What's Hot in 2020 Technology trends and a look back at past forecasts.

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What's Hot in Technology: 20 for 2020

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A look at technology in the forefront in 2020.

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Introduction

Until relatively recently, technology was often confined to a given system, process or silo. Tech often sat at the edge of the business as an addendum to strategy only for executives to find this too slow, rigid and unconnected for the demands of digital business. The value of digital and intelligent technology lies in its ability to connect people, objects and data, and by so doing, create new ways of working, new service propositions and business models. We now sit at the tail-end of this digital era, yet much of its impact is yet to be felt as industries belatedly adjust.

The emerging era, marked by pervasive and ambient connectivity together with artificial intelligence will rewrite the foundation of many of our assumptions about business. It has been said that '...everything invented in the past 150 years will be reinvented using artificial intelligence within the next 15 yearsⁱ.' New competitors, collaboration partners and platforms will help drive this change. If anything can be certain, it is that technological change will compel incumbents to redefine themselves as consumer-centric businesses. Industries, from banking and insurance to retail and even healthcare are finding that this often necessitates not just new talent and skills, but whole new organisation models.

In the post-digital age, technology is no longer an addendum to strategy; it must be aligned, or bound, with organisational and market change. Tech strategies are increasingly aligned with corporate strategy, whether with the IoT, internal use of A.I or in rewiring the IT function. However, '...we're no longer in a place where we can pick even the top three or top five technologies...you've got to look at everything simultaneouslyⁱⁱ.' This represents a different way of thinking from even a few years ago and will severely test the strategies and competencies as we enter an age of exponential change.

Many of our organisations, as well as laws and regulations, seem ill-prepared, however. A.I regulation, for example, is set to become a hot topic, both ethically and economically. 2020 will see a raft of new opportunities and perhaps the last chance for companies to develop resilience and future proof their cores. 75 percent of execs agree that their organisations will need to make significant changes to keep up with rising customer expectationsⁱⁱⁱ, more than one-third of the skills deemed essential for today's workforce are forecast to have changed in just a few years^{iv} while global tech execs report that the rate of industry change today is 1.6 times greater than just five years ago^v. If, in these uncertain times, we can be sure of anything – it is that the rate of change will again increase as we enter 2020 and beyond.

Post digital - where next?

As we move toward the 2020s, digital technology is becoming table stakes for most industries: Forrester, for example, while not down playing the importance of digital has branded digital services '...the least important^{vi},' – or decisive - factor when it comes to banking customer loyalty.

That does not mean that the digital era's impact will quickly dissipate, but it is no longer the driving force of innovation. \$1.25 trillion is set to be spent on digital transformation initiatives globally in 2019, and that number is forecast to climb to \$1.97 trillion in 2022^{vii}. The importance of digital cannot be downplayed, but very little of this investment will redefine industries or business: being digital is now the minimum needed for doing business and no longer a source of differentiation or competitive advantage^{viii}.

What does it mean?

As we enter 2020, the intelligent age is upon us, but the age of 'linear' tech change may also be at an end. Given a range of changes across multiple domains – bio, nano, quantum and A.I - we are entering the era of exponential change. At the same time, the main role for bridging discovery and commercialisation is increasingly falling to private concerns and away from government. Twinned with the range of technological changes, this promises to complicate attempts at regulation of what promise to be powerful technologies. Wired proclaims that '...biology will be the next great computing platform^{ix}.' The post-human age, the intelligent age and the biotech age are all emerging – how they interact with not only each other but also our ill-prepared systems, will help define multiple paths of change.

Equally, as headlines relating to quantum supremacy attest, those in the forefront in quantum computing are already battling for leading positions and the ability to shape development within that space. The importance of this should not be overlooked. It has been stated that '...quantum computing, not AI, will define our future. It's the 21st Century space race^x.'

- Companies should concentrate on their digital transformation if they have not already done so – many competencies and ways of working will provide foundational to the intelligent era.
- As future leaders emerge in a range of key technologies, companies must assess what role they can play.

