



# BEYOND 2020

Helping you embrace transformation

**CAPITA**



2017



2018



2019

## FOREWORD BY **JOE HEMMING**

### Welcome to a future of unimaginable opportunity

A multitude of forces are at work in the global economy today, but nothing is galvanising change as quickly and as entirely as technology.

It's not just changing the world of business, but the way we behave politically, economically, and as a collective society. It's a highly democratising force... with over half the world's population now connected to the internet, it has revolutionised the way we share knowledge – and power.

Trying to predict where technology might take us in 5 years' time may not be practical, but we do know that just like today, it will be disrupting markets and re-shaping entire industries. And the pace of change is only going to get faster.

At Capita, we believe that whilst undoubtedly an uncertain time, it's also an exciting time that offers tremendous opportunity and potential. This is the time, the moment for business leaders to embrace these unimaginable possibilities.

Joe Hemming  
Executive Officer  
Capita IT & Networks



# WHERE IS TECH TAKING US?

## WELCOME TO THE WORLD BEYOND 2020...

Where a drone delivers your mail. Where your power and connectivity are delivered not through a socket but through a light bulb. Where, from analysing your saliva, your smart toothbrush triggers a 3D printer to produce a vitamin pill containing the precise vitamin combination your body needs that day.

It might sound far-fetched, but - although not widely prevalent - all these technologies exist today.

Today, technology is transforming us. And like those that preceded it, this fourth industrial revolution has the potential to advance standards of living and increase wealth for populations across the globe. Never before have we seen technology giants such as Amazon, Ali Baba or the likes of Cambridge Analytica disrupt human behaviour on such a massive scale. It has the power to open up limitless possibilities.

In the business world, technology is driving new economic models, changing the concept of staff productivity and creating

new pools of customer intelligence. This digital era of disposable markets, real-time information and instant impact means shorter horizons, shorter lifecycles, and faster decision making. Businesses need to be even more open minded and agile than ever before.

In this whitepaper, we will explore the top three trends we believe will be the most disruptive beyond 2020, and how they inform the practical steps businesses should take here and now to be on the front foot and ensure they are ready for change.

# BIG DATA

## TURNING INFORMATION INTO A NEW FORM OF WEALTH

**Data is the new panacea. It provides answers; it holds incredible commercial value; and it is available everywhere, from everything. Connectivity provides the access to this wealth.**

The nature of connectivity will change, as companies use mediums such as artificial light (Li-Fi) to deliver pervasive coverage whilst providing better access control and security. And as data transmission moves to different channels, existing wireless connections will be used to deliver alternatives such as energy, radically changing the utilities marketplace.

