What's Hot in 2019

Technology Trends

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Introduction

The mental models that underpin industries, businesses and their systems are rapidly unraveling. The confluence of technological change and shifting human behaviour has led to a focus on digital transformation. Whilst such a focus may be understandable and even a prerequisite for future success, it is by no means sufficient by itself and the importance accorded to digital may even be impeding further change. Digital is often conceived as a project with a fixed destination but should be seen as an evolving process. The next stage of this process has already appeared; the digital age is already evolving into the intelligent age.

The danger of suggesting evolution, despite the common drivers and traits to digital and intelligent ages, is to assume continuity. We are entering an era where we can no longer pick the top three of five transformational technologies, since the synergies of artificial intelligence and data across a range of technologies mean we must consider things simultaneously.

Artificial intelligence and automation are increasingly common across a range of other emerging technologies. Everything is becoming A.I and A.I is becoming everything. The blurring of 'tech silos' represents an entirely new way of thinking and requires new forms of organisation, leadership and culture[i]. Doing different things and the creation of new models will result as people – as consumers and workers - are demanding them.

Research suggests that by 2025, 30 percent of global GDP will be represented by ecosystems[ii]. As a result, technologies are already shifting from plug and pay accessories to a new way of connecting people, data, companies and gadgets. Customer experience will continue to be driven by technology and many technologies are adapted towards measurable customer experience. In an environment characterized by ongoing and accelerating tech driven change, the need to refocus back on purpose, and even higher purpose, is pressing. This focus can blend new partners, methods, structures and business models together. This promises to be more effective than simply defining the rules of engagement.

As we become more networked in the intelligent age, the brand will become one of the few things a business truly owns. Trust therefore becomes the key currency for organisations to build and maintain. Choosing what to do with these technologies, how to link them strategically and how they benefit consumers will become critical in how consumers perceive organisations.

Improving the pipeline

The battle for talent has been well documented and broadly omnipresent feature of work for decades. The urgency of the issue has steadily risen however; for example, some 87 percent of insurers cite a lack of talent as their biggest barrier to innovation[iii]. This industry is by no means an outlier since 77 percent of CEOs across all industries cite a lack of access to appropriately skilled talent as their biggest threat[iv].

What does it mean?

The most obvious impact flowing from a lack of talent is a missing HR tech layer, since 80 percent of leaders are still basing talent management practices on gut feeling rather than analytics[v]. This is compounded by the erosion of existing skills' applicability – the half-life of skills is now down to between 2.5 and 5 years, from 20 years previously[vi]. Furthermore, only 20 percent of employees are thought to have the skills needed for both their current role and their future career[vii].

HR tech is evolving however, to help retention and acquisition practices. AI is changing the way firms screen, hire and manage their talent. Hilton has shortened the average time it takes to hire a candidate from 42 days to five with the help of HireVue, an AI startup[viii]. Infosys, meanwhile, is examining the use of AI to decide when to give employees a rise, based on their performance and their pay relative to that of colleagues[ix]. Accenture is rolling out a custom-built tool called Job Buddy which tells employees how vulnerable their job is to automation and predicts what training they might need so they can develop the right skills for the future[x]. Such moves are indicative of the types of change that 47 percent of HR executives at mid-market companies expect to see in how talent is managed over the next two years thanks to digital and intelligent change[xi].

What to do about it?

- Reassess talent pipelines and ongoing education and training provisions – how do you measure against best in class systems?
- Craft compelling work positions – think of prospective employees as customers – how can you match their needs and wants?
- Place talent issues high on the CEO agenda and that of other C suite execs, since HR tech will become a key organisation wide resource.

At the edge

The global data sphere is forecast to grow from 33 zettabytes in 2018 to 175ZB by 2025[xii] with a 61 percent compound annual growth rate. Concurrent with such high growth is the continuing data migration from central I.T. repositories to an increasingly democratised and distributed endpoints.

Organisations should aim to deliver computing capability to the edge where it is needed as they switch to consumer-centric models. 44 percent of executives across industries say the value of ecosystems lies in access to new customers, and with those customers comes data[xiii].

What does it mean?