Leaders catch up with tech (or, change management)

While most firms believe they're 'picking up on signals of change,' that might disrupt their lines of business, 42 percent admit that they're unable to act on those signals^{xi}. 54 percent of executives say that having a corporate culture unable to embrace digital technologies is one of their biggest barriers^{xii}.

As digital fast become stable stakes, with an emerging intelligent era compounding the effect of digital change, 2020 is the time for a new change management paradigm.

What does it mean?

70 percent of transformation efforts fail because '...the organisation never wins the employees' hearts and minds...you need to make sure that your workers have the skills and confidence to embrace the change with you^{xiii}.' Less than one in ten managers believe their leaders have the skills to lead in the digital economy^{xiv}. These issues are unsustainable at a time of increasing change --indeed, 68 percent of executives say that their organisation needs new leadership to compete in the digital age, let alone the intelligent onexv. Legacy systems simply won't cut it with fifty years of digital transformation happening in the next five years^{xvi}, whether from a technical, cultural, organisational or managerial perspective.

'Leaders and companies that put people and culture at the forefront are

more successful at managing the complex challenges of transformation^{xvii}.' Arguably the main challenge for a given company is whether they have the social, political and educational imagination to adapt and effectively use these technologies, or not^{xviii}.

- Leaders and managers must learn to craft and work within structures and architectures that enable professionals to flourish.
- Change management skills are vital for those wishing to drive change, and the rate of required change suggests that new paradigms will be needed (e.g. for working alongside robots and A.I)
- Organisations should have a formalised programme offering hands-on approach and guidance for professionals looking to stay relevant and add new sources of value.
- Invest in skills and learning across all levels of the organisation, especially management.

Rewiring IT

It is forecast that by 2022, 70 percent of IT organisations will have transitioned from builders and operators to designer and integrators of digital solutions that come to define every product, service, or process^{xix}. As a result, everything as a service (XaaS) will continue to grow – indeed it will need to as two-thirds of organisations typically bypass IT when procuring new tech yet 43 percent of firms still hold IT accountable if such initiatives encounter problems^{xx}.

What does it mean?

By incorporating the cloud's rapid deployment model, XaaS could also prove an effective driver of new revenue for innovative retailers^{xxi}. A Deloitte survey reveals that 76 percent of all businesses see XaaS as assisting in their rapid design and deployment of new services^{xxii}: A useful secondary impact, from the CIOs perspective, is that these changes can help shift the notion of IT as a cost-centre towards IT as a driver of digital business strategy and potential source of new revenue streams. Currently, one third of businesses don't recognise IT as a value creatorxxiii.

The boundaries between tech and strategy are fading, and thus increasing the need for a powerful and fluid IT capability. This more embedded, connected, and adaptive IT approach will gain momentum in 2020 - particularly as firms address the opportunities and challenges of emerging technologies running into legacy structures^{xxiv}.

With 90 percent of businesses not considering themselves IT resilient^{xxv}, the need to rewire the role and composition of IT, not to mention its relationships with other centres within the business such as marketing, is pressing and will become a key feature of successful digital transformations in 2020.

- IT organisations need workforces that are capable of change and adaptation, as do wider business organisations.
 CIOs will have central roles in helping create learning organisations.
- The CIO, and IT more broadly, has a significant role to play in helping establish an organisational culture of change and initiative.
- Organisations need to consider how they transition IT in light of the broader shift away from process driven structures and towards consumer oriented ones. This is being driven through the merging of functional areas and coordinating resources to deliver new and innovative products and services at pace – IT must be central to these changes.

Intelligence as a Service

In the digital era, as-a-service propositions have become well established and in 2020, such propositions will also usher in the start of the intelligent era. The hype of A.I is well established, but its mass market emergence is likely to be initially commoditised, with the truly revolutionary market impacts concentrated in relatively few organisations.

What does it mean?

