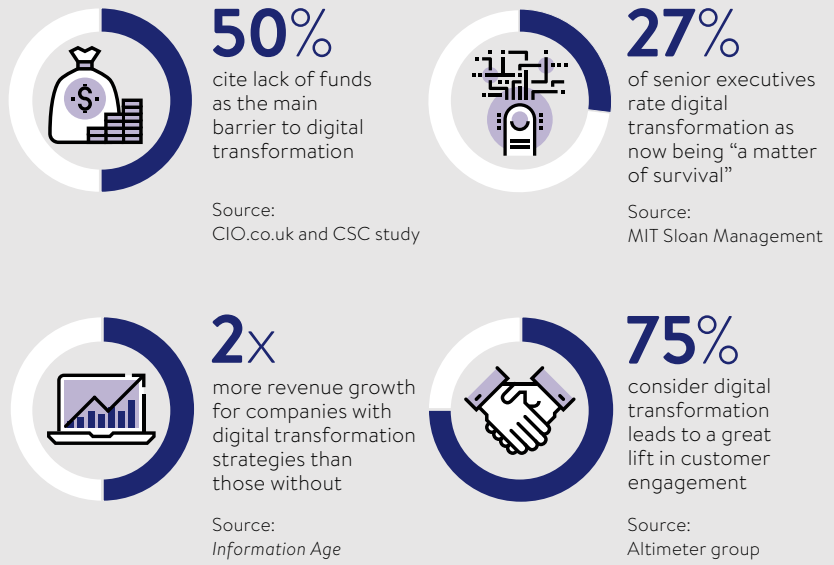
But transformation is not an incremental change. Creating a Twitter account, Facebook page or an iOS app is simply not enough; a real digital strategy is essential. It must start internally by transforming business models. Digital needs to become central to all activity by integrating people, processes and technologies. Management must lead the initiative and take charge.

Unleashing employees' potential is also essential, as they will be one of the main drivers of any digital transformation. Working with modern devices that reflect their personal use of technology will offer them extensive information access and collaboration capabilities. These new tools will ensure improved employee satisfaction, enhanced operational performance and adherence to the new digital transformation.

Yet there are obstacles that are preventing businesses from taking advantage of the digital revolution. Often the issue is finance. Companies are concerned at the cost of digital investment, with 50 per cent citing a lack of funds available as the main barrier to investing in these projects, according to a study by CIO.co.uk and CSC.

What some organisations fail to understand, though, is that investing in digital transformation can be done in a way that is both cost effective and self-financing. Deploying bespoke finance models means firms can invest in digital transformation today.

> Investing in digital transformation can be done in a way that is both cost effective and self-financing



Financial models must be tailored to the organisation, both its sector and budget. This goes well beyond classic lease and managed services contracts. Even cash-rich companies should match the cost of investment with the business benefits over a number of years, aligned with their strategy.

Econocom, Europe's largest independent provider of digital finance and associated services, is leading the way and developing innovative ways to enable businesses to initiate their digital transformation, now. New models such as variable rentals, pay-per-use and as-a-service solutions match the cost of digital investments with the improvements they bring.

In the UK, Econocom is currently working with a global oil company where the rentals are anchored to an external variable factor, in this instance the oil price. If the oil price is high, the project is paid over a shorter period, but if the oil price is low, the rentals are lowered accordingly and the amortisation takes a little longer.

Financial models can also be tied in with business cycles. Consider a retailer, for example. From September to November, when the retailer is stocking up and cash poor, the rentals are low. In contrast, from December to January, when the retailer becomes cash rich thanks to Christmas, the rentals increase thereby matching the client's cash flow.

Other options being proposed within the retail sector include rentals based on the square meterage of shops to spread the cost of digital investment equitably across the store estate. Econocom is also working with one of the UK's largest retailers on a different project where cost of investment is matched with a price per transaction model.

Even companies with highly variable incomes can take advantage of new ways of financing digital transformation projects. For industries such as entertainment, which is dependent on season tickets and event timetables, it's possible to adopt a highly flexible pay-per-event approach.

With imminent changes to the classification of leases (IFRS 16), these pay-per-use or as-a-service contracts mean financing may still be treated as a revenue expense, making it easier to get boardroom buy-in.

Such innovation in financing means almost any organisation is able to take advantage of new digital opportunities now and ensure it remains up to date in this new economy. Isn't it time you joined the digital revolution?

Econocom is Europe's largest independent provider of digital finance and associated services. With more than 9,000 employees in 19 countries and 2015 revenue of €2.3 billion, Econocom has the expertise to speed up digital transformation in organisations.

For more information, visit www.econocom.co.uk, call 020 8940 2199 or contact marie-neige.roux@econocom.com

Calling for digital governance and ethics

Policing the internet may be mission impossible, but there are measures companies can take to guard against misuse and instil consumer trust

DIGITAL ETHICS
ALISON COLEMAN

In an increasingly digital world, the need for clarity and vision from regulators, government departments and businesses to ensure consumers are protected has never been greater. At the same time, the pressure is on the providers of digital services to reassure customers that the key issues of ethics, governance and trust are respected.

Advances in digital technology have created huge benefits for businesses, enabling them to be more agile, flexible and responsive to customer demand. This has also led to a proliferation of digital and online services modelled along similar lines to disruptive brands such as Airbnb and Uber. Regulatory processes to protect consumer interests, however, are not as fleet of foot.

There is legislation in place to protect online consumers in the UK and Europe, including the new UK's Consumer Rights Act 2015, but some of the biggest challenges have arisen from the lack of international regulation around online and digital services, resulting in uneven protection for digital consumers.

