Unleashing the Mega Trends

THE
PERSPECTIVE
SERIES

New insights into the UK workplace

This report is based on an online survey of 503 technology-decision makers within UK-based private and public sector organisations

Circleresearch
The B2B experts

Foreword

Phil Mottram
Head of Enterprise,
Vodafone UK

The technology landscape continues to evolve at an alarming rate. As business leaders, we're bombarded with the next new thing.

Making sense of it all is often challenging, even for the tech savvy. And it takes the bravery of early adopters to help us learn how to best integrate the 'mega technology trends' into everyday business life. In our latest report in the Perspective series, we investigate what the Internet of Things (IoT) and Big Data really mean to UK Plc and share some fascinating insights which explain why these megatrends haven't been fully embraced yet.

At Vodafone, we've pioneered Machine-to-Machine (M2M) technology – a key enabler for the Internet of Things - and have been experiencing the benefits and challenges of the rapid adoption of smart devices, social media and more recently cloud services. The pace of change is fast and relentless and we now understand that businesses who have the right (and flexible) infrastructure in place are those who will be most successful. For example, we've helped businesses such as livestock feed manufacturer, Keenan monitor data and control performance of their dairy and beef herds by using our network's connectivity. This ultimately led to an increase in productivity and milk and beef yields for almost 10,000 farmers in 25 countries. (You can read more about this case study on page 10 of this report.)

With this in mind we're committed to providing you with award-winning thought leadership which helps you see the future, the opportunities new technology can bring, and practical strategies and tips for implementation.

Whilst this may seem the domain of big business, we've considered UK Plc in equal measure and it's clear that when it comes to these trends, there's similar appetite and challenges in relation to them across SMEs, corporates and the public sector. Our findings reveal that connecting machines, products and people, then analysing the data created can bring competitive advantage. However until consumers truly take on board the products and services that drive these trends, they won't reach a tipping point. And while the opportunity is becoming more obvious, businesses need to create data strategies that bring the IoT, Big Data, Cloud and security together.

I'd like to thank our partner Circle Research and all our contributors for their expert opinion, insights and advice – and all the organisations that took the time to share their ideas and views. We hope you find this report thought-provoking, practical and actionable.

Phil Mottram

Head of Enterprise, Vodafone UK

More from the Perspective series

The Perspective series gives you fresh insight into the world of work. Find this latest report at **www.yourreadybusiness.co.uk/perspective** and for other resources and insights **www.vodafone.co.uk/perspective**

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Length
35
pages

People
503
surveyed

The people behind it

Gareth Tancred, CEO, British Institute of Facilities Management

Gareth Tancred has been the CEO of the British Institute of Facilities Management since February 2012. As the professional body for facilities management (FM), BIFM promote excellence in FM for the benefit of practitioners, the economy and society. The Institute supports and represents over 14,500 members around the world.

Jos Creese, President, BCS, Chartered Institute of IT

With over 25 years IT management experience, Jos has held a number of CIO roles as well as a variety of non-executive director positions - with the BCS, Corporate IT Forum, Society of IT Management and as a trustee of Eduserv. He was president of the Society of IT Management in 2010 and elected president of BCS in March 2015. Jos has recently set up his own business as an independent digital consultant, supporting public and private sectors in maximising IT potential for business transformation.

Alex Hilton, Chief Executive, Cloud Industry Forum (CIF)

With 25 years of business experience in the IT industry, Alex has developed diverse knowledge and skills in several commercial roles. In 2010 Alex joined Rise (part of 1&1) as Managing Director building their Cloud services IaaS proposition. He developed Rise in to a profitable Cloud business and in 2011 they were awarded the accolade of Microsoft's world-wide Hosting Partner of the Year. In February 2013 Alex joined the Cloud Industry Forum as CEO. He had been serving as non-Executive Director since 2008.

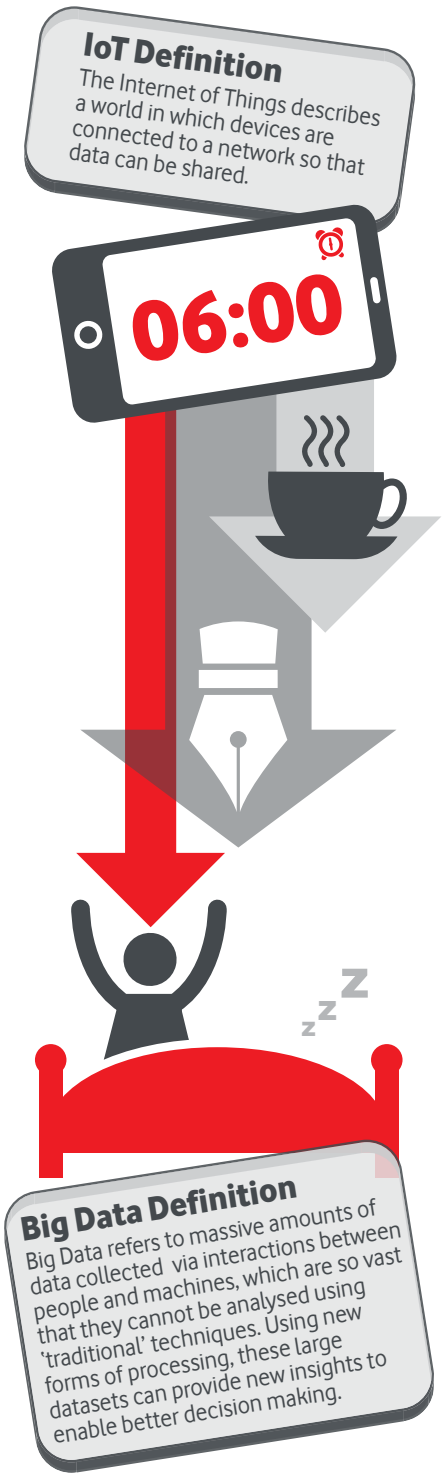
Simon Warnford-Davis, Marketing Manager, Northern Europe M2M

Simon Warnford-Davis is currently responsible for M2M Field Marketing in Northern Europe at Vodafone Global Enterprise. Simon has over 15 years' B2B and B2C technology marketing experience in enterprises large and small having working for global corporations such as Nortel Networks, Orange Business Services, and ZTE as well as start up's and for a time his own business. He has also previous worked in the consumer marketing team at Vodafone UK working with the direct online, telesales and retail channels.

Rohit Talwar, CEO, Fast Future Research

Rohit Talwar is a global futurist and founder of Fast Future Research. He advises clients around the world on how to exploit rapid advances in science and technology to drive innovation and exponential growth. His forthcoming book The Future of Business draws on contributions from over 60 future thinkers around the world to explore how disruptive developments such as the Internet of Things (IoT), big Data, Artificial Intelligence (AI) and hyper-connectivity could transform the commercial landscape for businesses of every size.

Introduction



"Internet of Things (IoT) and Big Data have been talked about in the media for over a decade, and have been identified as "top technology trends" by industry analysts like Gartner over the past few years. However, while many acknowledge the potential benefits that these technologies can bring to organisations, they have yet to have a real impact on the business landscape. With adopting lagging significantly behind other technologies such as personal smart devices, social media and, more recently, Cloud computing.

Based on research with over 500 technology decision makers, our latest "Perspective Series" report suggests that we are now reaching a tipping point for these technologies. The fact that one in five organisations are already using IoT and Big Data means that "Pioneering" and "Fast Follower" adopters are on-board. Assuming positive experiences and demonstrable benefits are spread by these groups, the mass market will follow-on in a tidal wave of adoption and investment. Again, our research shows that these positive experiences are abundant.

Digital is evolving faster than ever before

In 2015, 4.9 billion[1] 'things' from laptops to smartphones, cars to buildings, health diagnostics to security systems, will all be connected to the Internet. In fact everything will be connected – both these things and people will be constantly communicating, sharing data and providing real-time information over what is commonly known as the 'Internet of Things'. For example, your alarm clock could wake you up at 6am and notify your coffee maker to start brewing your coffee while also updating your daily appointments from your calendar.

And as data is king – 90% of all data that's ever existed has been created in the past 2 years[2] – we are seeing the emergence of 'Big Data'. Over 2.5 million terabytes being generated everyday to be exact! Organisations all around the world now find themselves inundated with data. Lurking within the mêlée can be insight of huge value; but making sense of this incredible mass of information is no mean feat.

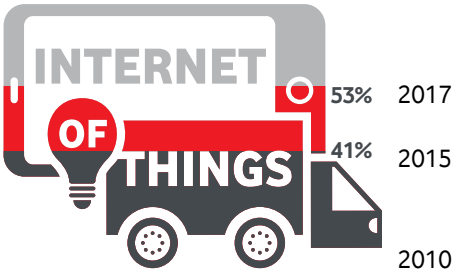
Internet of Things (IoT) and Big Data are the Mega Trends. The generators and analysers of a mind-numbing multitude of data. They are the essence of a 'digital world' and, according to many analysts, the future of all our interactions.

