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THE EVOLVING ENTERPRISE

Digital Transformation of the Enterprise

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Talking Heads:

Focus on outcomes not technology, says Aeris Communications

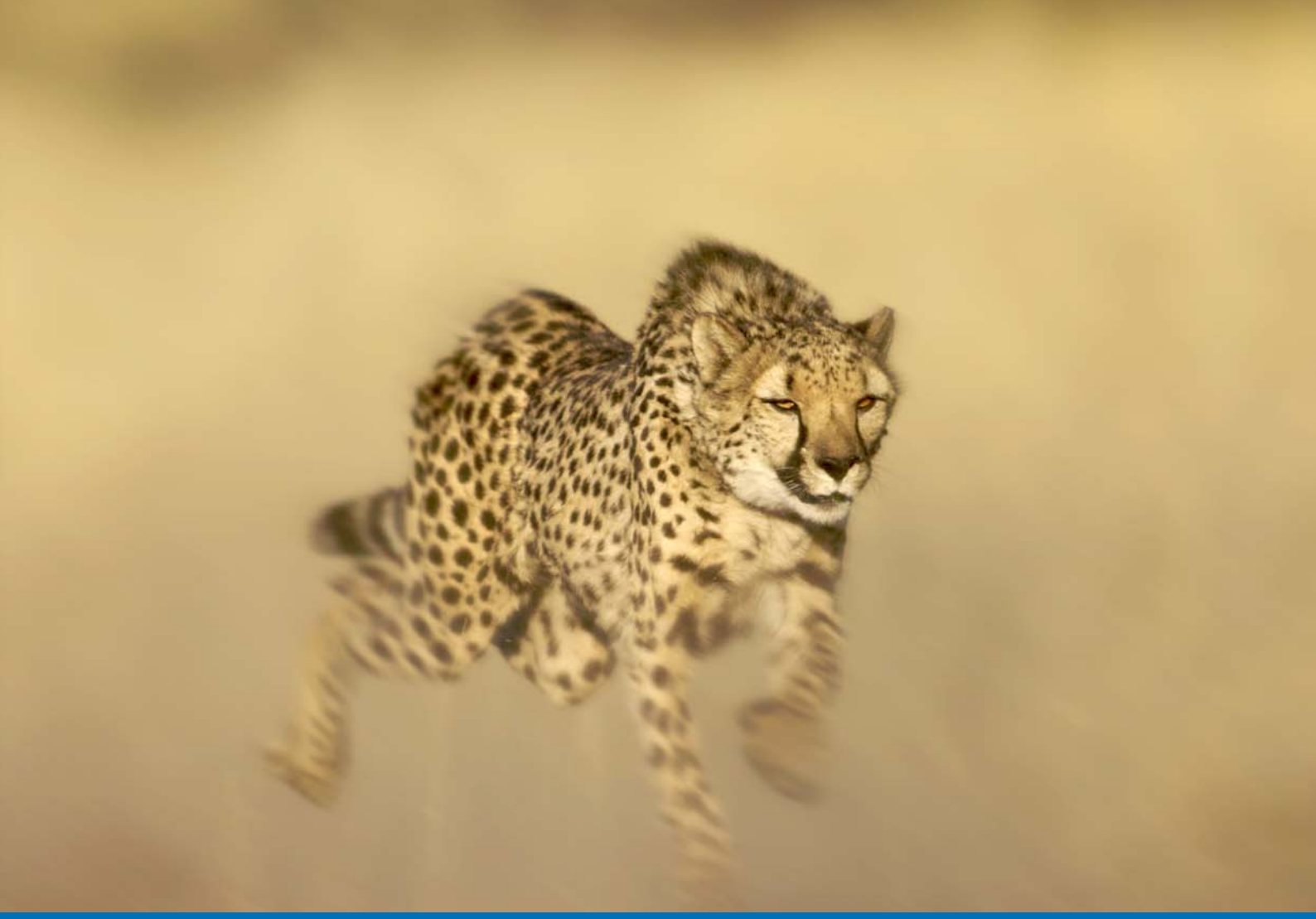
What is Digital Transformation and why is it worth $5 trillion?

Transforma Insights assesses the Solutions

Artificial Intelligence revealed

3D Body Scans, Moneyball Moments as we Shift to AI, and Managing Public Concerns

PLUS: Product & Market News • 'The Insider' Column: When Digital Transformation misses • Data Analytics • Digital Twins • Financial Services • Retail Technology • Events Near You • **See more: @TheEE_io www.TheEE.io**



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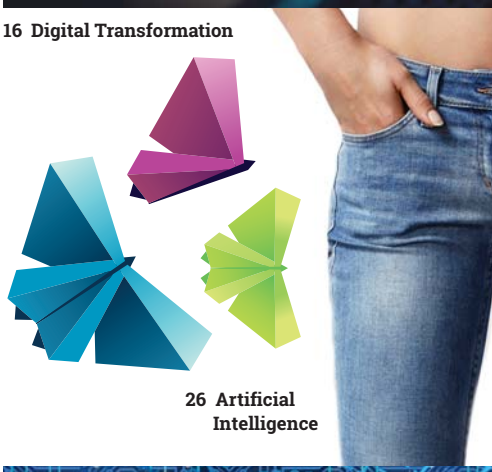
In this Issue

14 The Insider Column

16 Digital Transformation



26 Artificial Intelligence

32 Digital Twins

34 Financial Services

Learn from DX successes, and failures!