67 percent of large companies expect to have live A.I initiatives in 2021, up from 14 percent in early 2019^{xxvi}, yet the talent gap in the emerging intelligent era is as severe, if not more so, than that in the digital era. Indeed, the gap between organisations A.I ambitions and abilities remains sizeable and the prospect of designing and deploying organisations own AIbased systems will remain too expensive and challenging a proposition for most^{xxvii}.

It is therefore likely that platforms providing as-a-service options will flourish in providing a widening range off the shelf A.I solutions. This may mean enhanced efficiency and even customer experience, but if adopted at a large enough scale across industries, would not necessarily confer comparative benefits. That doesn't necessarily mean that an off the shelf solution will work equitably across different organisations, however. It is important to consider the processes into which such solutions are grafted or added. As noted by Gary Kasparov, a 'Weak human + machine +better process > a strong human + machine +inferior process^{xxviii}.' Somewhat ironically the nature of much imminent A.I adoption will put more emphasis, not less, on overall strategy and how the solution is aligned with it. In both 2020 and up to 2030, A.I will redraw how companies work, how they interact with each other especially with regards to the value chain - and how knowledge and expertise are shared.

- Map out where A.I can be used and where it is most appropriate given internal structures and processes.
- Ask whether A.I can streamline, transform or else complicate existing processes.
- Develop relationships with third party providers.
- Prepare the workforce for working within and alongside A.I driven structures and processes.

A new media paradigm: mixed reality

While online has reinvented the broad media landscape, engagement technologies such as virtual reality and augmented reality will give rise to immersive experiences that create new and increasingly personalised engagement. Mixed reality has been referred to as '...the next gen computing platform,' that could redraw media, engagement and marketing.

What does it mean?

By the end of 2019, Google is set to control 37.2 percent of online ad spend in the U.S, followed by Facebook with 22.1 percent and Amazon with 8.8 percent^{xxix}. The key question is to what extent could new mediums, such as extended reality impact this in the future? With predictions of VR mediums declining in price by about 15 percent each year, this could shift dramatically in the future^{xxx}.

71 percent of VR users exposed to immersive VR ads are deemed more likely to purchase goods^{xxxi}. Likewise, 63 percent of consumers are interested in using VR to preview products^{xxxii}. The potential for this to impact media and marketing would appear well-known by executives, 82 percent of whom expect substantial AR-driven redesign of business processes^{xxxiii}. According to Goldman Sachs, virtual and augmented reality together form an \$80 billion market by 2025^{xxxiv}, and as both a communications and potential sales medium, mixed and extended reality could rewrite the dominant media and marketing paradigms. This could happen well in advance of 2025, with 68 percent of businesses believing mixed reality to be an important tool to drive their company's strategic goals over the next 18 months^{xxxv}.

- Assess how extended and mixed reality could be used as a medium for engagement and marketing, and what partnerships may be needed for this.
- Assess the potential for these technologies for internal communications. On average, 21 percent of worktime could potentially be augmented by the use of extended reality^{xxxvi}.
- Build new talent pipelines: World Economic Forum cites the gaming industry as one possible talent pool given digital skills such as virtual or augmented realities^{xxxvii}.

Intelligent HR

Four out of five CEOs bemoan their employees' lack of essential skills and identify that as a threat to growth^{xxxviii}, with skills mismatches already impacting over half of all employers^{xxxix}. It is estimated that by 2030, 1.4 billion workers will not have the right skills for their jobs. This constitutes what is arguably the most significant operational, and perhaps strategic, threat to business.

What does it mean?

41 percent of HR executives are confident that their departments are sufficiently versed in advanced technologies, yet only a guarter of other business leaders share the same confidence in their HR departments tech proficiency^{xl}. Predictive analytics hold the potential to change the HR paradigm, in terms of both identifying and remedying skills gaps, learning and retention of employees. Change is imminent with 62 percent of execs saying their companies are already using tech to collect data on workers^{xli}. The more these systems benefit the individual worker the better.