In this report we explore the practicalities of unleashing the Mega Trends as we uncover the daily motivations, opportunities and barriers organisations deal with as they get to grips with these critical technologies.

If you're struggling to get to grips with IoT and Big Data, don't worry – you're not alone. But as these trends continue to rise in importance it's vital that you are prepared. As well as primary research, our report combines case studies, top tips and opinion from industry experts to provide direction and strategy for navigating your way. We hope you find it valuable.

1 Gartner; http://www.gartner.com/newsroom/id/2905717
2 http://www-01.ibm.com/software/data/bigdata/what-is-big-data.html

Research



Blue-sky or tangible trend?

In October 2014, Gartner released its predictions for the top 10 technology trends for 2015 – trends that "organisations cannot afford to ignore"[3]. These included:

- The Internet of Things
- Big Data Analytics

Gartner isn't alone in this prediction. In November 2014, Datameer estimated that the global Hadoop market (a way of doing Big Data) would grow from $1.5billion (£960 million) in 2012 to $50.2 (£32 billion) in 2020 – an average annual growth of 55%![4]

But will these predictions actually come true? Two years earlier in October 2012 Gartner also released its predictions for the top 10 technology trends of 2013[5]. These included The Internet of Things and Big Data Analytics.

These technology trends have remained on Gartner's top trends list not just because of exponential growth (because they are certainly growing). Our findings show that despite huge potential, they have so far failed to penetrate much of the business landscape, with fewer than half of organisations feeling that these trends have had an impact on them over the last five years and only a handful more expect them to do so in the next two years. This adoption lags far behind other technologies such as personal devices, social media and cloud computing:

	Had a notable impact over last 5 years	Will have a notable impact over next 2 years
Personal devices used in work context	71%	77%
Social Media	63%	71%
Cloud computing	54%	72%
Unified Communications	50%	62%
Big Data	45%	52%
IoT	41%	53%

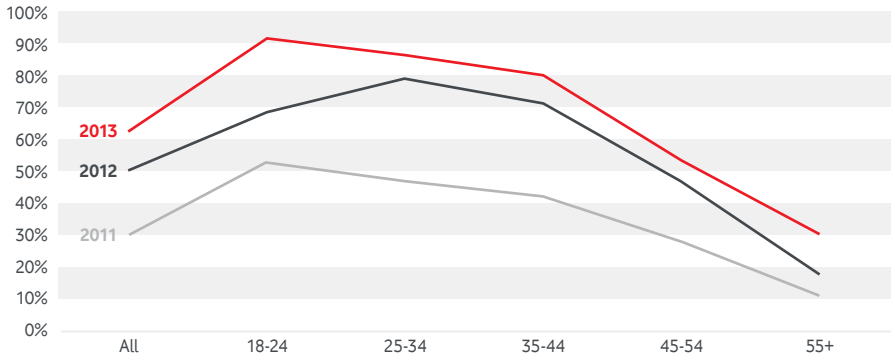
One reason for this 'lag' in impact lies in the limitations of these technology trends within the 'consumer world'. Only when these technological trends are understood by the average consumer can true adoption take place. To be able to understand what benefits the trends will offer, we all must agree on what these trends are and understand the true definition and business implications these technologies have on business.

3 Gartner; http://www.gartner.com/newsroom/id/2867917
4 http://www.datameer.com/pdf/infographics/State_of_the_Industry.pdf
5 Gartner; http://www.gartner.com/newsroom/id/2209615

What are we missing?

When it comes to technology products and services, we are increasingly seeing the rise of business-to-business-to-consumer (B2B2C) offerings – products and services that are sold to, and used by, both consumers and businesses alike.

Technologies that are mainly used by consumers – such as smartphones, social media and, to a growing extent, cloud computing – have experienced rapid adoption. Take smartphones for example. From 2011 to 2013 smartphone penetration amongst UK consumers more than doubled from 30% to 62%. This growth was propelled by 'younger generations' – in 2013, 4 in 5 UK consumers under the age of 45 owned a smartphone.



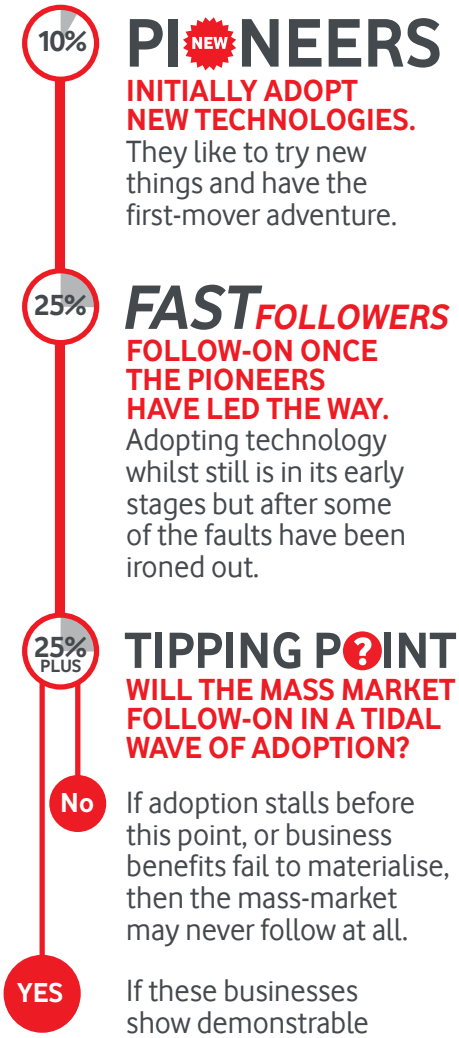
UK consumer smartphone penetration by age, 2011-2013[6]

This widespread growth in penetration of smartphones amongst consumers has had three major impacts:

1. Innovation in the functionality of smartphones has been widespread.
2. The UK workforce has become very familiar and dependent on the added benefits of smartphones leading to an ability (and desire) to incorporate them within work environments. This leads to practices such as 'Bring Your Own Device' (BYOD) in the workplace.
3. Smartphones are getting cheaper – the average cost of a smartphone in Europe in 2013 was US$419 (£270) and this is set to drop to just US$259 (£167) in 2017 – a decrease of 38%[7].

All of these factors increase the level of adoption in business environments.

6 Our Mobile Planet; http://think.withgoogle.com/mobileplanet/en
7 Statistica; http://www.statista.com/statistics/283334/global-average-selling-price-smartphones



However, the situation with IoT and Big Data is very different. Whilst consumers are increasingly using products that are powered by these technologies, they don't rely heavily on them for everyday personal activities. Businesses need to demystify these technologies and be clear about what they offer in terms of benefits.

Despite how daunting our household finances can at times appear, there is little cause to resort to Big Data analytics (a simple Excel spread sheet would more than likely suffice). And whilst smart devices around our home may now talk to each other via the IoT, we 'outsource' all the technicalities – unaware of what data is being shared, why or to what purpose – content so long as the heating is on when we return home on a cold day.

As a result, adoption of these technologies does not follow the B2B2C path of smart devices or social media; instead they are more traditional business-to-business (B2B) offerings that lack a 'consumer rocket' to propel their growth.

However, this in itself does not mean that these technologies are necessarily less 'worthy', just that their adoption will follow a different path. For technologies such as social media, mass adoption by consumers is driving adoption by businesses (B2B2C) as the twin prongs of customer expectations for organisations to be on social media and personal familiarity with the technology amongst staff combine to facilitate rapid adoption. However, in the case of IoT and Big Data, the same path is not being followed due to relatively small consumer usage. Instead, these technologies must follow their own B2B path, filtering down through different 'attitudinal segments' of businesses.

With B2B technology adoption we typically encounter a number of different attitudinal segments:

- **Pioneers** (typically around 10% of the market) will initially adopt these technologies; partly out of a mindset pre-disposed to 'trying new things' and partly in an attempt to gain first-mover advantage.
- **Fast Followers** (typically another 10-15%) will then follow-on once the pioneers have led the way. Whilst the technology is still in the early adoption stages when Fast Followers get on-board, some of the risk has been removed by Pioneers treading the path first and ironing out any difficulties.
- At this stage, we reach a tipping point. Should adoption rise to around 25% of businesses (Pioneers + Fast Followers), and assuming that these businesses show demonstrable benefits from the technology adoption, then the mass market will soon follow-on in a tidal wave of adoption. However, should adoption stall before this point, or business benefits fail to materialise, then the mass-market may never follow at all.

When it comes to IoT and Big Data, we are now on the verge of the tipping point with 19% of businesses using IoT and 20% using Big Data. Critical to these technologies making it past the tipping point though will be the spreading of positive experiences from Pioneers and Fast Followers. As we see in the next sections, the evidence suggests that these positive experiences are abundant.

Should IoT and Big Data be unleashed?

According to IT decision-makers, these trends need to be unleashed. However, there are a few questions we need to answer first.