There's always that moment in launching a new online and print publication when you wonder; What if nobody comes? Not gonna lie, I get this before every title launch. We've launched and grown the market-leading Internet of Things title, **www.IoT-Now.com**, and now we've identified a need for independent, expertly-written business information covering Digital Transformation (DX). So, it's time to unveil **The Evolving Enterprise** (**www.TheEE.io**). There is too little informed media coverage and analysis of crucial technologies like Artificial Intelligence and Data Analytics, something we intend to correct.

Any lingering doubts were dispelled when we learned during the launch phase that our old friends from Machina Research, who sold their highly successful Internet of Things (IoT) analyst firm to **Gartner** in 2016, were following a near-identical path and forming a new analyst business covering, you guessed it, Digital Transformation. No surprise then, we invited the founders of **Transforma Insights** (**www.transformainsights.com**), to share their analysis of this enormous sector that we both aim to serve. So, get yourself a good coffee and set aside a few minutes to savour a meeting of high-level minds as Matt Hatton talks to Mohsen Mohseninia, VP for International Market Development at our sponsor, **Aeris** (page 10) about how IoT is one critical part of Digital Transformation and how you also need to focus on other disciplines like Artificial Intelligence (AI).

In these pages we show how AI is making a difference to businesses right now. As you'll see on page 26, they're doing it in retail, business strategy, and healthcare to name just three areas. We're also starting a fascinating series of articles by 'The Insider' (page 14), who has spent years working at the sharp end of DX – sometimes, he says, you have to learn from your failures. But to avoid failures in the first place, Bernard Marr says a cultural shift by enterprise leaders is now vital for businesses to survive in this age of analytics (page 28). And you can find out how to optimise your business performance on page 32 with Digital Twins.

Over the coming months, we'll all have to face our own enterprise transformations, but you don't have to do this alone. In **The Evolving Enterprise** you'll meet the world's DX experts. To find out more, see us online at **www.TheEE.io** . Enjoy this issue and give us your feedback on **Twitter, @TheEE_io**.

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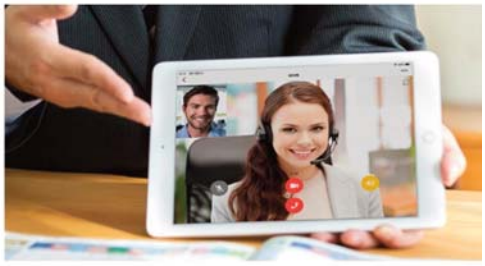
Japan develops AI/human interpreting system in 13 languages for financial services and government



Konica Minolta's Business Innovation Centre (BIC) Japan has developed KOTOBAL, a multilingual interpretation service that assists communication between front desk personnel at financial institutions or government offices and foreign nationals living in Japan.

The service aims to enable communication where technical terms are often used by combining machine interpretation results displayed on a tablet screen with video interpretation by an operator. KOTOBAL has been developed to be used at the front desk of financial institutions, government offices, real estate agencies, and dispensing pharmacies by applying the operational know-how and technologies of MELON, a multilingual communication assistance service for medical institutions that started in 2016 in Japan.

The number of foreign nationals living in Japan exceeded 2.73 million at the end of 2018, a record high, and is expected to increase by 340,000 by 2024. So, the number of foreign nationals visiting financial institutions and government offices is expected to rise too.

Communication difficulties due to language barriers will only increase the workload of front desk personnel. Meanwhile, financial institutions have to monitor and investigate suspicious transactions to prevent money laundering.

KOTOBAL is said to enable quick and accurate communication between individuals who speak different languages through artificial intelligence (AI)-based machine interpretation and video interpretation by an operator. It can handle 13 languages including English, Chinese (simplified, traditional), Korean, Portuguese, and Spanish as standard. Vietnamese, Thai, Russian, Tagalog, Nepali, Indonesian, Hindi, and French are also available.

KOTOBAL's machine interpretation uses the speech translation engine developed by the National Institute of Information and Communications Technology (NICT). A user-friendly, quick-response application has been developed using Konica Minolta's experience in services for medical institutions.

The chat screen displayed on tablet devices has a function to save conversation logs, which can be checked afterwards to help prevent problems. When in-depth communication is required, the user can talk with an interpretation operator available 24/7 through the monitor.

'Android in the cloud' enables enterprises and DSPs to deliver mobile applications at scale

Canonical has launched a platform called Anbox Cloud that containerises workloads using Android™ as a guest operating system. It enables enterprises to distribute applications from the cloud.

Anbox Cloud allows enterprises and digital service providers (DSPs) to deliver mobile applications at scale, more securely and independently of a device's capabilities. Use cases for Anbox Cloud include enterprise workplace applications, software testing, cloud gaming, and mobile device virtualisation.