5G is set to cover 40 percent of the global population by 2025[xiv] and this will likely further enhance the likelihood of embedded analytics to flourish at the edge. By 2025, almost 20 percent of data created will be real-time in nature – rather than be sent to the core of the network for processing[xv]. Sending it to the cloud will not make much economic sense, but the impact of the edge could be even deeper by fueling growth of technological segments such as virtual reality. This will require new architectures, partnerships and data governance. The impact could be significant for how we do things and who does them; for example, marketing could morph into a trusted advisor type position, offering personalised insight and recommendations in exchange for data access. Information technology strategies, consumer behaviour and the architecture within which to operate would all shift as a result, some in unpredictable ways.

What to do about it?

- Web VR will soon become the natural way we experience content. Volumetric storytelling – enabled by the edge - will bypass apps and ensure both VR and AR are readily created and experienced[xvi]. How we interact with tech could change forever.
- Edge processing is critical for autonomous vehicle safety systems, to make quick decisions such as those relating to lane departure detection and automatic brakes. Huge data volumes compel the use of edge. By 2030, it could prevent 2.5m road accidents and $22bn in avoided insurance claims[xvii]
- By 2025, extended reality is projected to generate over $100 billion in sales, with consumer and e-commerce sectors chiefly benefitting. The interaction of the edge and extended reality carries significant implications for healthcare, education and real estate as well[xviii].

3D everything

3D printing has been around for decades, albeit mostly on the manufacturing fringes and for prototypes. In the last decade, it has assumed prominence but remained generally confined to using plastics. Material options are widening however, as cost and time are mutually reduced.

For example, researchers from the Lawrence Livermore National Laboratory have developed a 3D printing method for creating stainless-steel parts twice as strong as traditionally made ones[xix]. In addition, the world's first bioinspired 3D printed cement paste has been produced, which refills when cracked and thus promises to make infrastructure more resilient to natural disasters and ageing[xx].

What does it mean?

3D printing has passed the tipping point, going from doing thigs differently to doing different things. Not only have we started to optimize traditional material properties, our very ways of mass producing products could be about to change profoundly. This could be the killer app for the technology, and one that is emerging.

Using advanced 3D printed parts, Rolls Royce is testing a new engine core that should be available from 2025 and could yield an improvement in fuel efficiency of some 25 percent[xxi]. Most notably such prints transform what are often complex engineering and assembly into a simple yet precise process.

Prototypes and mass manufacture will now become available to a wider range of industries than ever before, providing opportunities for reimagining processes and products. It will also reshape supply chains, further emphasise the roles of ecosystems and partnerships and introduce a wave of new market entrants and competition for industries slow to adapt.

What to do about it?

- Supply chains could radically shift. PwC notes that '…companies like Amazon and Google are looking into business models based on platforms for 3D printing design files and blueprints.' Scenario planning for new ecosystems is therefore a must.
- Built to order production strategies will challenge the dynamics between manufacturers, retailers and consumers.
- Direct to consumer models will likely thrive, necessitating a new form of marketing and consumer relationship.
- Focus on positive data stewardship. Data use – and misuse – will define such relationships.

Facial recognition

Questions remain as to whether as a society we are ready for the privacy and social implications of facial recognition, even as businesses roll out its use.

Perhaps the least controversial sphere of use lies in security. Environments where we already have a reduced expectation of anonymity or privacy will likely dominate early trials.

Delta Air Lines is launching what it calls the first "biometric terminal" in the US, using facial recognition at check-in, security and boarding[xxii]. Doha's Hamad Airport wants to use the technology to eliminate the need for passports within five years. Since 70 percent of passengers want tech to help speed things up at the airport[xxiii], we would expect airports to become the first widespread case use for the technology.

What does it mean?

Singapore's Government Technology Agency has revealed that facial recognition will be used as part of its national digital identity system[xxiv]. Beyond airports, government agencies, banks and other highly secure environments, we are also being habituated to this technology through our gadgets. Facial recognition and iris scanning are forecast to become more prominent over the next 5 years, with adoption exceeding 1 billion devices[xxv].