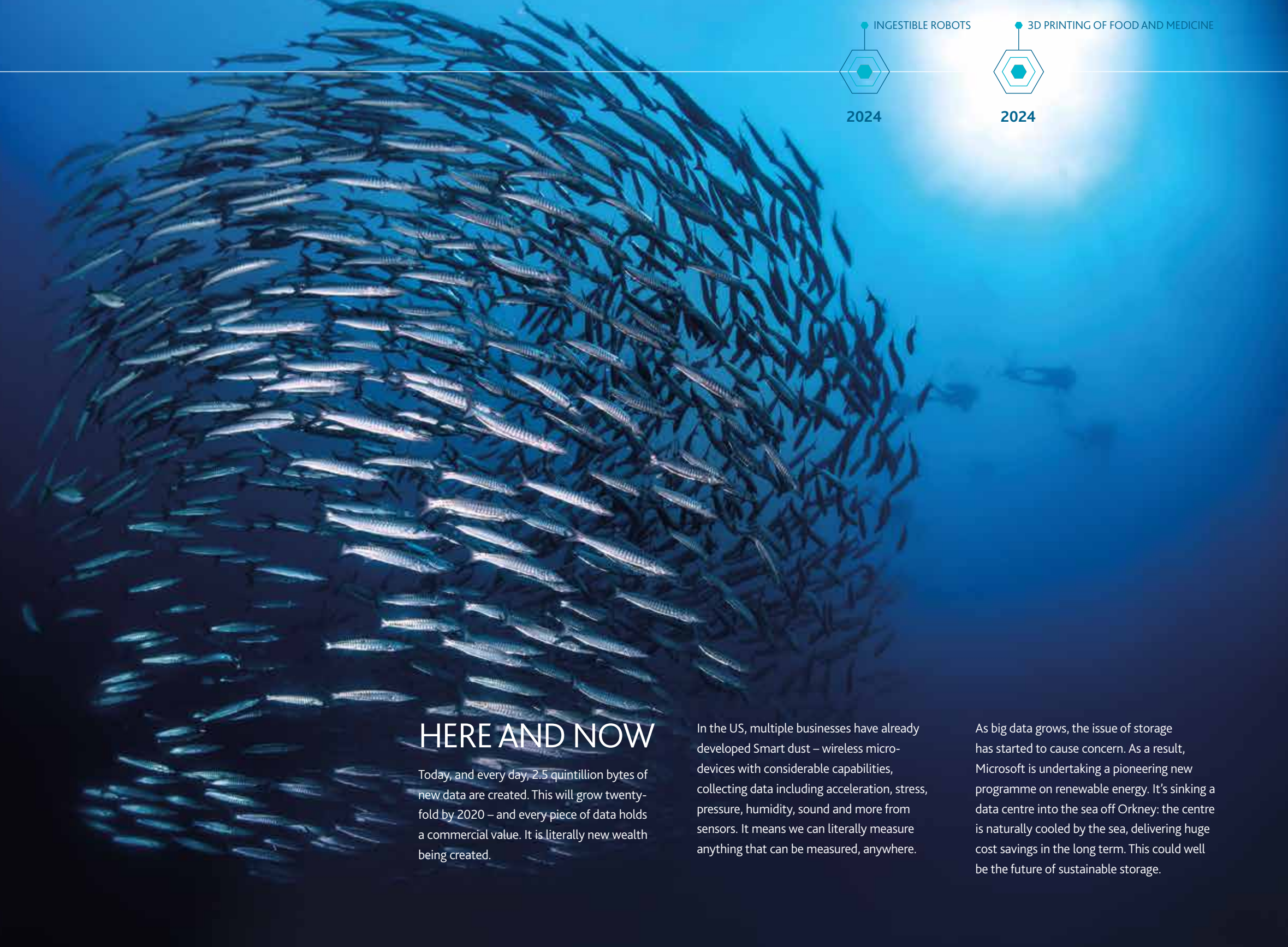
As mass data becomes available, issues around ownership, accuracy and usage will come to the fore. Data will become monetised at a consumer level, allowing people to pay for services with their personal data, rather than cash – an advanced 'value exchange'. This will lead to the hyper personalisation of services and improved customer loyalty: businesses will deliver the best service to those customers who have invested more with them, because they will know more about their needs.

## HERE AND NOW

Today, and every day, 2.5 quintillion bytes of new data are created. This will grow twenty-fold by 2020 – and every piece of data holds a commercial value. It is literally new wealth being created.

In the US, multiple businesses have already developed Smart dust – wireless micro-devices with considerable capabilities, collecting data including acceleration, stress, pressure, humidity, sound and more from sensors. It means we can literally measure anything that can be measured, anywhere.

As big data grows, the issue of storage has started to cause concern. As a result, Microsoft is undertaking a pioneering new programme on renewable energy. It's sinking a data centre into the sea off Orkney: the centre is naturally cooled by the sea, delivering huge cost savings in the long term. This could well be the future of sustainable storage.



# AI AND ROBOTICS

## DISRUPTING LABOUR MARKETS ACROSS THE GLOBE

AI has long been the golden child of futuristic predictions, and recent headlines may well have indicated those days have arrived. In reality, AI is still very much in its infancy – and is often confused with the much more advanced deep data mining (some would argue there is little difference).

Regardless, with self-writing code and intuitive software already in action, it won't be long before this trend truly begins to disrupt, with current estimates suggesting that more than half of the activities people are paid to perform can be automated by adopting AI within the next 5 years.

But this isn't a warning of mass unemployment. Robots fundamentally lack creativity, and excel only at a comparatively narrow set of tasks. So simple, repetitive, mindless tasks that lead to boredom and frustration amongst the workforce almost certainly will become automated, but what this means is that your employees will be free to focus their time creatively, solving more complex challenges.