The ability to offload compute, storage and energy-intensive applications from devices (x86 and Arm) to the cloud allows end-users to consume advanced workloads by streaming them directly to their device. Developers can deliver an on-demand application experience through a platform that provides more control over performance and infrastructure costs, with the flexibility to scale based on user demand.

Jeff Wittich, Ampere: Better experience

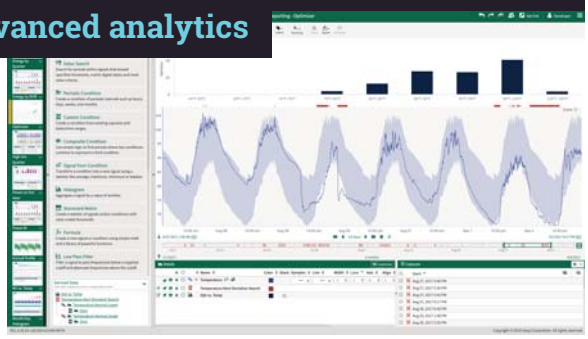
"Driven by emerging 5G networks and edge computing, millions of users will benefit from access to ultra-rich, on-demand Android applications on a platform of their choice," says Stephan Fabel, director of Product at Canonical. "Enterprises are now empowered to deliver high performance, high density computing to any device remotely, with reduced power consumption and in an economical manner."

Anbox Cloud enables enterprises to accelerate their digital transformation initiatives by delivering workplace applications directly to employee's devices, while maintaining the assurance of data privacy and compliance.

Enterprises can reduce their internal application development costs by providing a single application that can be used across different form factors and operating systems.

According to Jeff Wittich, SVP of Products at Ampere, "As the vast library of Android and Arm-native applications continues to grow, developers need proven systems that provide scalable capacity, reliable performance and deployment flexibility. The combination of Ampere's Arm-based servers with a provisioned virtualisation solution like Canonical's Anbox Cloud delivers the flexible, high-performance and secure infrastructure that developers need in order to deliver a better user experience for consumers."

Seeq Corp expands Saudi-led Series B funding with US$24mn to fuel advanced analytics



Seattle, USA-based Seeq Corporation, a specialist in manufacturing and Industrial Internet of Things (IIoT) advanced analytics software, has secured a US$24 million expansion of its Series B funding.

This expansion round is led by Saudi Aramco Energy Ventures (SAEV), the corporate venture subsidiary of the energy and chemicals company, Saudi Aramco. It includes renewed participation by Altira Group, Chevron Technology Ventures, Second Avenue Partners, and other existing investors.

Seeq enables engineers and scientists in process manufacturing organisations to rapidly analyse, predict, collaborate, and share insights to improve production outcomes. Customers include companies in the oil and gas, pharmaceutical, chemical, energy, mining, food and beverage, and other process industries. The funding will accelerate Seeq's expansion of development, sales, and marketing resources, and will also increase its presence in international markets.

"Seeq is providing an important improvement in software for customers in process industries to accelerate insights, action, and impact on their production and business outcomes," comments James Sledzik, venture executive at SAEV. "We are pleased to be leading the effort enabling Seeq's continued growth."

Upon final closing, Seeq expects the Series B expansion to reach approximately $30 million, which is in addition to Series B funding led by Altira Group.

Three out of four retailers plan to move some public cloud applications back on-premises

Greg Smith, Nutanix

According to the latest *Enterprise Cloud Index Report* the vast majority of retailers (87.5%) identified hybrid cloud as the ideal IT operating model. It also showed many retailers (72%) are planning to move some public cloud applications back on-premises.

The retail industry findings of the second annual report have been prepared by Vanson Bourne for the enterprise cloud computing specialist, Nutanix. The London, UK-based cloud company's report measures retailers' plans for adopting private, hybrid and public clouds. Retailers apparently recognise that "seamless customer experience is no longer a 'nice-to-have', it's a critical factor in winning new customers and retaining existing ones – and flexible cloud infrastructure is critical to delivering it," says Nutanix.

Other findings of this year's report include:

Retailers focus most on agility: Unlike in the broader IT industry, where cost is the top driver, retailers ranked the ability to accelerate IT deployments (54.3%) as the top factor in deciding the best cloud environment for each application. In order to adapt quickly to customer trends in an age of multichannel selling across many platforms, retailers are leading the pack in maximising the flexibility of IT infrastructure to keep pace.

Security is top of mind: Data showed that security heavily shapes retail cloud deployment plans. Nearly two-thirds of respondents (63.6%) said security has significant influence on their future cloud deployments, with hybrid cloud specifically identified as the most secure (32%). As data privacy regulations continue to tighten and expand, retailers are at the forefront of looking for ways to efficiently manage customer data securely. Hybrid cloud operating models offer the security and flexibility retailers need to stay ahead of policy changes.

Retail leads in digital apps and IoT cloud deployments: Always innovating to keep pace with customers' demands, retailers outpace averages in using the public cloud to run digital applications and Internet of Things (IoT) applications.

"Staying relevant to today's customers means having the necessary cloud infrastructure in place to embrace omnichannel retail experiences," says Greg Smith, VP of Product Marketing, Nutanix.