This will start in earnest in 2019, and should be seen by other industries as a down payment for the future. Facial recognition technology is finally ready for its post-phone future. By the time the public has accepted (or perhaps rejected) the value inherent in facial recognition, companies need to be able to move swiftly.

Using data and facial recognition, AI is already able to create highly-personalised experiences at scale in real-time. Companies have already begun installing screens at service stations that use facial recognition to target and personalise the customer experience with tailored ads[xxvi]. This could snowball quickly, with some 80 percent of marketing leaders saying AI will revolutionise marketing by 2020[xxvii].

What to do about it?

- Link any prototypes to GDPR and consumer value; what do your customers get out of this technology?
- Look into privacy and ethical issues; do your ideas for this tech use stand up to probable future regulation

Cognitive communication

A.I is hardly a new phenomenon – it could have featured as a top technology for every one of at least the last twenty years – but as its' capabilities increase, so do the implications.

One hitherto underexplored area centres on communications, yet some 47 percent of smartphone shoppers would like a service that automatically restocks everyday items. 63 percent of these people suggest they'll have a personal shopping advisor within three years[xxviii].

What does it mean?

Meanwhile nearly one in three consumers globally say they plan on buying an AI device or personal assistant, but this is close to 50 percent in East Asian countries[xxix]. Such devices will increasingly divorce from the screens that one supported them and potentially cut through choice paralysis.

It is only a matter of time – perhaps less than a year – before these personal devices mesh with either Google's predictive tech or Amazon's recommendation engines. When it does, we will be on the frontlines, perhaps prosaically at first, of automated consumption. Virtual personal assistants could evolve from chatbots to provide a personalised banking interface - more than one-quarter of people say they would consider using voice-controlled assistants for everyday banking, and 6 percent already do[xxx]. Such devices could also advise us on the latest offers, deals and updates. MIT developed AI that can even assess depression from the way you talk[xxxi]. Cognitive communication could therefore optimize existing processes and generate new revenue streams.

It is estimated that, together with visual, voice searches could drive 30 percent of commerce revenue by 2021[xxxii]. Voice-based commerce is expected to jump to $40 billion in 2022, up from $2 billion today[xxxiii], driven by the 225 million smart speakers expected to be in people's homes by 2020[xxxiv].

The emergence of such devices goes beyond consumer interfaces. Devices that can interpret and act on voice commands are transforming the traditional supply chain.

What to do about it?

- Executives will need to learn how to fit cognitive comms into their short-term strategy.
- 'To create integrated, end-to-end systems, companies may need to integrate such message systems with digitized supply chains[xxxv].'
- Cognitive comms will require new design principles for what is a new interface.

Mini me digital twin

Around the world, the ability to prove your identity is critical for economic, social and financial life. It is likely to become a key component of digital life too. Increasingly, '…private companies, governments and regulators are searching for comprehensive solutions that enable clients and citizens to identify themselves online[xxxvi].' Access to increasingly digitised services – healthcare, education, voting as well as commerce will need to be secured against fraud.

As a result we may require a digital go-between along the lines of a digital avatar or virtual assistant, to represent us, as perhaps as well to prompt us or point us towards recommendations.

What does it mean?

Gartner sees mainstream adoption as early as 2020, along with speech recognition[xxxvii]. We would therefore expect prototypes chiefly representing ordinary consumers, as opposed to brands, to appear in the interim.

Some 48 percent like the idea of a digital alter ego; in-fact 46 percent say it would help improve the quality of their life[xxxviii]. With digital identity also set to become a key industry and technology in its own right, the idea of our own personal digital twin – a trusted (by ourselves and those we interact with) verified, online presence could quickly become a key staple of digital life.

This creates a market that lends itself well to financial services firms, whether incumbents or fintech. "For financial institutions, this is the opportunity to become trusted identity providers across different industries, leveraging the trust that consumers traditionally place in the sector[xxxix]." Longer term, the World Economic Forum suggests that by 2030, we'll see credit scoring expanding into 'life scoring'. Identity and reputation will be digitised and analysed in minute detail, shaping a future where a personal 'trust score' will be the norm, with all the benefits and drawbacks that might bring[xl].

What to do about it?