The first question to ask is should we care that IoT and Big Data are lagging behind their apparent potential? Are they actually important trends for organisations or have they been overhyped? After all, only a minority of organisations currently have any capabilities in place to use these technologies (19% IoT; 20% Big Data).

Our research reveals:

- **IoT and Big Data are some of the most significant trends faced by organisations** (IoT 67%; Big Data 71%).
- **...and those who fail to adopt these trends will be at a competitive disadvantage** (IoT 68%; Big Data 70%).
- **As a result, organisations plan to invest in these technologies over the next two years** (IoT 66% ; Big Data 56%).

It's also quite important here to highlight that these statistics are virtually identical across both the public and private sector; and across organisations from just 10 employees to over 10,000 employees. Ok, micro-businesses (fewer than 10 employees) may feel these technologies are less applicable to them, but that aside, these are trends that are engaging the entire organisational landscape.

This is the power of the Mega Trends. They are not 'big business', 'money-cows' or public sector 'initiatives'. These trends are the great 'equalisers' of our time – open to all and allowing companies to operate on a vast scale, the realms of which were previously the exclusive reserve of only the biggest corporates. Uber is a good example of this. Founded in 2009 and with fewer than 500 employees, its easy to use tech enables everyday people to make money from driving their cars like taxis.

So the reason behind the lack of mass-adoption of these technologies does not therefore lie in any over-stated importance, but rather in more practical barriers – the impact of which are widely acknowledged, with around half of organisations saying that neither they nor their competitors have adapted well to these technologies so far.

THE FINAL PIECE TO KEENAN'S WORLD-CLASS FARMING SERVICE

Keenan is one of the world's foremost livestock feeding businesses, combining manufacturing, science and technology to maximise milk and beef production yields for thousands of farmers across Europe, the United States and Australasia.

Keenan understood that it was the accuracy and quality of the physical feed mix within the wagons that produced improved milk and beef production, more healthy cattle and improved farming incomes.

Vodafone machine-to-machine (M2M) SIMs and mobile network connectivity allows multiple devices to share information without the need for human intervention. Vodafone's network connectivity is now facilitating unprecedented levels of data analysis and control of the performance of dairy and beef herds for Keenan customers, enabling precise fine tuning of feed mixes, drawing on the contents of the largest feed efficiency database in the world.

Verified results from more than 1,000 herds in the UK and France showed that the Keenan system increased feed efficiency by 10%, while milk yields increased by 1.74 kg per cow per day.

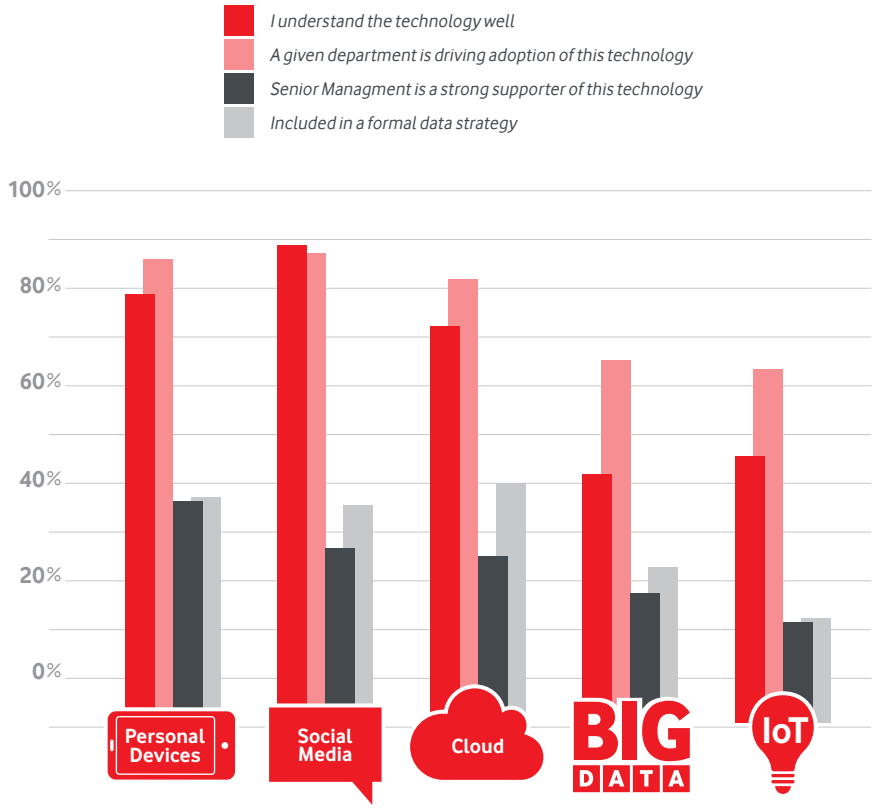
Overall, almost 10,000 farmers in 25 countries are producing more and better quality milk or beef from the same or less feed, and increasing profits by wasting less.

"Farming is a risky business with many factors out of the farmer's control, from the weather to the volatile prices paid for milk and beef. The addition of Vodafone M2M technology has further improved the quality of our service and the results are being enjoyed by farmers and consumers alike."

Michael Keogh
Group Marketing Manager
Keenan

So what needs to happen differently to unleash IoT and Big Data?

If we look at the way in which organisations are approaching trends that are having a significant impact – personal devices, social media and cloud computing – and compare this to IoT and Big Data, we see that there are four ways in which the approaches vary.



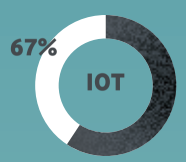
Unlocking these differences holds the key to unleashing IoT and Big Data. Compared to more widely adopted trends, there is less understanding, a lack of internal ownership/drive, lack of promotion by senior management and no formal strategy for IoT and Big Data.

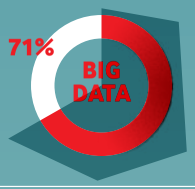
Why are IOT and Big Data blindspots for UK businesses?

Big Data and The Internet of Things (IoT) are key technology trends that will deliver significant business value in the coming years. However, businesses have been slow to adopt them. Our infographic shows why this might be and highlights how to stay ahead of the curve.

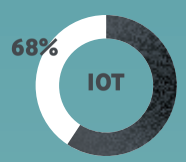
1 IOT and Big Data in the UK

These are the most significant trends faced by organisations





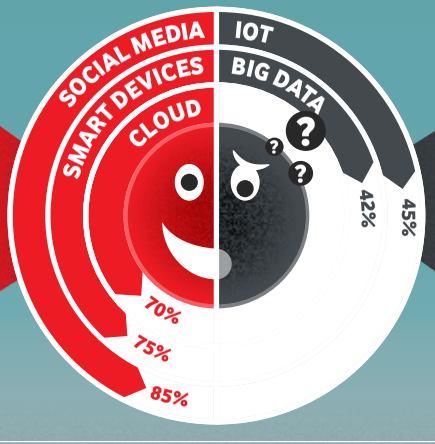
Failure to adopt will lead to competitive disadvantage



2 Business adoption hasn't reached a tipping point

3 Consumer adoption influences business uptake

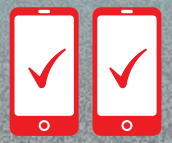
The tech trends we know and use daily in our personal lives



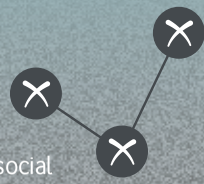
The ones that haven't been widely adopted or understood

4 How does this usage impact tech strategy?

Use of **personal smart devices** receives **2x** support of data from senior management



IoT is **3x less likely** to have a formal strategy than cloud/smart devices/social



Top tips to help businesses improve their awareness and use of Big Data and IOT

TIP 1 Give responsibility for adoption of IoT and Big Data to a specific department

TIP 2 In order to enable adoption of these trends you must get buy-in from senior stakeholders.

TIP 3 Ensure the trends are included in a formal data strategy

THE PERSPECTIVE SERIES

Source 1. Claranet Research Report, Adoption Trends in Cloud Computing 2011-2014 (www.claranet.co.uk) 2. Unleashing the Mega Trends, The Perspective series report 2015

HOW AMAZON SIMPLIFIED THE CUSTOMER EXPERIENCE

Amazon revolutionised the book world forever changing the way we can buy books. For many consumers it is now the place to purchase – whether it's the latest hardback, paperback, digital or Audio book release. And as we know it has since turned its attention to music, film, clothing and much more.

But this isn't the height of Amazon's ambitions. Its goal is to be 'the Earth's most customer-centric company for four primary customer sets: consumers, sellers, enterprises, and content creators'. To that end it needs to deliver what consumers expect today, and also anticipate what they may need tomorrow.

Amazon wanted to revolutionise the eReader market, tapping into the potential for book lovers to buy, download and read digitised content from a device even when they were on the go. To deliver a better user experience, to create the perfect integrated ecosystem of hardware, content and service, Amazon designed and built its own eReader.