Germany's Bundesliga to use AWS machine learning and analytics to enhance football fan's experience

Germany's Bundesliga has selected Amazon Web Services (AWS) to deliver greater insight into every live broadcast of Bundesliga games and enable new personalised fan experiences.

Bundesliga will use AWS artificial intelligence (AI), machine learning (ML), analytics, compute, database, and storage services to deliver real-time statistics. These statistics will predict future plays and game outcomes, and recommend personalised match footage across mobile, online, streaming, and television broadcasts.

Using AWS technology, Germany's premier national football league will build new cloud-based services that automate processes, increase operational efficiency, and aim to enhance the viewing experience for the league's rapidly growing global fan base. By developing a new statistics platform on AWS, using Amazon SageMaker, a fully managed service to build, train, and deploy ML models, Bundesliga will offer fans real-time predictions on when a goal is likely to be scored, identify potential goal-scoring opportunities, and highlight how teams are positioning and controlling the field, based on live data streams and historical data from over 10,000 Bundesliga games.

Bundesliga also plans to leverage AWS ML services, such as Amazon Personalise, an ML service to create real-time and individualised recommendations, to offer fans personalised game footage, marketing promotions, and search results based on their favourite teams, players, or matches.

Using other AWS ML services, including Amazon Rekognition, an intelligent image and video analysis service, Bundesliga will build a cloud-based media archive that will automatically tag specific frames, from more than 150,000 hours of video. Combined with metadata such as game, jersey, player, team, and venue, the league can easily search historical footage and bring out pivotal plays for in-game broadcasts, in more than 200 countries.

AI system recruited by HR firm Randstad Belgium to improve customer relations and cashflow

Jean-Cyril Schütterlé, Sidetrade

Randstad Belgium has adopted the Sidetrade artificial intelligence (AI) platform called Aimie. The solution is designed to optimise the financial side of its customer relationships and to accelerate cashflow.

Randstad Belgium specialises in human resources services, flexible work (with the Randstad and Tempo-Team brands), and outplacement (Risesmart). According to a spokesperson, "by combining the best features of physical and digital processes, we can reinvent the future of work." Over the last few years, Randstad Belgium has been optimising its processes by putting innovative technology at the service of the job seekers and workers they help.

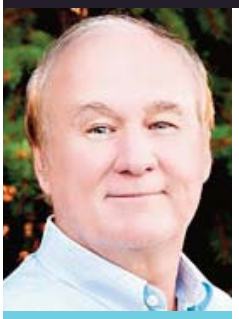
The HR company has been using Sidetrade's technology since 2013 to digitalise and automate its financial processes. Its finance department has reported a four-day drop in days sales outstanding.

Today, with enhanced data processing, artificial intelligence (AI) is playing an ever-greater role in companies, giving clear information in real time on the state of the business, and providing support to make the best decisions. New areas are said to be ripe for intelligent automation, including personalised client relations for finance, automated processing of invoices, and anticipation of client behaviour.

"We are going through a revolution, where our AI technology, using deep learning, and working in unison with CRM and ERP systems, rationalises business processes, makes work easier for people, and improves performance," says Jean-Cyril Schütterlé, chief product officer of Sidetrade.

To deal with an increase in sales (which total €1.5 billion) and a corresponding jump in the number of invoices, Randstad Belgium has decided to use Aimie (Sidetrade AI) for decision-making support. Trained on 313 million business-to-business (B2B) payment experiences totalling more than €953 billion over the last three years, Aimie frees staff from time-consuming collection tasks, and automatically adjusts workflows according to client-specific payment behaviour, while assigning the most complex cases to staff depending on workload. The actions recommended by Aimie are reportedly 53% more effective than conventional decisions made by the human mind alone. The solution also cuts useless tasks by 51%, allowing staff to focus their expertise on the most important disputes and spend more time developing human relations with clients.

Enghouse Systems buys Dialogic's software business for US$52mn



Steve Sadler, Enghouse Systems

Reading, UK-based Enghouse Systems Ltd (TSX:ENGH) has acquired the USA's Dialogic Group Inc. for approximately US$52.0 million. Based in Parsippany, New Jersey, Dialogic partners with mobile operators, system integrators and technology developers to deploy its solutions via its worldwide network of offices.

Dialogic specialises in media processing software, with a scalable solution that supports real-time video conferencing and collaboration applications across all devices. Dialogic's infrastructure products offer a best-in-class Session Border Controller and several software-based network solutions to communication service providers. This combination enables the transformation from legacy TDM (time division multiplexing) to next-generation network platforms.

Steve Sadler, chairman and CEO of Enghouse Systems says, "This acquisition strengthens our position in the enterprise video and unified communications market segment by adding rich multi-media processing applications and capabilities."

Developers feel pressured to sacrifice code quality to hit deadlines, new study finds

Developers are under pressure to produce quality software, and to do it quickly. But new research from Diffblue suggests that developers can't reconcile these conflicting expectations with manual effort alone.

When asked which factors contribute to poor software quality, 40% of developers attributed it to manual processes, and 40% cited unrealistic schedules. Without addressing these issues, improvement in code quality is unlikely — so for company expectations to remain high, organisations will need to start providing better support for their development teams.