- Identification projects will soon start to see consolidation and standardisation – being up to date with these ecosystems is critical for those looking to operate in this space in some way.
- Review cybersecurity procedures: can digital identity help your company? What challenges could it present?
- Assess how this could benefit your customers.

Ambient information

With 4,756 IoT connections now being made every minute[xli], perhaps it is no longer enough for every company to be a tech company or even a digital company. Are we all destined to become IoT companies?

While IoT data is growing twice as fast as social and computer-generated data[xlii], some 46 percent of companies report a shortage of staff with the analytics skills to support their IoT plans[xliii]. If this is problematic now, the impending surge of IoT growth will create significant structural issues.

What does it mean?

The Internet of Everything is set to boom thanks to developments in 2018 such as the creation of '…sticker-like electronics or sensors,' that can be attached to the outer surface of any given object. This could add an Internet connection to almost any product, even without manufacturing changes[xliv]. The IoT is no longer confined to tech.

Thanks to synergies with other technologies, such as blockchain, around a third of potential deployments are applicable across multiple industries. This brings a new disruptive wrinkle to the technology[xlv] and could move it out of the hype and experimentation phase into a new way of doing things.

It is worth remembering that the IoE is more of an architecture than a technology. It requires a greater degree of organisational change than other technologies.

Collaboration, platforms, not to mention cybersecurity and data compliance all point to the encompassing architecture of the IoE. The ability to meet overcome some of these obstacles prevent many organisations from moving beyond piecemeal deployments, and in some cases, eschewing it completely. Perhaps most importantly, 68 percent of businesses that aim to implement IoT, or that are already doing so, are struggling to find employees with the skills to address IoT-focused business models[xlvi].

What to do about it?

- Platform participation may become a must. Deciding on which level to operate within such ecosystems is critical. For companies used to selling products, understanding the core principles of platforms is key.
- Understand where there are gaps in the ecosystem to help identify the partners, acquisitions, or new technologies needed to potentially create a successful platform.
- Identify the ecosystem partners needed to fill those gaps.

A new playing-field

The benefits and advantages of 5G technology are expected to be available sometime in 2019. Although the extent of its impacts are unlikely to be realised immediately, WEF suggests '…that it will be as revolutionary as electricity or the automobile[xlvii].' Both the lack of an immediate 'wow factor,' and 5G's long term potential are based in the fact that it is a significant enabling technology.

What does it mean?

In and of itself, the obvious immediate impacts include higher speeds, low latencies, lower power consumption and greater reliability. 5G will enable us to move from simply connecting people to information towards connecting people to everything. The mechanisms of collaboration, curation and crowd creation will become critical skills and processes for businesses.

The synergy of 5G with other technologies, including IoE will '…open up potentially new roles for intermediaries in the value chain, positioned downstream of network operators, offering to bundle and repackage connectivity for particular industries[xlviii].'

5G will also prove a catalyst for connected healthcare, autonomous vehicles and mediums such as virtual reality across multiple industries including education and various customer facing industries.

5G could enable edge computing and analytics – shifting consumer journeys, data strategies and fundamentally redrawing business and operating models decisively.

What to do about it?

- 'Products will flow to the household like a utility, as electricity and water do. For many products, the shopper will be a bot, leaving customers with the sole task of consumption[xlix].'
- This will require new marketing paradigms to be explored.
- Engagement will increasingly demand a user interface oriented towards next technologies. The more real an experience is, the greater degree to which we will engage with it as consumers, or employees.
- Ironically, what is largely a plug and play technology will prove much more complex organisationally.
- Data architectures, talent needs, ecosystem partnerships and fundamental role in newly emerging spaces will all need analysing and all will impact business and organisational models.

A.I jobs boom

Much of the A.I debate and many of the headlines over the past five years have focused on future dates by which a given percentage of jobs will (or could) be automated. To a lesser degree, a contrary narrative has emerged stressing the impact of A.I on individual tasks and the augmentative potential of this technology.

This suggests that A.I won't replace most jobs anytime soon, but will instead shift employer preferences to those who can work with A.I and against those who cannot. However, we are also on the verge of A.I driving the creation of new job types.

What does it mean?