And this wider adoption of automation will demand a technically-skilled workforce. Every employee will be a data scientist. Successful businesses will adopt a culture of ongoing learning, allowing education to become a part of the working week, as employees continuously upskill in new technologies.

SYNTHETIC HUMAN TISSUE



2025

SMART CLOTHING



2026



## HERE AND NOW

Robotic precision is a huge opportunity. A robot, programmed by a surgeon, has just successfully removed a tumour in a cancer patient's neck through his mouth, avoiding permanent paralysis.

In Singapore, workers from the age of 25 can access a skills credit from the government worth \$500 to help them train. They can choose from a range of courses, and the government regularly tops up the credit to encourage continuous learning.

Google's artificial intelligence programme, AlphaGo, defeated a Chinese grand master at the ancient board game Go. And, through a process of reinforcement learning, it took the programmers at Google's DeepMind division only four hours to teach AlphaZero to play chess.



2028



2029

# 3D PRINTING

MASS PERSONALISATION –  
DOWN TO YOUR DNA

Like AI and Robotics, 3D printing is already commonplace in certain sectors, indeed you can buy a 3D printer for little more than £100 over the internet. But we are not even scratching the surface of what is possible.

3D printing allows for intricacy, removing many of the barriers of traditional manufacturing. It uses less materials and has no waste, driving costs down and removing logistical challenges nationally and globally. Time to market for new products will be dramatically reduced but most importantly, because each item is effectively a one off and not part of a production line, 'mass personalisation' can become the norm so products can be created to exact specifications at minimal cost.

Much like the revolution of personal computing in the 1980s, it is easy to envisage a situation where every house has at least one 3D printer, used for everything from electronics and spare parts to food and medicine, bringing wider access and availability to all.

## HERE AND NOW

Scientists have already managed to print human muscle tissue. It only becomes a matter of time before more complex human tissues are created. This will revolutionise medicine. For example, it would effectively remove the need for organ donation, and patients could have organs printed that will exactly match their DNA, removing the risk of rejection.

Plans to tackle living conditions in third world countries by printing 3D houses have been announced by organisations in the USA. The prototype is already standing in Austin, Texas, new houses can be printed less than 24 hours, and there are plans to roll out in South America in 2019.

3D printing is already evolving into 4D printing, where materials once printed may change their nature when stimulated for example by heat or electricity.



DIAMOND BATTERIES



2031

CHEAP SOLAR POWER



2033

# QUANTUM COMPUTING

## SCHROEDINGER'S QUBIT

**Ok, we said top 3 trends, but we just couldn't ignore quantum computing.**

Just like quantum physics, quantum computing defies the laws of the natural world.

A classic computer transmits information in bits, with capacitors switching open (1) and shut (0) in billionths of a second. Quantum computers are able to process data using quantum bits or qubits. These qubits can be both a 1 and a 0 at the same through a phenomenon called superposition.

The result is a whole new level of computing capability.

For example, researchers are excited about the prospect of using the new technology to model complicated chemical reactions, a task that even the most advanced traditional computers can't manage well. In 2016, Google engineers used a quantum device to simulate a hydrogen atom for the first time. Since then, IBM has managed to model the behaviour of even more complex atoms and molecules. Eventually, researchers hope they'll be able to use quantum simulations to design entirely new molecules for use in medicine.

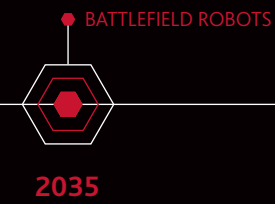
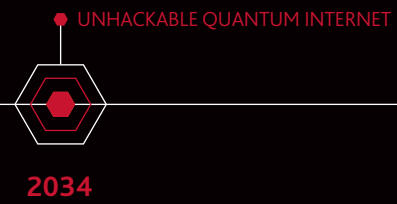
There's a lot of talk about quantum computing right now, and whilst yes it is commercially available, it isn't without challenges. One of the big problems with quantum computers is that there isn't any software, programs, or codes for them. It's hard to write code for a machine that defies the laws of physics!