Developers want to improve code quality, but don't have time to do it manually

Organisations often set "code coverage" targets for developers to achieve, which requires writing unit tests to ensure software quality. The study revealed that the average code coverage target for organisations is 63%.

Most developers agree that unit tests improve software quality (90%) and speed up code maintenance (95%), but to meet their coverage goals, developers spend 35% of their time writing tests, and 20% of their time just writing unit tests. Even so, almost half (48%) of developers agreed that they sometimes find it difficult to achieve the unit testing coverage set by their organisations.

In addition to code coverage targets, developers are also under pressure to deliver new production code, which takes 29% of their time. According to the study, 42% of developers agree that they have skipped writing unit tests in order to speed up new feature development.

Developers want to introduce more automation

The research also found that introducing the right tools, especially tools that automate repetitive manual tasks, is important to developer job satisfaction — and 73% of developers in the UK report they could be more satisfied in their jobs.

For most, their organisation's willingness to adopt new technology, like artificial intelligence (AI), is important to job satisfaction (84% agree), as is having realistic targets (87%). Both of these can be addressed by providing access to the right tools.

Of the developers surveyed by Vanson Bourne in the US and UK, 82% would rather spend their time on creative tasks, such as developing new product features, than on repetitive tasks. When it comes to writing the unit tests necessary to meet internal coverage targets, 66% agree that unit test set-up is mundane and 39% of developers wish they didn't have to write unit tests at all. When asked which tasks developers would most like to see automated, findings bugs (selected by 73%) and software testing including writing unit tests (selected by 70%) were the top two responses.

Responses for this study were collected from 300 participants (200 in the US and 100 in the UK) in an online survey. All respondents work in software development, application development and DevOps in sub-executive-level roles at companies with at least 500 employees, across various sectors.

Q&A WITH TRANSFORMA INSIGHTS

Matt Hatton and Jim Morrish, founders of Machina Research, which was acquired by Gartner in 2016, are back with a new industry analyst firm, Transforma Insights. This time they are focused on Digital Transformation (DX), which aligns neatly with the launch of this magazine, The Evolving Enterprise (www.TheEE.io). Here, EE's editorial director and publisher, Jeremy Cowan talks to the serial entrepreneurs about the buzz and the business challenges in DX.

We're going through a process of technology-led change that is unlike what we've seen in the past

JC: There's a lot of discussion about Digital Transformation within enterprises at the moment. First of all, how do you define it?

MH: Our view is that it's mostly a useful umbrella term for the use of new technologies to provide some form of competitive differentiation, which might be through greater operational efficiency or product improvements. We've chosen to use the term at Transforma Insights because it broadly covers the technologies we think are disruptive and transformational.

JM: Our coverage focuses on a group of technology families, such as artificial intelligence (AI), Internet of Things (IoT) and Distributed Ledger, that are commercially available today, and potentially disruptive to markets and transformational to organisations. Naturally, the list will change over time as new things arise and older technologies become part of the fabric as has been the case with e-commerce say, or enterprise mobility.

JC: Why is Digital Transformation so important now?

JM: We're going through a process of technology-led change that is unlike what we've seen in the past. Historically, technology has stimulated organisations to change what they do. This latest wave is changing the nature of those organisations so that they are becoming technology companies themselves.

MH: ICT is no longer a support act, it's now a strategic imperative and part of the fabric of the organisation. Every enterprise is a technology company now. That is qualitatively different from the disruption we've seen in the past. But it's important not to hyperbolise. Will it be as transformational as the agricultural and industrial revolution where 80% of the population had to change almost every aspect of their lives, including what they do and where they live? Unlikely.

JC: Which technologies do you think will be the defining ones for enterprises in the next decade?

MH: There's not much doubt in my mind that the big ones are AI and IoT. In many ways this is because they cover a multitude of diverse topics in themselves. Both have their relatively mundane implementations, such as spam detection or environmental monitoring, but they also have incredibly rich opportunities.

JM: That's borne out by the extensive forecast exercise we recently completed looking at how

Matt Hatton,
founder, Transforma Insights

Jim Morrish,
founder, Transforma Insights

much organisations are investing in the various technologies (*see pages 16-19. Ed*). IoT and AI will account for over three-quarters of the US$5 trillion global spend between now and 2030.

MH: We tend to think that IoT has been around for most of the last decade, and that's partly true with the vanguard of adopters doing really interesting stuff. Most enterprises have only scratched the surface. AI is even less mature and organisations are still testing the bounds of what's possible.

JC: What are the biggest challenges for enterprises looking at Digital Transformation?

JM: Digital Transformation ultimately comes down to three things: technology, people and process. Those three are inextricably linked. The key for technology success is picking the right ones at the right time and implementing them in the right way, learning lessons from other similar deployments. Enterprises need to think very carefully about their approach to horizon scanning and innovation. They need to be structured for success. That's where *Transforma Insights* comes in. One of the key ways we help our clients is educating them on the technology landscape and how they can best use the new tools available. That said, it's people and processes that generally represent the biggest challenge for most organisations. Often these transformational exercises involve dramatic changes to internal organisational processes and structures.