Business is preparing the groundwork for new job types. 50 percent of CEOs plan to adopt cognitive computing by 2019[l] in reaction to the expectation that 75 percent of existing jobs will be altered or enhanced by AI-driven technologies[li]. Some 61 percent of companies are already redesigning their existing jobs to more readily incorporate AI and robotics into their operations[lii]. Alongside these augmented jobs, new jobs will appear from machine regulators to emotion engineers[liii].

Indeed, while WEF suggests that 75 million jobs may be displaced by a shift in the division of labour between humans, machines and algorithms by 2022, 133 million new roles may emerge that are more adapted to this. This suggests 58 million new jobs by 2022[liv]. 2019 will see the first instances of these jobs emerge, prompting companies to adopt new organisational structures revenue streams and business models.

Organisational processes will also need to change to accommodate such jobs. Increasingly the way we recruit for jobs, both current and future, will also be driven by A.I. In China, Baidu is testing neural networks that can match job seekers to open positions[lv]. Amazon's reported ditching of a similar algorithm for displaying bias against women highlights some of the obstacles still to be overcome, but whether from a supply or demand perspective, A.I driven jobs will thrive in 2019.

What to do about it?

- Defining new KPI's will be needed for measuring company-wide A.I integration success.
- Given the current shortage of analytical talent, leaders cannot wait to see if their individual managers are capable of working in and alongside automated systems.
- This compels leaders to explore and experiment with A.I, and develop training strategies.

Faster than real-time

2018 was a breakthrough year at the research junction of neuroscience and artificial intelligence. Japanese researchers developed a system that can parse your thoughts into visualisations[lvi], and A.I powered models can now predict a person's choice before that person has even made their mind up[lvii]. Other developments include a system that can predict your personality simply by tracking your eyes[lviii] and wearable devices that can be controlled with the mind[lix].

What does it mean?

Often the gap between research or proof of concept and commercial applications takes years. Ethics and regulations often lag, discouraging companies from adoption, while the technologies themselves often lack case uses. There are reasons to suggest that this gap is now becoming an overlap as progress blurs into a continuous cycle of research, development and adoption.

In fact, mind-reading software is not only ready for commercial use, but emerging with everyday business applications[lx]. The HR department at steel processor, Companies Inc., uses an A.I tool called Xander to analyse staff annual feedback surveys. Xander can read between the lines to '…determine whether an employee feels optimistic, confused or angry, and provide insights to help manage teams[lxi].' It may only be a matter of time before such systems are used for customer feedback and marketing. 2019 will likely see more innovation in the space, but we expect more widespread commercial use to develop even in the absence of regulations in this area.

In fact, customer service and marketing uses may not compare in technical difficulty to the extent it has already been used. In 2018, Nissan also revealed its IMx KURO concept car, complete with an EEG headset. When the driver is in manual control of the car the system analyses brainwaves for signs that they are about to take an action, such as brake, accelerate or turn. The car's driver assist system then speeds up the action, which by Nissan's claims, can amount to half a second[lxii].

What to do about it?

- A.I transformation cannot happen as a singular process. It also requires data harmonisation, ecosystem creation and a build-up of A.I capabilities, processes and skills within the workforce.
- Privacy issues will be huge: delivering value and being transparent in data use, storage and beyond, will be key for developing sustainable propositions.

Control of identity and privacy

Deloitte suggests that '…like the Internet reinvented communication, blockchain may similarly disrupt transactions, contracts, and trust—the underpinnings of business, government, and society[lxiii].' It has also been suggested that the potentially transformational impact of blockchain is '…like the early Internet. There's an inability to know in advance all the uses it could be put to[lxiv].' What the net was and is to information, blockchain could be for notions of value.

The timing for the widespread introduction of this much hyped technology has been the object of much discussion. McKinsey suggests commercially viable applications are still at least three years away[lxv]. In the narrower field of identity and privacy however, new blockchain models are already appearing.

What does it mean?