Amazon wanted to drive innovation in this segment. In doing so the plan would be to allow users ease of access to their content, anytime, anywhere*. For this to work, the device would need connectivity.

Amazon needed a connectivity partner capable of delivering a consistent, global user experience. Today Kindle Paperwhite 3G users have the ability to download a book in more than 150 countries.

From a business perspective, the Vodafone Simple Out-of-Box Experience meant Amazon was able to manage the global launch from a single SIM across multiple markets and thereafter the supply chain with minimal effort - a huge benefit in terms of both cost and management.

*subject to network availability

The starkest difference occurs in the understanding of the technologies, with more than a 25% lag in understanding between IoT / Big Data and cloud computing / social media / personal devices.

This lag in understanding is in part due to the exclusion of IoT and Big Data from the 'consumerisation' of the latter technologies. With usage of personal devices, social media and cloud computing are high amongst consumers, increased understanding naturally spreads throughout society. With IoT and Big Data, the understanding has to be 'actively learnt'.

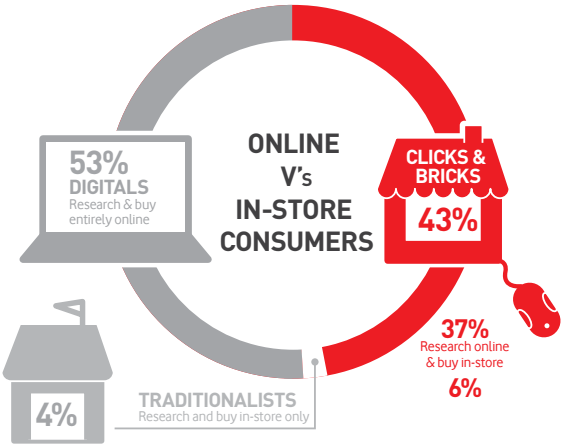
One way to encourage this learning would be to incorporate the technology as part of a formal data strategy (top tip #4). In fact, top tips #1-#3 – all of which relate to internal alignment – could potentially be galvanised by forming a data strategy. If designed well, a data strategy will have the backing of senior management, will include assigning ownership and responsibility for the technologies, and will identify training needs as appropriate.

With over half of organisations planning to invest in IoT and Big Data over the next two years, creating the right environment to facilitate successful adoption – from training to internal support to formalised data strategies – will be vital. Opportunities to benefit from the technologies are identified, a business case will need to be developed; and challenges with implementing the technologies anticipated. In sections 3, 4 and 5 we explore the practicalities of unleashing the Mega Trends.

Dissecting Big Data

The first step of building a Big Data business case should be to verify and substantiate what information you have available to work with. Accordingly, one of the areas in which organisations will be investing in over the next two years is the collection of data in a systematic way.

Currently, the primary sources of systematic data collection are financial information (48%) and customer transactions (46%) – the 'building blocks' of any successful business. However, as the drive towards digitisation continues, backed by high public demand, organisations expect to increase this scope over the next two years to also include data such as social media interactions (63%) and customer service interactions (71%).



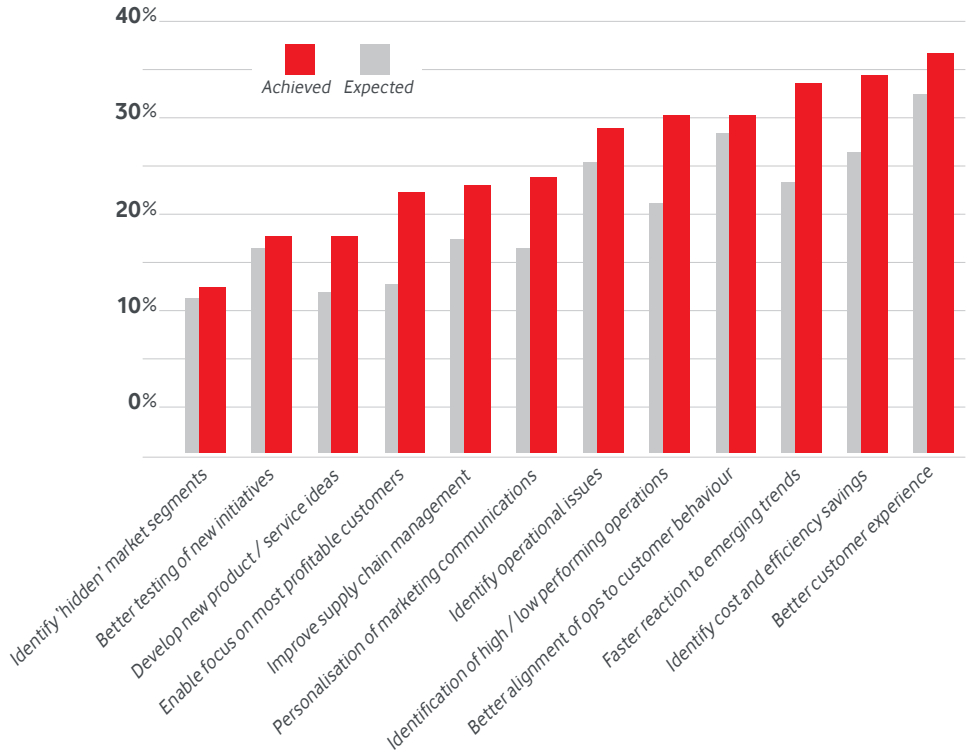
Over 85% of organisations planning to collect each type of data also have plans to analyse it to better understand their consumers' behaviour.

High demand for digitisation in private and public sector services[8]

This data is not simply being collected as part of a record-keeping exercise; instead it has an immediate business purpose. Over 85% of organisations planning to collect each type of data also have plans to analyse it to better understand their consumers' behaviour.

The business benefits of analysing Big Data are several-fold. They are also highly achievable with realised rewards closely matching the expected benefits. The Keenan case study (pg 10) shows an enhanced customer experience, identification of cost and efficiency savings, and faster business reaction times are all prevalent benefits of utilising Big Data. Other benefits worth noting are improving supply chain communications, personalisation of marketing communications, identifying hidden market segments and identification of high and low performing operations.

Benefits of Big Data analytics

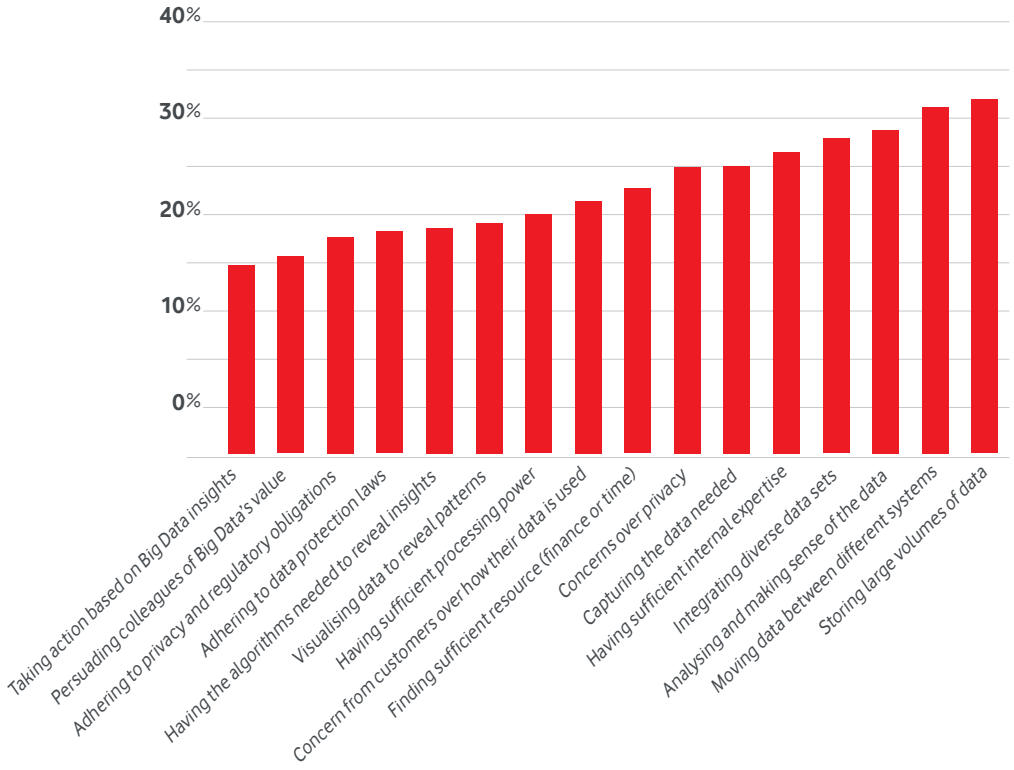


However, whilst the potential business benefits of Big Data analytics are significant, implementing the technology will not be without its challenges.

However, whilst the potential business benefits of Big Data analytics are significant, implementing the technology will not be without its challenges.

The two main challenges of Big Data are seen to be difficulties in storing large volumes of data (32%) and difficulties moving data between systems (31%).