Accenture alone spends \$1bn training staff in-house^{xlii}, with its Job Buddy programme having helped to retrain almost 300,000 employees over the four years to January 2019. The program assesses which roles are most likely to be automated, offers advice on which adjacent roles can be learned within the company and provided relevant training. Within 18 months of launching the pilot, 85 percent of employees for whom it was made available had used the system to assess their current job and enroll in further training^{xliii}. With 76 percent of executives believing internal talent mobility is important, but only 6 percent of companies believing they are excellent at moving people from role to rolexliv, such programmes are likely to become more popular. Indeed, some surprising linkages may be made; using AI, CareerBuilder figured out that veterinary technicians could make good prison guards^{xiv}, for example.

- HR needs to be empowered to drive strategic change. Organisations across all industries are aware of the premium talent is placing on learning and upskilling. It stands to reason that an intelligent HR department is a key juncture in providing what workers want.
- There needs to be a formal skills and jobs matrix that enables companies to both retrain existing workers and act as a magnet for future talent, whether built in-house or in partnership with others.

A.I regulation

From being seen as an onerous burden, the nature, breadth and impact of regulation is set to become a key strategic facet for many organisations. Those with strategic foresight will look to pre-empt and in conjunction with others, help shape the direction of regulation to come.

What does it mean?

Gartner predicts that '...by 2023, a selfregulating association for oversight of A.I and machine learning designers will be established in at least four of the G7 countries^{xIvi}.' Indeed, the EU Commission digital department has already recommended a regulatory framework for A.I that would set transparency obligations on automated decision-making^{xIvii}. Could Artificial Intelligence be the next GDPR? 2020 could be a key battleground in shaping the discourse in which future A.I develops.

'Wired' notes that '...intelligent systems at scale need regulation because they are an unprecedented force multiplier for the promotion of the interests of an individual or a group^{xlviii}.' Digital reality will also likely need some regulatory guidelines^{xlix}, requiring business and government to work together. MIT Sloan believes that '...the first country to figure out the best way to regulate the broader tech industry could become the focal point for the next chapter of the world's digital revolution^I.' A lot is at stake – some advocate for forms of regulation that reach into actual taxation of robots much like income tax works today for humans.

The likely most immediate impact of any new regulation for individual organisations will be to increase cycle times for A.I and ML development and deployment^{li}. This may increase costs, raise developers' salaries and impact organisations tech strategies.

- While waiting or planning for the future, organisations of all types would do well in policing themselves. A Stanford study, for example, found that companies that try to fix problems on their own may sidestep more onerous regulations in the future^{lii}, not to mention avoid damaging the trust of consumers and ceding brand value.
- If the future of business is trust, self-regulation with regards to A.I is a must in developing a future-proof product and service.
- Work with authorities or other interested parties using the sandbox testing format.

Weaponised data, A.I & Cyberttacks: standard business practice?

We noted in our 2018 What's Hot entry of 'Data becomes toxic,' that '...what data we hold and how we use it will be the life and death of our companies.' Prompted not just by GDPR and the possibility of consumers reestablishing control over their data, a darker possibility is also emerging – that of weaponized data, A.I and even cyberattacks emerging as corporate practices against competitors.

What does it mean?

There seems to be an assumption that deepfakes, fake news and the wave of trust related issues that have developed prominence are in some ways ring-fenced to politics. The business world has remained somewhat secondary in most analysis of what weaponized data and A.I mean for society, aside from the financial cost of cyberattacks. Where it is often mentioned is through the implication that no single organisation can mount future-proof cybersecurity operations without the need for some sort of community based defence. This of course, assumes that most companies are driven by long term planning and not short-term profit gain. It is perhaps a shaky assumption.