Software company Evernym has started work with the U.S, state of Illinois in developing a blockchain birth-record registration system[lxvi]. Blockchain is also the basis of one effort for safer consumer-centric retail that places personalized product recommendations on retailers sites, apps, and physical stores. Shopping has now created a 'universal shopper profile' that enables consumers to control who sees their information. Consumer control of data rights is a key part of the equation. The model sees the consumer receive Shopin tokens for viewing ads, shifting the retail model in interesting ways that seek to benefit both retailer and consumer. Since it is forecast that by 2019, 20 percent of all IoT deployments could have basic levels of blockchain services enabled, the impact on business could go far beyond retail[lxvii] and reach into a range of new industries.

'In a new era of Europe's General Data Protection Regulation (and other similar online data privacy legislation on the way), blockchain is poised to take its place at center stage in today's economy. It's likely that this change will be top-down: People won't be demanding blockchain, so businesses will have to lead the charge in transitioning to this system[lxviii].'

What to do about it?

- The relationship between brands and consumers is poised for radical change, giving people more control[lxix].
- Developing consumer-centric propositions before this could be key.
- Explore how blockchain could benefit consumers, and ultimately your business

The green circle

The concept of the circular economy is nothing new, first appearing in Denmark's Kalundborg industrial park in the 1970's. Today, 13 different companies in the area save around $100 million a year while significantly reducing their waste and emissions footprint[lxx]. The concept goes beyond recycling; in effect the waste from one process or business is used to power another.

Though circular economy business models are still in their infancy in the wider world, they have already demonstrated potential for increasing efficiency and profitability. $4.5 Trillion could be gained by their use by 2030.

What does it mean?

Steps towards developing a circular supply chain are already appearing. Several global brands, including Patagonia, Eileen Fisher, H&M and IKEA are all experimenting various aspects of the circular economy. These feature repair, buy-back and enhanced recycling programs that aim to extend their products' lives[lxxi]

The pace at which companies explore this area will likely increase. A 2018 IPCC report places the need to alter our present environmental course at the feet of business. It warns that this '…means companies need to step into potentially uncomfortable territory for the good of the planet. This means rethinking investment decisions and heavily bias them toward carbon reduction[lxxii].' Indeed, zero emissions are required by 2050 as per the IPCC report.

Given the concurrent rise of the platform economy, there appear to be more opportunities than ever to make steps towards circularity. For example, an EU-funded startup called Circularise is developing an open-source blockchain platform '…that would enable companies to give logistics providers (in this case, recycling companies) the information they need to more efficiently and effectively separate materials for reuse when a product reaches the end of its life without revealing the details to competitors[lxxiii].' A completely circular economy is beyond the realms of possibility for 2025, let alone 2019. However, with retail increasingly expected to reflect Millennials' social concerns, significant steps will be taken in 2019 to develop more sustainable solutions.

What to do about it?

- Look to embed sustainability into products, processes and services.
- Partner within your industry and with external partners that could develop synergies.
- Explore platforms as a way of entering this environment,

Rent a Robot

The general trend among many technology providers is a retreat from selling products to selling the services associated (or derived) with such products. Exemplified by GE, this includes revenue streams from maintenance, upgrade changes and support.

RaaS sees robotic products and solutions leased to clients as a full service. The “as a service” model for robotics is one of the least developed of all current as a service models. However, this market may represent the fastest growth potential for the wider adoption of robotics, since the RaaS market could expand from $217 million in 2016 to $34 billion in 2026[lxxiv].

What does it mean?

Designing robots and the associated RaaS to successfully meet client needs and expectations will require a more holistic look at what it is the client or consumer wants. Do they want a robot, or do they want problem XYZ solved, and does it matter how this is done?

Rolls-Royce – well attuned to pioneering new models with its pay as you use airplane engines, has demonstrated robotic maintenance ‘bugs’ and this suggests they could form the basis of new business models[lxxv], building another aaS wrinkle to its offerings and benefiting from a steady stream of income.

From the perspective of the end-user, a significant RaaS benefit is the shifting of capital expenditure to an operational expenditure. This allows end users to deploy solutions without significant upfront costs and use robotics without necessarily requiring advanced robotics skills, assuming these form part of the RaaS solution.

Despite the plug and play nature of (X)aaS technologies or platforms, the organisational impact should not be underestimated. For example, 61 percent of companies are already redesigning their existing jobs to more readily incorporate AI and robotics into their operations[lxxvi].