"In Europe, for example, website terms and conditions are required to be fair and easy to understand," says David Marchese, a partner at law firm Gordon Dadds. "In the United States, this requirement does not exist, resulting in complicated 'terms of use' that would require a lawyer to interpret. Until the changing global standards of online consumer protection are addressed, consumers using such sites might be caught out by the small print."

> Until the changing global standards of online consumer protection are addressed, consumers might be caught out by the small print

Other legal experts have argued that the digital business space is less of a minefield than it used to be and the old adage describing the internet as the "Wild West" is simply not true.

"As a general rule, users are more protected in the online world than the physical one," says Kolvin Stone, partner, technology companies group, at international law firm Orrick. "Rules relating to e-commerce, for example, are quite prescriptive in terms of what you are required to tell consumers, what rights they have and the contractual terms you are allowed to include in your online terms of sale."

Digital transactions and behaviour are also recordable and traceable. This gives consumers a degree of protection, particularly in relation to fraud, that is not necessarily available in the physical world. The trade-off, says Mr Stone, is that users have to accept the lower privacy standards inherent online.

Fraudulent online activity poses another threat to digital business, often directly to the companies themselves. Posting of fake negative reviews on online websites such as TripAdvisor and Yelp, in some cases by competitors, can inflict damage on the brand and the business. While the UK Consumer Protection Act in theory covers users against false or liable reviews or statements, when it comes to online review sites, the main issue is enforcement.

Dr Gerhard Knecht, global head of information security services at Unisys, explains: "If a user cannot be sufficiently identified, then they cannot be held responsible for any false or defamatory reviews. Also, websites like TripAdvisor and Airbnb attract reviews from users from across the globe, so enforcement would be difficult because of the differing international laws, even if you can identify the user."

The problem is compounded further by the fact that many of these websites are averse to any form of censorship of reviews, because the viability of their service could be compromised if they are filtering or removing reviews.

Some of the larger platforms are using sophisticated software to identify and weed out fake reviews. They also rely on their vast networks of internet users to self-police sites and report fake reviews.

Ashley Hurst, partner at law firm Osborne Clarke, says: "The European Commission is looking at this as part of its Digital Single Market initiative, but these international issues are difficult to legislate for. Technical solutions and policy-based initiatives will probably have greater success in the long run than increased regulation."

While the regulators play catch-up, there are steps that individual companies can take to reassure their customers that governance and ethics are in hand, including creating their own data ethics framework.

Harry Armstrong, senior researcher at UK innovation foundation Nesta, says: "Companies such as HP have been championing a big data code of ethics and have created their own. The government has also launched its own data ethics framework, so there are a growing number of resources to pull from and businesses do not have to start from scratch.

"It is important to involve as many people within the company as possible in creating the framework to get more buy-in, which demonstrates that the company is actively exploring the legal and ethical side of data."

Simply displaying a trust seal can go a long way to building and strengthening trust between a company and its customers. "A trust seal shows that connections between customers and a company's web server are encrypted and hence secure, using the https protocol," says Gavin Hammar, founder of social media management firm Sendible. "The added bonus is that the displaying of badges, such as Norton, Verisign and McAfee, has been shown to increase customer conversion rates."

Perhaps the most effective way for digital businesses to demonstrate their commitment to online governance, ethics and the protection of their customers is to have greater clarity around their social responsibility agenda. Consumers are more socially aware and more discerning about which brands they engage with and are far more likely to choose digital businesses with a strong, authentic social purpose at their core, over those that have one as an afterthought.

As Kerim Derhalli, chief executive at fintech company Invstr, points out, abidance with the letter of the law is no longer sufficient as a measure of ethical business standards.

"The recent remarks by a well-known former retailer in the UK that he broke no laws are redolent of an out-of-date mindset," he concludes. "The genie of consumer empowerment is well and truly out of the bottle and, as consumers, we expect more socially responsible behaviour."

Getty Images

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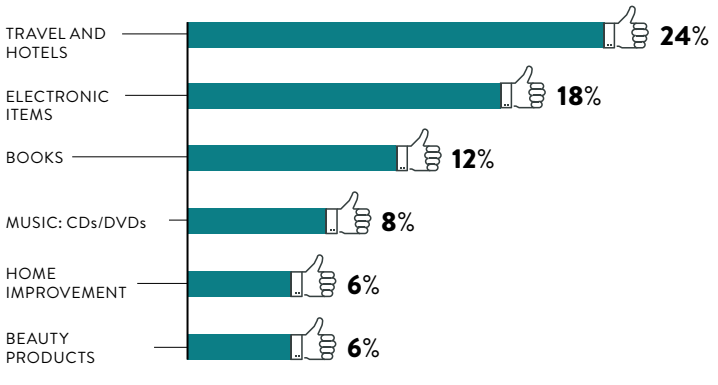
Difficulty in identifying fake or bogus reviews on websites such as TripAdvisor and Airbnb is one of the major problems for regulators

USE OF ONLINE REVIEWS BY SECTOR

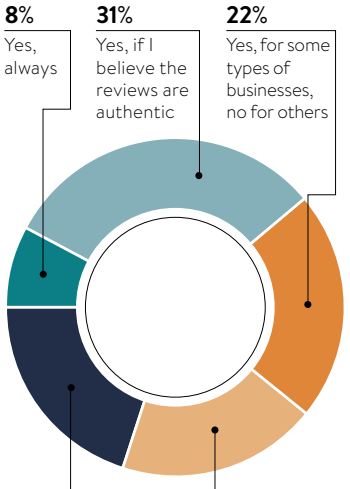
Share of UK individuals who purchase a product/service after reading online reviews



Source: Competition and Markets Authority 2015

TRUST IN ONLINE REVIEW WEBSITES

Do you trust online reviews as much as personal recommendations?



Source: BrightLocal 2015

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