It is true that '...Al will be used to generate fake audio and video designed to fool users; as a result, deepfakes alone will cost businesses over a quarter of a billion dollars,' in 2020^{liii}. On the other hand, how much could a given business profit from a competitors' downfall or stagnation? As misinformation campaigns launched by various global actors have shown, the rewards from a relatively inexpensive campaign can be handsome - how sure are we that no company will adapt similar tactics in an age when competitors' decision making is increasingly dependent on data, and sentiment and brand image easily damaged with fast moving media? True, few organisations would relish the notoriety that would come with being found out, but given both the rising likelihood of impactful success and the range of vectors from which to conduct it, we would expect a significant uptake in company on company cyberattacks and maliciously planted data in 2020.

- Data lakes can help provide consistent access to data for stakeholders, even if access is 'graded,' to ensure appropriate usage.
- Data hygiene and data reliability should be baked into processes.
- Effective cybersecurity partnerships or networking may be struck with adjacent or unrelated industries.

IoT goes from tech strategy to business strategy

IoT is allowing and some would argue forcing organisations to rethink their models, products and pricing. At an operational level this is already happening, with some 66 percent of organisations planning to deploy 5G by 2020, mainly for IoT communications and video, with operational efficiency being the key driver^{liv}.

What does it mean?

Global IoT spend could hit \$1 Trillion by 2022. Data architectures will likely need to change^{lv}. Statistics demonstrate the extent of the trend. 4,756 IoT connections are made every minute^{lvi} and by 2025, the average connected person, anywhere in the world, is forecast to interact with connected devices nearly 4,800 times a day, or once every 18 seconds^{lvii}. This could increase exponentially as concurrent technological progress decreases associated costs. Stickerlike electronics or sensors that attach to the surface of objects have been developed that could add connectivity to almost any product^{iviii}, for example.

Ambient connectivity redraws the where, why, how and what of business in fundamental ways. Previous mental models and assumptions will dissolve in the face of such profound change. This is why the IoT is no longer a tech strategy but a core business strategy^{lix} - implications of its use impact not just the service or product offered, but potential competitors, how to market it, cybersecurity and the skills and talent needed to maximise the benefits of its use.

Organisational and industry boundaries will erode at an accelerated rate, providing huge opportunities to not just do things differently but do different things. Those that refuse, or are unable, to change their legacy systems (whether cultural, organisational or technological) will at best lose ground to start-ups and a new range of competitors.

- Assess how our IoT strategy if we have one – fits with our overall strategy?
- Examine our goals with the IoT?
- Ask ourselves whether we are ready to reinvent our IT systems and renew our talent pipelines?

Automated commerce

40 percent of consumers suggest they would buy a brand they'd never heard of if it was recommended by Siri, Alexa et al^{Ix}. As our dependence on new media deepens, consumers will be able to do different things, not just do things differently.

What does it mean?

Companies like Amazon and Baidu have helped heighten consumer expectations to the point that 76 percent of consumers now expect organisations to understand, and presumably act upon, their individual needs^{lxi}. A similar, albeit slightly lower percentage of CEO's (70 percent) feel the responsibility to deliver on these specific interests^{lxii}. Consumers could, for example, automate (or delegate to a virtual personal assistant) much of the decision and purchasing cycle for much of their activities. How to reach the consumer, engage and break through will all be complicated^{1xiii}. Indeed, when trust and automated feedback issues are considered, it may mean that some brands are never again considered by some consumers.

The confluence of advanced analytics and context-specific data shift the balance of power away from the provider and towards the consumer – leading to proactive and predictive recommendations that support the user's short, mid and even long-term goals. Automated algorithms will compel brands to compete against each other electronically, but even within this space, such systems could completely block out brands that don't meet the individual consumers' criteria. This could be along a range of existing and emerging inputs, from environmental impact to social sustainability - all of which could be ranked increasingly in real-time. Engaging the consumer will become a problem once automated systems are employed by both consumers and businesses. Algorithms will increasingly be making the offers; and deciding if they are beneficial for (or even seen by) individual users too.

- The successful implementation and use of new technologies and business models will require organisational and skillset renewal.
- Build partnerships and ecosystems free from existing internal structures that can experiment and innovate without being bound by legacy management or culture.
- Within this space, consider 'what could kill us?', 'what is it we *actually* do?' and 'where could we play in the future?'