## HERE AND NOW

IBM's quantum computing is already commercially available in the cloud.

Google is convinced that its quantum processor will be available in the first supercomputer this year, whilst in Israel, work is already underway to find a way for quantum and traditional computers to talk to each other

Quantum is causing issues for another key technology: Blockchain. Originally thought of as totally secure, new research now suggests quantum computers may be able to break the Blockchain codes



# 7 PRACTICAL QUESTIONS FOR THE HERE AND NOW

“Good IT investment is about making the right choices, not the easy choices.”

Mark O'Connor – CIO, IT and Networks

The journey beyond 2020 will bring its own challenges for every company and every industry; but business leaders will need to adopt the same principles if they are to succeed:

- Get digital – understand it, let it saturate your people and your business
- Invest in your people – they are your single biggest protection against digital disruption
- Act – there are no wrong moves to make except inaction

But digital transformation isn't just about strategic change: it needs organisations to take a practical approach, to get into the grassroots of the business, to start making decisions to get things done.

In this section, we have identified the 7 practical questions organisations should be asking about their digital transformation journey, and give our view on how those questions can be addressed.





● 3D PRINTING IN EVERY HOME



2037

● SELF-SUFFICIENT ENERGY ECOSYSTEM HOMES



2039

## #1 HOW DO WE TAKE BACK CONTROL?

IT has traditionally been a high stakes investment. Large sums of cash to deliver infrastructure based on maximum usage requirements and minimal agility. It forced businesses into a cycle of firefighting and asset sweating, instead of innovation.

But that has now changed. Services based models allow businesses to buy what they need, as and when they need it, scaling according to usage and only paying for what they use, when they use it.

Migrating in part or in full to hosted and 'as a service' solutions across both your infrastructure and applications will put control and predictability firmly back in your hands, allowing your business to flex and adapt to change.

## #2 DO OUR CUSTOMERS KNOW THEIR DATA IS THE NEW GOLD

Technology is opening up many new sources of customer data. But businesses need to tread carefully. Customers are becoming increasingly savvy about the commercial value of their personal data – and privacy laws are giving them ever greater control over how it is used.

Beyond 2020, empowered customers will barter their personal data in return for a financial reward, creating a value exchange. That means businesses need to make sure they gain as much intelligence from that data as possible.

AI, machine learning and customer analytics will become the driver of customer engagement over the next decade. Platforms and intelligent software will collect transactions, behaviours, and preferences to create a rich profile of an individual.

It's win-win for the customer: a personalised service at a price they are willing to pay. But it's good for your business too, because customers receiving that experience will want to stay – loyalty earned, if hard won.

SMART PROSTHETICS



2040

HOLOGRAPHIC PETS



2041

SPACE-BASED SOLAR ENERGY



2045

“We don’t keep our eye on the ball...  
We watch where the ball is going.”

Joe Hemming – Executive Officer, IT and Networks

### #3 HOW DO WE ATTRACT AND RETAIN THE RIGHT TALENT?

It’s not just about the skills of your IT team. If you want to digitally transform your business, that means digitally transforming your people too, and by 2020, your organisation may need staff with very different capabilities.

We’re already seeing a high demand for AI and analytics experts, and as organisations become more reliant on this technology, employing and retaining the best talent will be critical for future success. But not every business can afford to pay the rates of a top notch data scientist. And that is where training comes in.

As pension ages rise, the UK will have a wealth of highly experienced employees. By investing in upskilling – especially with digital skills such as coding - businesses minimise the risk of compromising their most skilled workforce.

And of course, businesses that prioritise the learning and education of their staff will be the ones attracting the best possible talent in the future.

### #4 DO WE GET VIRTUAL?

By 2020, flexible working is set to become the norm, with more than half of the UK workforce working remotely. Every team will be virtual, allowing businesses to bring together the right people to solve challenges. Teams and talent are dictated by expertise and experience, not geographic proximity.

The fluidity of virtual teams will lead to more virtual offices, with many companies shifting away from the physical in favour of the digital workspace, bringing real cost savings through reducing real estate costs.

Giving your team access to the right data at the right time is crucial. Integrating online communications tools with your CRM and document management systems will be essential in ensuring a single source of truth for your business, and preventing information fragmentation.