MH: Thinking about specifics, one of the main questions that enterprises ask us is how they should organise their innovation or digital transformation (or whatever they call it) efforts. The answer is relatively simple. It's essential to have some kind of central function coordinating efforts. Without that it's chaos. However, it's equally important to ensure that the central business unit doesn't succumb to the usual mistakes of such functions and become removed from the real-life operations of the business, churning out strategic policies which are roundly ignored. Front line business units must be involved in the formulation of strategy and testing, for instance by allocating responsibility for identified disruptive technologies to the most relevant unit and allowing further strategic decisions to be made there.

JM: I'd go even further. For many organisations it's just too difficult to enact change, so they may have to set up a new division to use the new technologies. Like **HSBC** bank did with **First Direct**, for instance.

JC: You must see a huge number of cutting edge deployments. Tell us about some of the more innovative thinking you've seen during your research?

JM: Well, for me it has to be additive manufacturing in space. It's one of those things that isn't immediately obvious, but just makes sense. Why struggle to fit solar panels for satellites into the restricted cargo hold of a launch vehicle, when you can just print them when you get there? Also, from the additive manufacturing field is generative design: applying the principles of evolution and natural selection to alternative component designs to optimise for a combination of price, weight, and strength. Some of the resulting designs are spectacular.

MH: I'm going to have to point to the world of AI. The most interesting things that are happening are in deep learning and specifically neural networks, i.e. getting AI to think like a person. Not replicating the output, but actually going through the same learning processes as a human.

JC: Finally, how do you see the analyst world at the moment? You've both been analysts for many years. How do you see that evolving?

MH: The role is still essential. It's outsourcing that horizon scanning capability that Jim referred to earlier. Analysts are better able to keep their fingers on the technology pulse than anyone. We do it so our clients don't have to, which brings the obvious benefits of scale. But the way that clients are supported is changing. At Transforma Insights we're focusing on providing tools to help our clients make critical decisions, based on real-world examples.

JM: We think that's better than saying "the analyst knows everything" and trying to provide supposedly actionable recommendations that are universally applicable to every organisation. The reality is that organisations know themselves better than analysts ever can. They want to be told what they don't know and helped to apply it to their circumstances, rather than being spoon-fed generic advice. ■

Focus on outcomes not technology, says Aeris Communications

Matt Hatton, founding partner at Transforma Insights, speaks to Mohsen Mohseninia, VP for International Market Development at Aeris Communications, about how the Internet of Things (IoT) is critical to Digital Transformation, and how Aeris is focusing its discussions with customers on how to remove their pain, rather than a focus on an alphabet soup of technology.

"Ventic is our new joint venture with Volkswagen, one of the world's largest car manufacturers. It will develop and operate a connected vehicle platform for Volkswagen."

Matt Hatton: For the readers of The Evolving Enterprise who may not be familiar with you, can you introduce Aeris Communications and what you do?

Mohsen Mohseninia: Our core role is to take our clients on a journey from unconnected products to connected services. Put simply, we help companies, large and small, to win with IoT. There are two main parts to what we do. First, we provide highly reliable and scalable connectivity for IoT devices through our Aeris Fusion IoT Network. The other pillar is the Aeris Mobility Suite, with which we support car manufacturers and other organisations in connecting moving assets such as vehicles, bicycles and so forth. Both of these capabilities are aimed at providing our clients with best-in-class capability in a cost-effective way, which helps to reduce their time to market with new services.

We have a team of more than 300 people worldwide responsible for supporting more than 14 million devices connected in 190 countries. The team has more than a decade experience in the IoT space and we have won numerous awards for our products and services.

MH: In our latest forecasts, we found that more than half of the value of what is termed 'Digital Transformation' was dependent on your core focus area of IoT, making connecting things a critical part of most organisations' digital transformation initiatives. Does that resonate with you and what do you think are the critical factors that an enterprise should be thinking about when undertaking their digital transformation initiatives?

MM: We work with organisations of all sizes, all around the world, all of whom are looking at how to use new technologies to get a competitive edge. For most of those organisations, the starting point is connecting some sort of remote asset. So yes, IoT features prominently and early in their digital transformation journey. What's particularly challenging for many of the clients is that they are venturing into a completely new world with IoT, which often is well outside of their comfort zone. Decision making is particularly challenging given the accelerating pace of technology change.

The key thing for organisations looking to implement IoT is to find trusted partners that will provide the most capability with the least pain. Specifically, this involves finding an organisation to work with that gives as much functionality as possible, no lock-ins, and no barriers to scaling. It's also important not to lose sight of the time scales involved. Organisations are committing to technology programmes that will be with them for decades. With that in mind, they need partners who have a proven track record in delivering. Aeris has been doing this for more than a decade, supporting connected devices running critical applications worldwide.

Mohsen Mohseninia,
VP for International Market Development at Aeris Communications

MH: Is it vital to put yourself in the customers' shoes? Most of them are a long way from being experts on IoT or connectivity. They just need someone who understands their issues and solves them.