Challanges of Big Data analytics



TOP 3 BENEFITS OF BIG DATA

- Better consumer targeting
- Enables innovation
- Greater operational efficiency

TOP 3 CHALLENGES:

- Revealing actionable insights
- Managing privacy
- Having sufficient expertise & infrastructure

Cloud computing provides flexible data storage and processing capacities that can be scaled (up or down) with need, all within a 'connected' environment that allows integration and movement of data.

IT decision-makers agree. Nearly three quarters (74%) say that cloud computing should be used to store the data behind Big Data analytics.

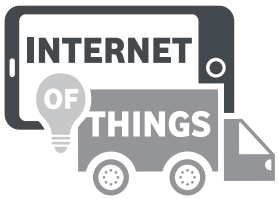
However, this is far from a current reality with the majority of organisations still storing their data on their own in-house servers (56%), or servers in a 3rd party data centre (17%). Fewer than one in five (24%) are using a cloud solution.

Whilst storage and movement of data are the two biggest challenges though, they are by no means the only ones. One in four organisations (25%) have concerns over privacy when using Big Data and believe that their customers / the public feel likewise (21%). This is not only a 'theoretical' or 'moral' concern but for many can also be a legal concern (18%).

Over the past few years, as well as recognising a vast range of benefits from digitisation, the UK public has also become increasingly aware (and in some cases concerned) about the use of personal data.

The consequences of falling foul of protection legislation can be severe - from a loss of customers to legal convictions and reputational damage - and it's therefore vital that organisations are aware of, and able to meet, both legal and customer expectations when it comes to how they use data.

TOP 3 BENEFITS OF



- Increased efficiency
- Better serve customers
- Improved productivity

TOP 3 CHALLENGES:

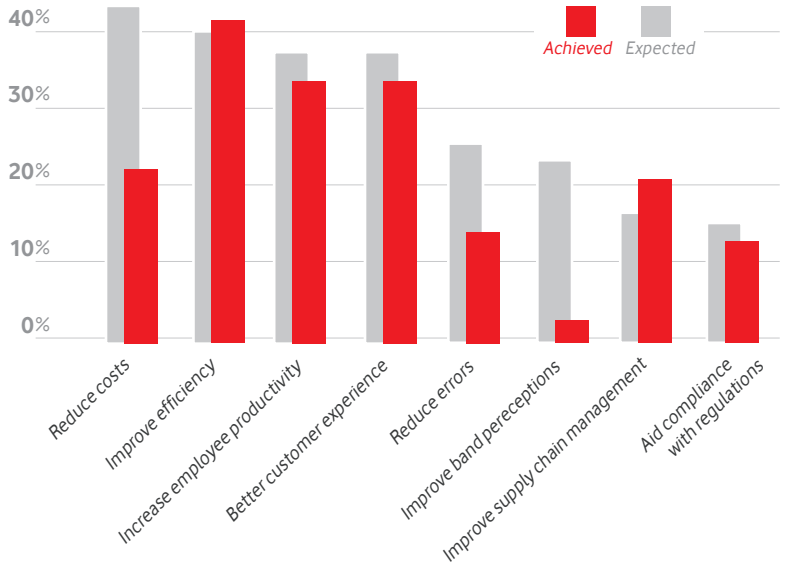
- Lack of right infrastructure & expertise
- Security and compliance
- Cost/ investment required

IoT and Big Data belong in the Cloud

The recession may be over but both public and private organisations are still facing significant budget challenges, which is the main reason why they see a benefit in adopting the IoT. Nearly half (42%) expect cost savings to emerge as a result. And whilst there will be a 'lag-time' between the investment and the materialisation of cost savings, over one quarter of organisations who have adopted the IoT are already starting to see this benefit.

In addition, there are plenty of other business reasons also encouraging investment. Improving efficiency, increasing employee productivity and creating a better customer experience are all expected benefits of introducing IoT for more than 1 in 3 organisations. Similarly these have all been realised by more than 1 in 3 of the organisations that have already adopted the IoT.

Benefits of the Internet of Everything (IoE)

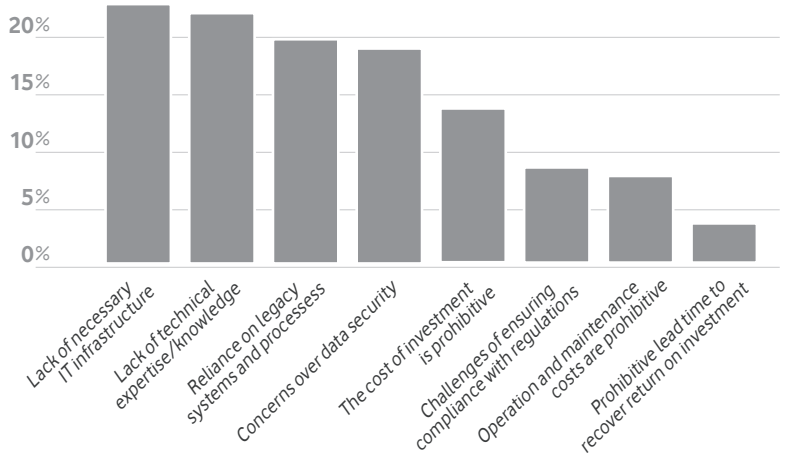


So why are some being held back?

With fewer than one in five organisations currently using the IoT, something must be stopping the rest from getting onboard.

Apart from a minority who simply feel the IoT isn't for them (27%), the two most prevalent barriers preventing adoption are a lack of necessary IT infrastructure (23%) and a lack of technical knowledge (22%) – both more prevalent than any concerns about cost of investment (16%) or lead-times (9%). The lack of IT infrastructure in the business can also be held responsible for stopping businesses from deploying more personalised services and marketing automation online.

Challenges of the Internet of Everything (IoT)



So what infrastructure needs to be put in place? According to IT decision-makers, it is vital to take a holistic approach and consider the IoT in relation to other complementary technologies rather than in isolation:

- 4 in 5 (80%) believe that data generated by the IoT should be stored via cloud computing...
- ...and that these vast amounts of data should be analysed using Big Data techniques (85%).

In section 3 we saw how cloud computing was seen to be essential to Big Data analysis. Now we see that it should also be used to store and process data generated by the IoT.

It therefore emerges that cloud computing is the glue that binds IoT and Big Data together allowing for efficient implementation. Indeed, these technologies are so closely related that two-thirds of organisations (65%) say that a lack of progress in just one of these technologies is currently hampering their abilities to use the others.

The solution to successful IoT and Big Data implementation? Build these technologies around cloud computing as it's accessible and scalable.

2015 The Cloud Forecast

Our research shows that the upswing in the use of Cloud could help reap the benefits of Internet of Things (IoT) & Big Data

CIOs BELIEVE IOT WILL:

Reduce costs (42%)

Improve efficiency (39%)

Increase employee productivity (37%)

80% Believe that data generated by the **IoT** should be stored in the cloud.

TOP 3 CHALLENGES

IOT

- Lack of necessary IT infrastructure (23%)
- Lack of technical knowledge (22%)
- Reliance on legacy systems and processes (21%)

BIG DATA

- Storing large volumes of data (32%)
- Analysing and making sense of data (29%)
- Moving data between systems (31%)

85% Believe this data should be analysed using **Big Data** techniques

CIOs BELIEVE BIG DATA WILL:

Improve customer experience (39%)

Identify costs & efficiency savings (37%)

Faster reaction to emerging trends (36%)

THE PERSPECTIVE SERIES

Source 1. Claranet Research Report, Adoption Trends in Cloud Computing 2011-2014 (www.claranet.co.uk) 2. Unleashing the Mega Trends. The Perspective series report 2015

of organisations say they completely understand what their data security or regulatory obligations are when it comes to using Big Data.

Nine in ten organisations say that it's important for anyone using these technologies to have an excellent data security strategy (Big Data 89%; IoT 90%).

Getting to grips with security

Our study confirms that security is a concern for many organisations and that this often acts as a barrier or challenge to implementing IoT and Big Data. This security concern can arise from two factors:

- Fulfilling regulatory and legal obligations
- Managing concerns from customers / the public

And these security concerns are not unfounded:

- One in two think that using these technologies will increase data security risks (IoT 50%; Big Data 49%)...
- ...so much so that organisations believe they will be likely to experience a breach (IoT 72%; Big Data 70%)...
- ...the repercussions of which they believe could be severe (IoT 69%; Big Data 75%)

Plus, organisations understand that their customers / the public are concerned too (67%).

Part of the reason underlying these concerns may be a lack of confidence on the organisation's part when it comes to understanding their obligations. Take Big Data as an example. Only 1 in 5 organisations (20%) say they completely understand what their data security or regulatory obligations are when it comes to using Big Data.

As a result, one would expect great effort to be applied to creating robust data security strategies – indeed, nine in ten organisations say that it's important for anyone using these technologies to have an excellent data security strategy (Big Data 89%; IoT 90%).