## #5 FAIL-FAST AND QUICK WINS – IS IT TOO RISKY?

Industry is being subjected to a relentless pace of change. Innovation is rapid, technology is quickly obsolete, markets have become disposable and there is pressure to realise return on any investment in a much shorter time scale. With the pace set to speed up even further, momentum is critical and adopting a fail-fast mentality is crucial to ensuring you don't get left behind.

Businesses need to adopt a proof of concept approach to new IT investments, using as a service models to test new solutions with users without financial commitment. By starting small and proving the concept before scaling up and rolling out across the company, stakeholder buy-in can be gained more easily.

These quick wins can keep your business agile, help to drive momentum, and encourage an internal culture open to change.

"It's not about the technology;  
it's what you do with it that counts."

Allan Jackson – Managing Director, IT Services

## #6 SHOULD WE RIP AND REPLACE?

Digital is the backbone of every organisation, with many businesses looking to future technologies to support their growth. But few can afford to 'rip and replace', or write off the legacy investments they have already made.

Instead, new investments will need to integrate and enhance existing infrastructure and help businesses realise further returns on existing investments. Cloud platforms are a great example: these can be integrated easily with existing on premise solutions to boost scalability and agility without the need for full migration.

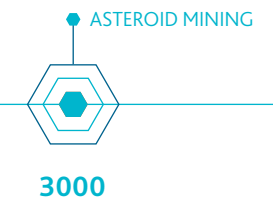
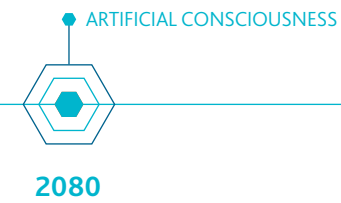
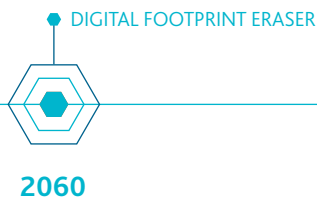
And, as we've already highlighted, because these services are consumption-based models, customers are only paying for what they use. It's a broad trend – and one that is set to continue.

## #7 ARE WE SUPPORTING OUR PEOPLE THROUGH THIS CHANGE

We've already talked about virtual working and the need to support a diverse range of IT capabilities. Both demand a lot from your IT team. That's why, just as the role of the CIO is evolving, so too is that of the IT department.

IT teams need to position themselves as "a business within a business", providing services internally to other departments that aren't just about hard tech, but about the softer side, supporting adoption and ensuring your team are using IT to its maximum capability.

These services need to be centralised by creating new in-house and management capabilities within the IT department.



## PRACTICAL TRANSFORMATION: WHY THE TIME TO ACT IS NOW

The future is clear. In this sea of digital change, continuing to operate in the same way every day is like treading water just to remain afloat. Business leaders must act to survive.

According to Forrester, over 60% of executives believe they are behind in their digital transformation. But 20% of CEOs will fail to act and, as a result, their firms will be put at risk. It's clear that our current environment favours those who take aggressive action in place of holding on to what has worked before.

In this fast-forward, digital-first world, only the forward-thinking and front-footed companies will succeed.

## CAPITA: DELIVERING PRACTICAL TRANSFORMATION FOR ORGANISATIONS ACROSS THE UK

We support thousands of enterprises in both the public and private sectors across a wide range of industries. From this experience, we've gained invaluable insights and deep sector expertise in local government, central government and the health sector through to commercial industries in finance, legal, manufacturing, telecommunications and retail.

But we understand that every business is unique and we don't profess to know it all. That's why we'll take the time to get to know your customers, your people, and your processes – only then will we know which solutions to implement.

When you partner with us, you'll gain access to our expert team and their depth of industry knowledge. You'll also gain access to the latest infrastructure and applications, technology-driven solutions, and secure networking. You'll be able to improve efficiency, reduce your service and support costs, free up your employees' time, and ensure compliance with the latest regulations.

The value that we provide is more than just technology and cost savings. It's about context; about finding real solutions here and now so you get the best long-term value from your investment.

Find out more at [www.capita-it.co.uk](http://www.capita-it.co.uk)

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