MM: For our clients, factors such as time-to-market and availability are much more important than, say, which technology is being used, or which carrier. It's easy to obsess about connectivity technologies, such as 5G, in a constantly evolving landscape. But the thing that matters most to the clients is that their application is connected in as reliable and cost-effective a way as possible.

It's critical that we at Aeris Communications never lose sight of the need to create network solutions that work for our clients. One way in which we do that is to break down the walls between application and connectivity. Because we manage both elements, we're able to use connectivity features such as SIM provisioning, data consumption tracking and troubleshooting more effectively to deliver the real outcomes that the client needs. For instance, we're able to analyse network behaviour to determine if there is an underlying issue with the application. By thinking holistically about the connectivity and the application together, and running our own core network, we can reduce operational costs by 30%. Also, field updates are 50% quicker, thus helping our clients beat the competition to market.

Matt Hatton,
founding partner at
Transforma Insights

"The Aeris Fusion IoT Network has been designed from the bottom up with a network to support IoT devices, which makes it much more effective and resilient than retrofitting into an existing system."

What we do is provide an extra layer of value on top of IoT connectivity. In recent years, it has become common to hear about connectivity being described as commoditised, with price being the only differentiator. There are pile-it-high, sell-it-cheap providers of connectivity that are nominally cheaper, but the reality is that the Total Cost of Ownership (TCO) can be significantly compromised by buying connectivity off the shelf. When you consider time-to-market, fault resolution, network future-proofing and all those other issues, the cheapest option usually isn't the cheapest option.

MH: Your main product suite for connectivity is the Fusion IoT Network. Can you elaborate on what it provides?

MM: The Aeris Fusion IoT Network has been designed from the bottom up with a network to support IoT devices, which makes it much more effective and resilient than retrofitting into an existing system. It's deeply integrated into carrier networks, which gives us better visibility for troubleshooting and management. It's also much easier for our clients to work with, providing a single pane-of-glass management for multiple carriers and access technologies, and a single portal for billing, support, APIs, VPNs and more.

To get a bit technical, the Aeris Fusion IoT Network is an intelligent solution for connecting IoT devices across all of the relevant mobile technologies, 2G, 3G, LTE, LTE-M and NB-IoT. We're also 5G-ready, which we think makes us stand out from the crowd. However, the important thing for our clients isn't the technical specifications, it's what we're able to do for them. The big advantage for our clients is that they don't need to think about technologies. We will deal with issues such as technology sunsetting, as well as shifting to more efficient technologies as they become available.

To give one great example, 2G and 3G network technologies, upon which IoT has depended for years, are being switched off around the world. Some countries already have done so, others are in the process of doing so but with little consistency of approach, and in many other places, the technologies will persist for years to come. This patchwork of networks causes quite a headache for anyone making a connected device, particularly if the device will need to operate in multiple countries and for many years – which technologies should they use?

The bottom line is that businesses should not need to care. All they want is to ensure that their solution is future-proof and as cost effective as possible. That's where Aeris as a partner comes in.

MH: Clearly, the important thing for you is the client impact, rather than the technology. Can you share some of the benefits that your approach brings?

MM: Happy to do that. With the Fusion IoT Network, devices connect more reliably, operational efficiency is improved, IoT programmes work better and fault resolution is faster. The top line figure is that our connectivity solutions deliver up to 30% savings on connectivity costs.

To dive in to one specific area quickly, by virtue of our operating model, in which we work with multiple carriers, we are able to provide better coverage for our clients, which provides a benefit that can be passed on to our clients. For instance, in the U.S., by working with multiple carriers, we reduce connectivity issues by more than 10%, and with a lower battery consumption, which is critical for some of our clients' applications.

MH: It's hard to discuss IoT without bringing up the topic of security. This must feature prominently, of course?

MM: Yes, naturally, and it's one other thing that our clients don't want to have to worry about. In the same way that we take a holistic view of the application and connectivity, security also is an integral part of what we do, rather than being bolted on at the end. Within Fusion IoT Network, we have a number of integrated features. For example, we have created ConnectionLock™ which is implemented at the network layer, giving an additional level of security by preventing access to unauthorised endpoints and acting as a firewall. This provides an additional layer of security for clients wherever in the world their devices might be deployed.

MH: You recently made some announcements about the Aeris Mobility Suite and particularly a new initiative called Ventic. Can you tell me a little more about those?

"IoT features prominently and early in their digital transformation journey"

MM: Aeris Mobility Suite is our application platform for what we call the Internet of Moving Things. It provides a set of modular tools to allow automotive manufacturers and similar organisations, such as insurance companies, for usage-based insurance and car sharing scheme providers to easily roll out connected vehicle services. We have more than a decade's experience in supporting car manufacturers in their connected car journey and we count a number of major manufacturers amongst our clients.

Because of our heritage in connecting vehicles, the client can have a tried and tested solution from an experienced provider delivered quickly; we can have a working system delivered to new clients in less than six months and new applications in the market in 90 days. Again, the key questions for clients should be; have you done this before, can we rely on you to do it right and will it be quick to market?

With Aeris, the answer is yes, yes and yes.