However, data security policies are generally focused on meeting regulatory obligations and preventing security breaches. That's not to say that every effort shouldn't be made to protect data, but it's more than just about securing the data.

Businesses do need to understand and respect the use of individuals personal data and ensure they have the correct permissions to undertake Big Data analytics. There are misunderstandings surrounding which data to collect, its purpose and how it's manipulated, as well as what permissions need to be in place from the 'owner' i.e the customer.

When not managed well, these customer/public sentiments can cripple organisations' plans. Indeed, the large majority of organisations (88%) say that customer and/or public concern is limiting the extent to which they pursue the adoption and usage of the Mega Trend technologies. Quite simply, organisations are missing out on potentially huge benefits due to fear not of the technologies themselves, but of perceptions.

According to organisations in our study who have experienced these public/customer concerns in the past, the solution is all around how you interact with, and explain your behaviour to, your customers. The advice they offer to other organisations primarily cover three principles:

1. **Don't cut corners** – make sure your organisation's IT security systems are in place.
2. **Be entirely transparent** with your customers/the public – make sure you're capturing the right levels of consent from individuals, and using the personal data for the purposes you require it for.
3. **Promote the benefits** – organisations can too quickly adopt a back-foot position. Instead of trying to defend using data to your customers/the public, tell them about all the great advantages it can bring and how it will make their lives better.

In the rapidly changing world of technology there will always be uncertainty and risk. The public understands this. They are not seeking invincibility, just transparency and control.

Top Tips for unleashing the Mega Trends

1. Make Big Data and IoT part of your data strategy

4 out of 5 believe that Big Data, IoT and Cloud are all interconnected and that it's important for organisations to have a single strategy that covers all of these technologies... but fewer than half (41%) currently even have a formal data strategy. Where strategies do exist they rarely cover IoT or Big Data. Concentrate on building your business case around the benefits of using IoT and Big Data to create a better customer experience, alongside efficiency savings and improved agility.

2. Get senior management to champion it

The power of data and analytics is profoundly altering the business landscape – however our research shows that senior management is not engaged in these technologies.. Finding a "champion" from senior management is critical for success – especially considering that Big Data and IoT typically span a wide range of functions. Appeal to the board by focusing on the "bottom line" benefits that can be gained – especially greater operational efficiencies, higher productivity and better customer understanding & responsiveness.

3. Provide training for everyone, even top stakeholders

Fewer than half of IT decision makers say they have a good understanding of how IoT) or Big Data work – which is clearly hampering implementation. But don't despair – there's a lot you can do to educate yourself and your organisation. Conferences, online courses, e-books and beginners guides can all be found online. Also, don't be afraid to speak to your tech/ communications suppliers to get their perspective. Why not pull the learnings together as an easily accessible wiki or cloud-based learning tool for the whole team?

4. Enhance IoT with Cloud Computing and Big Data analytics

These 3 technologies go hand-in-hand. Cloud Computing will provide an efficient storage solution for all the data produced by the IoT, and Big Data analytics offers a way to extract maximum benefit from the data you collect and store in the Cloud. Storing and moving data are the biggest challenges to reaping the benefits from IoT and Big Data, and IT professionals agree that Cloud computing is the solution.

5. Get to grips with security

When it comes to storing and using data, legal obligations and customer perceptions are complex and evolving so it's vital to take control from the start. You need to manage customer perceptions, be transparent in your use of data and position the use of these technologies in a in a positive way. These technologies hold the potential to improve customers' lives and should be positioned as an opportunity, but an opportunity that is being implemented with care.

Perspectives

Gareth Tancred
CEO
British Institute of
Facilities Management

Buildings with brains

Henry Ford, American industrialist and founder of Ford Motor Company, has a number of famous quotes attributed to him but my particular favourite is "I know that half of my advertising budget is working...I just don't know which half."

At first this may seem shocking but given the age in which this quote was originated it is perhaps unsurprising. These days things are different; I can go out for a run with my phone strapped to my arm and then on my return I can see a range of data about my performance and upload it on to social networks before I've even taken my running shoes off.

This sudden burst in technological wizardry has been boosted by the level of sophistication in hardware, coupled with cloud capability. Everything is now a device and everything has the potential to capture data which has given rise to the buzz term 'Big Data'. The challenge we face isn't capturing data, that's the easy bit. It is making sense of the streaming code in front of them and working out what decisions to make as a result.

Those managing buildings are facing up to this challenge. Smart buildings can capture an extraordinary amount of data whether that is using smart meters to monitor energy use, sensors under desks to analyse space utilisation or an app that can keep track of coffee consumption; it all helps to paint a picture of how a building, and the space in it, is being used.

This data can have a profound impact on performance as well. In our *FM and the Trust Dividend*[9] project last year we asked Facilities Management professionals what would improve the relationship between them and their service provider; 54% pointed towards a combination of real-time, trustworthy data. We found that organisations that had this were much more likely to have productive, high performance relationships with their suppliers. They also enjoyed the confidence of the board fostered through the ability to present concise, transparent data. In turn this led to these Facilities Management teams being able to focus on forward thinking, proactive projects rather than a series of cost cutting initiatives.

It makes total sense but still we don't see the technology used to its maximum extent very often, due to perceptions around the investment needed. Even when investment is made, a lack of focus on behaviour change required to adopt the new ways of working leads to a perceived lack of effectiveness. Perhaps a cynical view, would suggest that the more data that is provided increases the level of scrutiny and accountability of performance.

"The challenge we face isn't capturing data, that's the easy bit. It is making sense of the streaming code in front of them and working out what decisions to make as a result."

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Facilities Management

9 http://www.bifm.org.uk/bifm/news/7214

We need to overcome these barriers. The results this can yield are great; energy management, for example. Many organisations are taking the sustainability agenda more seriously but the more Facilities Managers I speak to the more I hear that the biggest challenge is behaviour change, rather than not having the right kit to manage energy. Being able to demonstrate the impact that behaviour is having on a shared vision and objective is critical to modify behaviours and sustain momentum.

The opportunities are endless and as the technology continues to improve I'm sure we're going to see some amazing uses in buildings and sites. One organisation I've spoken to are processing weather data and using it to automate gritting jobs in specific areas of the country. Will it be long before that gritting process is delivered by robots rather than onsite personnel? Who knows? Teams, as they become more aware of the possibilities, will be dreaming up more innovative ways of utilising the technology but at its heart is not the ability to install gimmicky devices; it must be about being able to monitor behaviour and performance to make informed business decisions.

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Gareth Tancred
CEO
British Institute of Facilities Management

Jos Creese
President
BCS, Chartered Institute of IT

How Big Data can help public services on a budget

When it comes to strategy, the public sector is often criticised for reacting to situations as opposed to taking a proactive stance. With the government's spending priorities the temptation is to become more reactive, addressing challenges when they crop up and fighting fires on a piecemeal basis.

But the kind of challenges thrown up in the public sector - reducing the cost of landfill, improving social care, reducing crime rates and helping disadvantaged families - require leaders to go back to the causes and find efficient solutions.

In the first wave of cost-cutting five years ago, public sector organisations did the obvious things: they cut non-essential activities, became more careful about waste and improved the way they delivered some services. That resulted in a lot of savings, but the reduction was way off target.

In the second phase, these groups undertook a fundamental review of their operations, making adjustments and improvements at the very heart of how they operate. The costs were reduced again, yet it was clear that spending still needed to drop further.

The public sector is still under considerable pressure. One of the most effective ways it can meet its target is through better use of information, specifically by improving the way it collects, correlates and acts upon data from the people it serves. So spending time analysing data and connecting devices will be vital components in the way we operate in years to come.

At the core of this data-driven drive for efficiency is demand management. In other words, looking at the needs of individuals and working out how we can address those needs in a better way. How can we put in place measures that address small problems before they become big expensive ones?

It also means sharing information more readily between departments and groups, because a saving in one place could also lead to a positive impact elsewhere. For example, most local councils spend a large chunk of their budget on social care for older people. By building efficiencies in this area, it's possible to reduce the burden on the NHS. And by improving the NHS, we could reduce spend on social care. Benefits are cyclical and intrinsically linked across numerous services – once one is improved, the indirect benefits are vast.

How budgets are created will be a factor. It's easy to see how separating out small pots of money and giving individual managers responsibility over how they are spent could prevent economies of scale and stifle collaborative work.

Using data, we can show budget-holders how spending some money now could lead to big saving in future. People need incentives to act, and giving them details of the cause and effect of what they do is one way to guide their decisions for the better.

"By improving the NHS, we could reduce spend on social care. Benefits are a cyclical and intrinsically linked across numerous services – once one is improved, the indirect benefits are vast."

Jos Creese
President
BCS, Chartered Institute of IT

Stakeholders are then much more likely to invest from a constantly shrinking money pot, it they are convinced it will help those costs fall in the longer term.