A look back to the future: past forecasts for 2020

As part of this 20 for 2020 paper, we take a look back at some of our – and others- past predictions going back to 2010 on how tech, and its impact, could look in 2020. In 2013, Peter Thiel, speaking at Yale, quipped that '...we wanted flying cars, instead we got 140 characters^{lxiv}.' Have we met our own expectations yet?

Instability

In 2010, in a response to fantastical tech predictions for 2020 laid out in the journal 'Nature,', a biologist by the name of Peter Turchin suggested '...that all these (tech) advances could be derailed by mounting political instability, which was due to peak in the US and western Europe around 2020^{lxv}.' The mathematical models used by Turchin would seem fairly accurate, given the upheaval in the political order of the US or UK regardless of how Trump or Brexit turn out. The Fragile States Index, for example, already reveals '...a worsening trend toward instability in those two countries, in contrast to steady improvement in much of the rest of the world.'

Model mania

In 2012 we anticipated '...an expanding range of new business forms and models in the coming years. Evolving internet leveraged technologies and the need for a competitive advantage in many sclerotic economies will necessitate radical rethinking. We expect SME's and start-ups to have the best chances of developing such models and many larger organisations will develop labs, or think tanks designed to replicate or provide genesis for such ideas.'

Reasons to suggest we were right:

- M&A of fintech, insurtech and other 'techs' has become a key strategy for incumbents.
- Platform models and ecosystems have proliferated.

What we got wrong:

 Many new ideas have come not from sclerotic economies but from booming Asian economies, China in particular.

Cloud

'Despite privacy concerns, it is increasingly likely that we will come to expect our personal information to be accessible anytime, anywhere and from any device.' While our 2012 prediction of this basically sums up the cloud today, we also noted some key implications being that '...security will no longer be just an IT issue. Taking greater control of the future means business leaders need to know more of access management, data privacy, and impacts of security breaches.' Reasons to suggest we were right:

- Cloud computing continues to change how businesses do things, from platforming supply chains, to data strategies.
- Cybersecurity is no longer just an IT concern. 71 percent of CEOs state that they see information security as a strategic function^{lxvi}.

What we got wrong:

 Not wrong, but we did not include or note the difficulties surrounding data privacy nor the on-going efforts needed for effective data management.

Smart machines

In 2013, and in the same period that the seminal 'Future of Employment,' piece from Oxford's Frey & Osborne was published, we cited evidence claiming that 'CEOs are missing what could quickly develop to be the most significant technology shift of this decade^{lxvii}.' Perhaps the most worrying aspect is not just that this shift is being 'missed,' but that 60 percent of CEOs believe that the emergence of smart machines capable of absorbing millions of jobs within 15 years is a 'futurist fantasy.'

Reasons to suggest we were right:

- More than 40 percent of CFOs in Europe reported that they are increasing automation in response to the current skills shortage^{lxviii}.
- 62 percent of executives now believe they will need to retrain or replace more than a quarter

of their workforce between now and 2030 due to automation and digitization^{lxix}.

What we got wrong:

 It remains to be seen what direction automation will tilt in and more importantly when – possibly towards augmentation (likely a first wave) followed by a more direct replacement wave. Arguably we have not seen the level of displacement we hinted was possible.

Perpetually connected

In 2013 and prior to the widespread usage of the 'digital transformation' term, we suggested that perpetual connection '...isn't a transformation that will impact (just) a single industry, or department or even a process within a company. Rather it signals a new normal in market conditions. Those wishing to compete in this world will need to embark on root and branch reform of their digital presence in profound ways.'

Reasons to suggest we were right:

- Consumer tech is becoming who we are, and spend is forecast to top \$2 trillion by 2023.
- Digital transformation is a key process for nearly all organisations.
- Root and branch reform is still needed: digital transformation has proven itself not just a tech project.