What to do about it?

- Change management is critical for prepping a workforce for episodic work alongside robotics.
- Examine where in your operations you could benefit from using RaaS.
- Ask whether you can offer some sort of RaaS service. What are the areas in which you – or your partners – could digitize and automate physical processes?

iHealth

Nearly three-quarters of healthcare consumers suggest they would use virtual care for an after-hours appointment if it were available. About two-thirds would similarly use it for a follow-up appointment after seeing a doctor or other healthcare professional in person[lxxvii]. As a result, the home healthcare market is expected to exceed more than $349 billion by 2020[lxxviii].

What does it mean?

Despite the consumer interest, only 14 percent of physicians currently have video capabilities and only 18 percent of those who don't plan to add the capability by 2020[lxxix]. This reticence has undoubtedly impacted the formation of viable iHealth models, but this hitherto barrier is eroding fast.

One reason is that physicians do at least see the value in consumer generated data. 83 percent of physicians say that consumer-generated data from phone apps and sensor devices could enable more personalised care plans. 74 percent of consumers are willing to share such personal data[lxxx]. Increasingly, and crucially, consumers will not care to whom this data goes to as long as their issue is addressed.

The home healthcare market is set to boom as wearable medical devices could be worth $10 billion by 2023[lxxxi].

Progress is likely to accelerate by 2020, when chronic conditions, such as cancer and diabetes, are expected to be diagnosed in minutes using cognitive systems[lxxxii]. Google's AI beats doctors at spotting eye disease in scans[lxxxiii]. Since today's algorithms are tomorrow's apps, the barriers preventing many diagnostics, checkups and monitoring from being geographically constrained, are falling.

The confluence of many technologies and an increasing tendency towards 'self-service,' could create whole new classes of virtual consultant-like jobs in the healthcare industry. This will be further enforced by a burgeoning use of extended reality (AR and VR) in healthcare, which is expected to reach $5.1 billion by 2025[lxxxiv] and become the dominant segment in that medium.

What to do about it?

- 84 percent of health execs agree that through technology, businesses are weaving themselves seamlessly into the fabric of how people live today[lxxxv]. Finding a way to do this – directly or indirectly, could be key.
- There is a need to orientate processes toward a consumer-centric, geographically-agnostic, future.

Decentralised health

The accumulated costs of non-communicable diseases over the next 15 years are forecast to be five times greater than that of the 2008 global financial crisis[lxxxvi]. Another way of looking at it is the equivalent of a global financial crisis every three years on average.

Working to mitigate this is probably beyond the remit of any single technology or practical solution. However, it is likely that together with behaviour modification and nudge theory, a range of new therapies and technologies could mitigate the costs of ill health. Nanotechnology is perhaps the one most primed for imminent widespread adoption.

What does it mean?

In 2018 it was announced that engineers had developed tiny ultrasound-powered robots that can navigate blood vessels, removing harmful bacteria along with the toxins they produce[lxxxvii]. Not only could such nanotechnology change how we treat disease, but also impact the geography of healthcare. It is plausible that such devices could send in real-time and translate our biological data to help diagnose disorders remotely[lxxxviii].

Both operational and strategic changes are likely to emerge from nanohealth. This could include optimising processes as well as introducing new revenue streams. In terms of processes, nanoparticles have been engineered to image and treat cancer[lxxxix]. MIT, meanwhile, has developed an aerosol spray that contains nanobots able to complete a range of activities, including diagnosing health issues[xc]. The collation of the IoT, nanotech and home health could revolutionise aspects of the healthcare paradigm imminently.

In the longer term and perhaps by the end of the next decade, nanotech is expected to perform medical procedures inside the body noninvasively.

What to do about it?

- The impact of this technology should not be thought of as confined to a single point in time. It'll continue to evolve.
- We are already on the verge of the tipping point that will see nanotech confer a genuine force for change.
- Nanotech is set to become a key component of a newly emerging '… quantitative era for digital health, AI, social networks, analytics and precision medicine that will eclipse the disease industry that exists today[xci].'
- Building the foundations of this system – involving stakeholders from multiple verticals and industries - should commence imminently.

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