When people think of 'Big Data' they imagine enormous mines of information that are created and sifted into meaningful structures over large amounts of time. This is great for the long term, but right now we need to select problems that are easiest to fix and take steps to make it happen. Managers who are bold enough to take some risks and capable enough to manage the implications of their decisions will be the first-movers. My advice to local authorities has always been to deal with the low-hanging fruit first.

For example, smart metering in social residences can help people with special needs live at home for longer. This has huge social benefits – most people want to be independent – but it also relieves pressure on the public purse because professional care is a large expense.

Biometric data recorded from people with chronic conditions such as severe diabetes can be used by medical professionals to know how and when to make interventions. Channelling this data through wearable technology in real-time will let health workers make instant improvements to lifestyles and prevent the need for hospitalisation.

It might be as simple as telling someone they need to drink more water, but knowing instantly when a trigger event is occurring will improve health and lessen the need for medical care.

These are just two examples where data and smart technology in the home can help to reduce spend overall. But there are many other real-world examples of this kind of investment happening throughout the UK and globally.

The key to speeding up this process, delivering social benefits and cutting the impact on the taxpayer, will be the public's buy-in. People are nervous about giving up their data, arguably more so when public sector organisations ask for it, compared to private sector companies.

The reason for this is that people need to see a perceived benefit to the recipient. You let Amazon know, for example, your buying preferences (implicitly if not explicitly) because that will improve the service and you might get a few offers and discounts.

This quid pro quo needs to be translated in the public domain. The benefits are there in the form of a better standard of living, better services and fewer interruptions to people's daily lives. But there is a communication job to do if people are to fully grasp these benefits.

Once these messages have been delivered and accepted, public sector services will be more efficient and impactful – all delivered at a fraction of the current cost.

"Managers who are bold enough to take some risks and capable enough to manage the implications of their decisions will be the first-movers. My advice to local authorities has always been to deal with the low-hanging fruit first."

Jos Creese
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BCS, Chartered Institute of IT

Alex Hilton
Chief Executive
Cloud Industry Forum (CIF)

How Cloud is enabling IoT and Big Data

The opportunities presented by adopting Cloud computing are manifold and transformational for many organisations. The flexibility, scalability, and agility, not just of the technology, but the business processes that the Cloud can enable, have proven invaluable and go some way to explaining the escalating popularity and the rapid pace of adoption of this IT delivery model. From our 2015 UK research project, UK Cloud adoption snapshot & trends for 2016, we know that 84 per cent of UK organisations have adopted at least one Cloud service (up from just 48 per cent in 2010), and that penetration within businesses is increasing quickly. Moreover, 96 per cent of UK large enterprises have already deployed some Cloud services and most are now broadening their deployments.

The same can't, however, be said for the phenomena of the Internet of Things (IoT and Big Data). Although they are being applied in the world of business and have the potential to drive profound changes in the way that we work, they are yet to reach critical mass in the same way that Cloud has. In a sense, the links between the three make this inevitable; you can't begin to explore the value of Big Data without Cloud, and the Internet of Things depends on being able to analyse and sort vast amounts of data (in other words, Big Data).

More accurately, you can't begin to explore the IoT and Big Data in a way that is economically viable without Cloud. We have been speaking about the IoT and Big Data for quite some time and while businesses largely recognise the value of these technologies they have been, up until very recently, the reserve of only the largest enterprises with enough available capital to invest in the computing resources needed to power them. Cloud, which grants the opportunity to successfully rent these flexible and scalable resources, while avoiding the need for big up-front capital investments, effectively democratises the IoT and Big Data and lowers the barriers to entry for all organisations and SMEs looking to exploit these technologies.

As an aside, the industry may be better served by dropping the "Big" as all data must be at the core of customer engagement and business processes in large Enterprises. The Cloud has a role to play here, particularly as the power of analytics enables all businesses to have access to enterprise class technologies.

A few years ago it was difficult to have a conversation about Cloud without someone immediately asking the question, "But is it secure?" I'd contend that we've somewhat moved on from that. Yes, people are concerned about the security of their data, but Cloud isn't seen as inherently less secure than on-premises IT; more something that should and can be managed. Indeed, if Cloud weren't secure, it wouldn't have reached its current heights.

"Indeed, if Cloud weren't secure, it wouldn't have reached its current heights. But ultimately this is not strictly a Cloud security issue, but a data security one, and it's important to get the fundamentals right."

Alex Hilton
Chief Executive
Cloud Industry Forum (CIF)

But ultimately this is not strictly a Cloud security issue, but a data security one, and it's important to get the fundamentals right. Our advice with any Cloud deployment is to understand what is needed, and why. Is local sovereignty important, purely for confidence or for regulatory requirements? What accreditations are important to you? Make sure you are asking the right questions of your Cloud provider: Where will the data be stored? Who has access to it? What security mechanisms are in place to protect it? Have you certified against a relevant code of conduct to demonstrate your credentials? Good Cloud security starts with choosing the right provider, which is why we established the CIF Code of Practice for CSPs to help in the selection process.

Arguably, businesses pursuing IoT technologies should prudently consider security to ensure they are managing vulnerabilities. More internet-enabled devices and end points equates to more avenues from which to harvest data. Manufacturers of IoT devices, and users of them, will need to take a 'belts and braces' approach to security if these technologies are to take off.

As with any IT delivery project most time should be spent on the planning and design phase but only once there is a clear end goal in mind. Big Data, IoT and Cloud are unquestionably the next generation of technology that many businesses will be moving towards, but as with all technology projects it has to be based on solving a real business problem in a service driven environment. Don't look to shoe horn a solution into place, rely on your accredited service provider and work collaboratively. 56 per cent of end users we surveyed said Cloud brings them competitive advantage, so when further combining with Big Data and IoT there is real differentiation available to deliver new and innovative solutions.

Coaching and mentoring as styles of leadership and management are buzz words at business schools all around the world in the twenty first century. Good leadership used to be thought to exist in the character of the leader. Contemporary thinking holds that it resides only in the quality of the relationship between the leader and the led. Received wisdom now believes that great leadership listens and responds to the aspirations and concerns of employees. It understands that true engagement cannot be 'pushed' down the line, but has to be 'pulled' together with the individuals involved. This does not make leadership skills any less important in the steering of a company to success – only that those skills must be different and tailored to the demands of gen flux if the value that they can create is to be harnessed.

Leaders who do this well create a culture that allows ambiguity, is excited by change and allows mistakes. Most importantly of all they create a culture in which learning is an everyday occurrence, where organisational agility provides dynamic competitive advantage keeping both gen flux individuals, and investors happy.

"56 per cent of end users we surveyed said Cloud brings them competitive advantage, so when further combining with Big Data and IoT there is real differentiation available to deliver new and innovative solutions."

Alex Hilton
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Simon Warnford-Davis
Marketing Manager,
Northern Europe M2M
Vodafone Global Enterprises

Why now is the time to invest in machine-to-machine

The Vodafone M2M Adoption Barometer report[10] is an annual report which provides a robust impartial look at the Internet of Things (IoT) marketplace and how machine-to-machine (M2M) communication is transforming the way this technology is impacting on businesses and consumers now, and in the future.

The latest report, which was published in the second half of 2014, provides excellent insight from a global survey and includes insights from one of the world's most respected M2M analysts, Matt Hatton from Machina Research who comments "It is particularly interesting to see that the idea of using M2M to get 'greater competitive advantage' is gaining significant currency." One of the key 'take home' points from the report is that M2M is maturing. It is now increasingly being used to improve customer-facing processes, as opposed to internal processes, so delivering better, more consistent service and increasing differentiation to create a competitive edge.

A key reason IoT or M2M is receiving an increasing amount of media airtime is the benefits M2M brings as the cost of technology and communications decreases. At Vodafone we see the return-on-investment (ROI) as an important factor as to why an organisation might consider an M2M solution and this is usually very measurable. For example, we have a customer that provides animal feed machinery to farmers. Over the years across its customer base it has built up a vast amount of data which is analysed and as a result the feeders are programmed to provide the cattle with the optimum level of feed. This reduces wastage and unnecessary cost and optimises the farmers ROI in terms of milk or beef production. The data is literally communicated to the machinery in the field via the Vodafone network from their livestock feed control centre. With over 10,000 farmers across over 25 countries using this service it's clear to see the benefits outweigh the costs. Verified results show that the feed system efficiency is improved by 10%, while milk yields increase by 1.74kg per cow per day.

Other areas where M2M is prevalent is in smart meters for domestic homes which offer benefits such as cost reduction and operating efficiencies for the energy providers such as not having teams reading meters coupled with more accurate readings to consumers saving energy as they become more in control of their energy management and aware of energy wastage. Smart cities are also currently much discussed. With governments, both national and local, focussing on the energy and resource saving aspects as well as efficiency gains and the all-important cost savings whether it be through smart street lights, more efficient refuse collection or public parking management.