What we got wrong:

• Perhaps the extent to which perpetual connectivity divides the haves and have-nots when it comes to organisations.

3D Printing

In 2013, when 3D printing was largely confined to plastics and simple one off designs, we suggested that '...progression in types of materials used, significant and ongoing cost reductions and the emergence of an industry ecosystem have all combined to give the impetus for future growth.'

Reasons to suggest we were right:

- Dubai has committed to printing a quarter of all new buildings by 2025.
- Printed aviation parts are key to the aviation maintenance industry.
- 3D printing has gone beyond plastic to a range of materials, including metal and even 3D printed food.

What we got wrong:

 Perhaps the extent and speed to which this technology could radically redraw global trade flows.

Social

In 2013 and 2014 we noted that while '...social networks have primarily been seen to-date as a tool for engaging people outside the organisation, next generational thinking and use of social networks will be to increasingly replace e-mail as the preferred electronic communication platform within the corporation. The (concurrent adoption) of a transformation program that enables new ways of working and is fully supported by senior management is needed.'

Reasons to suggest we were right:

- Yammer and Slack feature prominently across large organisations.
- Social management tools are allowing a greater decentralization of work, and where it occurs.

What we got wrong:

• Email is still prominent in many organisations.

loT

In 2014, we suggested that there is clearly a business rationale for developing a strategic approach to what, how and where the IoT can be used to unlock new value streams and create new business. We also noted that as we move towards 2020, The Internet of Everything will also demand that traditionally non-technical industries begin to acquire IT expertise

Reasons to suggest we were right:

- IoT business models have allowed pay as you go models, such as with Rolls Royce aviation engines.
- Digital skills are broadly needed by a widening range of industries.
- The IoT is shifting the basis for insurance, manufacturing and many other industries.

What we got wrong:

 Our belief that IoT strategies would become mainstream. Many are still not using IoT to create new business or even within their own business.

Data analytics

In 2014, we predicted that the period to 2020 could see data enable ever greater micro segmentation of customers, increased personalisation for customers and employees and a more effective search for new customers.

Reasons to suggest we were right:

- Data access is considered the primary benefit of ecosystem participation.
- 98.6 percent of execs are actively working to turn their organisations into data-driven enterprises^{lxx}.
- 38 percent use data analytics to predict and monitor skills gaps in the workforce: PwC^{lxxi}.

What we got wrong:

 Only 32 percent report success in achieving a data driven business culture^{lxxii}.

Haptics

Having picked up on news that 'Japanese researchers made haptic interfaces that create the sensation of being pushed or pulled by an invisible force,' in 2014 and comments by haptics researchers that the technology today is reaching a critical mass, we thought haptics would become major technology in both consumer and industrial tech by 2020.

Reasons to suggest we were right:

 In a basic form, many modern phones contain haptics technologies.

What we got wrong:

• Some of the more exciting forms, such as holograms you can touch, remain distant.

About the author

David is a leading strategic futurist who combines the experience gained from a 35 year IT, marketing and business career with strategic visioning to help organisations better prepare for the future. His career has spanned European and US corporations. He is a much sought-after keynote speaker and is the author of many works on embracing change and the drivers of change. Before establishing Global Futures and Foresight, an independent futures research firm, he created and ran the Unisys internal Think Tank, The Global Future Forum. Prior to this he was head of strategic marketing for their \$2bn global financial services business.





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Global Futures and Foresight is a research and consulting firm that helps organisations be better prepared to embrace change, innovate and develop new strategies and solutions and helps clients to avoid the risk of being blindsided by external disruptive change.

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About Marcela Lopez, Artist (Front cover by Marcela).



Marcela Lopez, Colombian artist with European influences based in UK. Commissions and artwork for sale. My subject matter is landscape. Using my hands I choose plaster to capture the movement of water and trees on wooden boards. Through my artwork I intend to invite viewers to a peaceful moment of reflection. I see my artworks gently brightening up any space and being a source point of serenity and comfort.

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