In an increasingly competitive commercial environment businesses of all sizes are looking to operate efficiently and find competitive advantage. M2M certainly provides the answer in many guises. Vodafone is the world leader in M2M and one of the reasons for this is our global SIM supporting M2M capabilities and applications across the globe. By providing a global SIM that is pre-provisioned and ready to use, we can significantly reduce the cost in operating M2M solutions from billing through to 'out of the box 'provisioning which is an important consideration for enterprises of any size. We have many smaller but ambitious customers benefiting from the global SIM approach as they grow internationally.

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10 The Vodafone Barometer can be found at: http://m2m.vodafone.com/cs/m2m/insight_news/2014-07-02-the-m2m-adoption-barometer-2014

Vanmoof is a Dutch firm manufacturing urban commuter bikes which is expanding internationally. Its e-bikes include GPS connectivity provided by Vodafone with SIM's integrated into the bike frame, which allows stolen bikes to be tracked anywhere in the world. As a result Vanmoof stands out from the crowd with this novel approach which also boosts its marketing and brand credibility. "We're a start-up, with a small marketing budget. We need to work with partners who can bring something extra." Says Niels Bark, Sales and Marketing Manager, Vanmoof.

If there are takeouts as to how to benefit from M2M - delivering a better, more consistent service and increasing differentiation to create a competitive edge - the Barometer Report summarises these succinctly:

- Take a good hard look at your own readiness for M2M. Do you have the strategy, culture and technology maturity to make it pay dividends?
- Think not just about how you can use M2M within your business, but also how it can transform customer-facing processes.
- Leverage the more mature horizontal applications of M2M (such as fleet management and inventory management) where possible, and use specialist providers to make sure your solutions are well integrated.
- Actively pursue C-level support, and embrace the cultural and process changes as well as the technological. Consider M2M within the context of other major technology transformations, particularly big data. M2M and analytics go hand in hand.

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Marketing Manager,
Northern Europe M2M
Vodafone Global Enterprises

Rohit Talwar
CEO
Fast Future Research

Will everything be smart in 5 years time?

The Internet of Things (IoT) is moving rapidly from fantasy to fact. Businesses are beginning to see the value of embedding sensors and intelligence into a range of objects from manufacturing equipment and vehicles to clothing and wearable devices. People are starting to see the value of a hyper-connected environment and the data it provides. To go mainstream, as with any new technology development, organisations are looking for proof of value. This means finding case examples from the marketplace and a willingness to experiment with potential uses within the organisation.

In our forthcoming book on the *Future of Business*, we highlight a range of 30 sectors, which will represent at least fifty percent of the global economy in the next 10-20 years. These include infrastructure transformation, smart cities, intelligent transport, alternative energy, smart homes, and green construction. The IoT will be a sector in its own right and play a major role in the development of all 30 sectors.

Any technology that has transformative potential also creates a sense of risk. Despite an accelerating pace of change, firms still want to make sure they are not creating risk for their customers or themselves. Leadership has to be willing to explore the potential opportunities and risks, do rapid experiments and drive through solutions. In the past we wrote detailed strategies for each new technology we wanted to pioneer. Now the focus is on developing proofs of concept, testing them to see what benefits and value they could bring and then evolving to a strategy through continuous and rapid experimentation. This approach reduces risks and increases management buy-in.

By 2020, we expect that the pace of development will have been so rapid that we'll be talking about the Internet of humanity with literally everything having the potential to be connected. There are a wide range of potential applications emerging such as finding lost objects around the house and implanted health monitoring devices that track everything from blood sugar to oxygen levels. As we build in artificial intelligence (AI), the scenarios of what might be possible grow ever larger and more imaginative. On the horizon are the fridge that re-orders when it needs to restock, and cars that identify when they need maintenance and book themselves in to the garage.

The Internet of humanity will tie together mobile, wearable and even implanted objects, connect us to our environment and perform smart analytics using artificial intelligence solutions residing in the cloud. By 2020, we will increasingly expect and demand this kind of functionality in the same way as we already assume that the quality of video playback and voice recognition will continue to improve on our smartphones. Firms might use IoT connected devices to monitor employee vital signs – with a darker potential of spotting when performance and concentration levels fall.

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CEO
Fast Future Research

Some firms may continue to show reluctance to experiment with and adopt IoT solutions and be concerned about the costs and data management issues. A big worry is how to manage and exploit the volumes of data thrown off by a highly connected, multi-sensor environment. This needs to be thought through early in any IoT project. As the benefits of IoT become clearer and the solutions become easier and cheaper to adopt, penetration of IoT into business could be widespread and accelerate quite dramatically. Technology vendors and service providers will continue to bombard the marketplace with research and evidence that highlight the transformative value and potential payback of IoT.

It is easy to get lost in the marketing hype and breathless enthusiasm of the IoT community. We think it's very important to do the research, understand how IoT is being deployed, and learn about the benefits, costs, risks and implementation challenges. This is true for large and small enterprises alike. In big firms, responsibility may be handed to specific teams. In small to medium sized firms, the leadership will need to provide a driving role, encouraging a willingness to develop smart solutions to current problems and emerging opportunities. Mindset is key here - creating a willingness to think the unthinkable, experiment, and fail fast and cheaply.

Digital inclusion is critical and, while we've had great success, we're just one organisation among many who are making headway. Fantastic charities, often with the support and investment from businesses and Government departments, like Apps for Good and Code Club are working with schools around the country, teaching thousands of kids how to create a digital response to real-life problems and opportunities. We are also proud to be partnering with the BBC on Make it Digital - a year long initiative to inspire a new generation to get creative with coding, programming and digital technology. We also welcome the recent inclusion of coding into the curriculum – but would like to see this go further and embed digital skills across all subjects – from Maths to English to the arts – in a hands-on manner, learning in an immersive way. Government can also do more to provide a roadmap for future improvement – signposting where the vulnerabilities lie, and co-ordinating and connecting businesses and charitable support to address them – ensuring that all groups of society, from north to south, urban to rural and young to old are covered.

While there's a lot to be positive about, as shown by the finding in this report that 16% of households remain unconnected, more needs to be done. Creativity and innovation are key competencies for UK Public Companies and technology is critical to maintaining and strengthening our economy and our position in the world. That's why we invite everyone – individuals, business and government – to join us in ensuring that digital skills are embtedded into our creative and entrepreneurial culture now, and for the years to come.

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Final thoughts

The Mega Trends are coming. For some they've already arrived. But whilst 'pioneers' in the field continue to reap the rewards that mass data collection and analysis has to offer (think of Amazon and their personalised recommendations based on the items you've already viewed for example), others are approaching the trends much more hesitantly, afraid of burning their fingers if they reach into the cookie jar.

Holding them back are three factors:

1. A lack of infrastructure
2. A lack of knowledge
3. Concerns about what the public will think about privacy and security breaches

Each of these barriers are sizeable, but the opportunity is too great to pass up. The future is in joined-up data. From collecting information via the IoT, to storing it on cloud solutions and analysing it via Big Data techniques, IT decision-makers are adamant that organisations must adapt or risk being left behind.

So infrastructure and consumerisation barriers must be overcome by replacing legacy servers with cloud computing; knowledge gaps plugged by up-skilling staff, hiring fresh talent or outsourcing activities; and public concern conquered by taking a transparent, honest and positive approach. a general understanding of them amongst the public to increase adoption.

In short, if you want to make IoT and Big Data work for you, you need a cohesive data strategy – knowing what you'll do with it and why. You also can't do Big Data without IoT, and vice versa. These two trends need each other to let businesses reap the full benefits and because of that, cloud computing is the glue that holds them together. And finally, macro-consumerisation and exposure to technology that incorporates these two trends is essential to ensuring adoption for the future.

If you're struggling to get to grips with the Mega Trends, don't worry – you're not alone. But as these trends continue to rise in importance it's vital that you are prepared. We hope that this report is useful in helping to provide direction and strategy for navigating your way.

References

1. Gartner; http://www.gartner.com/newsroom/id/2905717
2. http://www-01.ibm.com/software/data/bigdata/what-is-big-data.html
3. Gartner; http://www.gartner.com/newsroom/id/2867917
4. http://www.datameer.com/pdf/infographics/State_of_the_Industry.pdf
5. Gartner, http://www.gartner.com/newsroom/id/2209615
6. Our Mobile Planet; http://think.withgoogle.com/mobileplanet/en
7. Statistica; http://www.statista.com/statistics/283334/global-average-selling-price-smartphones
8. Vodafone Perspective Series – Connected Britain
9. http://www.bifm.org.uk/bifm/news/7214
10. The Vodafone Barometer can be found at: http://m2m.vodafone.com/cs/m2m/insight_news/2014-07-02-the-m2m-adoption-barometer-2014

All statistics and reports referenced by our expert contributors are included in this report in good faith.

Methodology

Methodology

This report is based on an online survey of 503 technology-decision makers within UK-based private and public sector organisations. Respondents to the surveys were representative of the UK adult population by age, working status, annual household income and geographical location. The surveys were conducted by independent specialist B2B research agency Circle Research.

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