Ventic is our new joint venture with Volkswagen, one of the world's largest car manufacturers. It will develop and operate a connected vehicle platform for Volkswagen. We're delighted with the launch of the new JV, not least because it's a great opportunity to prove Aeris's capabilities with one of the world's biggest companies.

MH: You're no strangers to working with the biggest corporations on the planet, by the sound of it.

MM: Absolutely right. In fact, this isn't even our first joint venture with a giant partner. Back in 2016, we announced a tie-up with Softbank, one of the biggest corporations in Japan. That's in addition to having numerous household names, such as Bosch and Mitsubishi, as clients. Aeris has a proven track record working with big companies. But I should stress that our clients come in all shapes and sizes. Many of the most progressive-thinking companies in adopting IoT are smaller ones.

MH: The team here at Transforma Insights made its name covering IoT but for the last few years it feels like the most cutting-edge things have related to adjacent technology fields, like artificial intelligence and machine learning, data exchanges, distributed ledger and so forth. Are we all Digital Transformation (for want of a better term) companies now?

MM: I think there's a lot of truth in that. Aeris now is in an enviable position in terms of putting in place the technical infrastructure to support connectivity and then build on that during 2020 with new functionality. In particular, we have turned our attention to machine learning and artificial intelligence as ways to increase operational efficiency.

We're very keen to avoid the scenario of being a technology company that advocates its clients adopt new technologies while being a laggard itself. We're particularly excited to explore what artificial intelligence and machine learning can do for us.

MH: One of the interesting trends we're predicting for 2020 is the greater integration of webscale cloud providers within the connectivity space. Is that something you are seeing too?

MM: That's just one way that the IoT space is changing. It's impossible to stand still and we are exploring lots of new avenues of change at the moment. For instance, we are working with a lot of new partners, including hardware makers and cloud major players, to develop the capabilities to improve time-to-market and efficiency. It's important for us that we're cloud-agnostic though, with no lock-in to a particular provider. ■

TRANSFORMA INSIGHTS

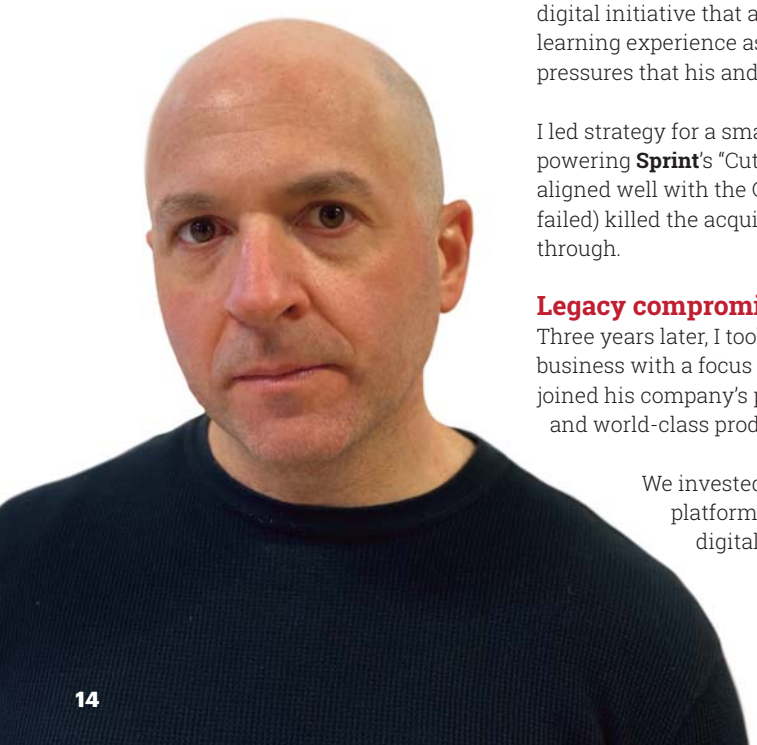
THE INSIDER
When Digital Transformation misses

The trend across enterprises is overwhelmingly toward digital transformation. It's considered critical to growth if not to survival. But digital programs do miss, sometimes badly. So says, Ed Finegold, author, analyst, thought leader & digital start-up veteran. Despite grandiose executive visions touted boldly in keynote addresses, folks with boots on the ground know all too well that vision and implementation often diverge.

In this new series we explore some of the practical reasons digital initiatives fall short, providing real-world examples of digital initiatives that look great on paper but are not viable as implemented. The aim of these articles is to offer takeaways for how to avoid late game misses at the start (or restart) of a digital initiative.

Will your legacy mindset compromise your digital competitiveness?

Ed Finegold,
author, analyst, thought leader
& digital start-up veteran



Carrying legacy process, technology and thinking forward in the course of digital transformation will make it difficult, if not impossible, for new digital products to compete. Executives espouse increasingly grandiose visions of what their digital transformation efforts will deliver, but these visions are frequently compromised as they trickle down to implementation.

It is not easy to abandon what's made an enterprise successful for years or decades. As legacy elements creep in, they can undermine transformation efforts. Projects may hit every milestone and go live, yet what is delivered is so compromised at a detail level by legacy that it is not digital enough to compete.

Brilliant CIO

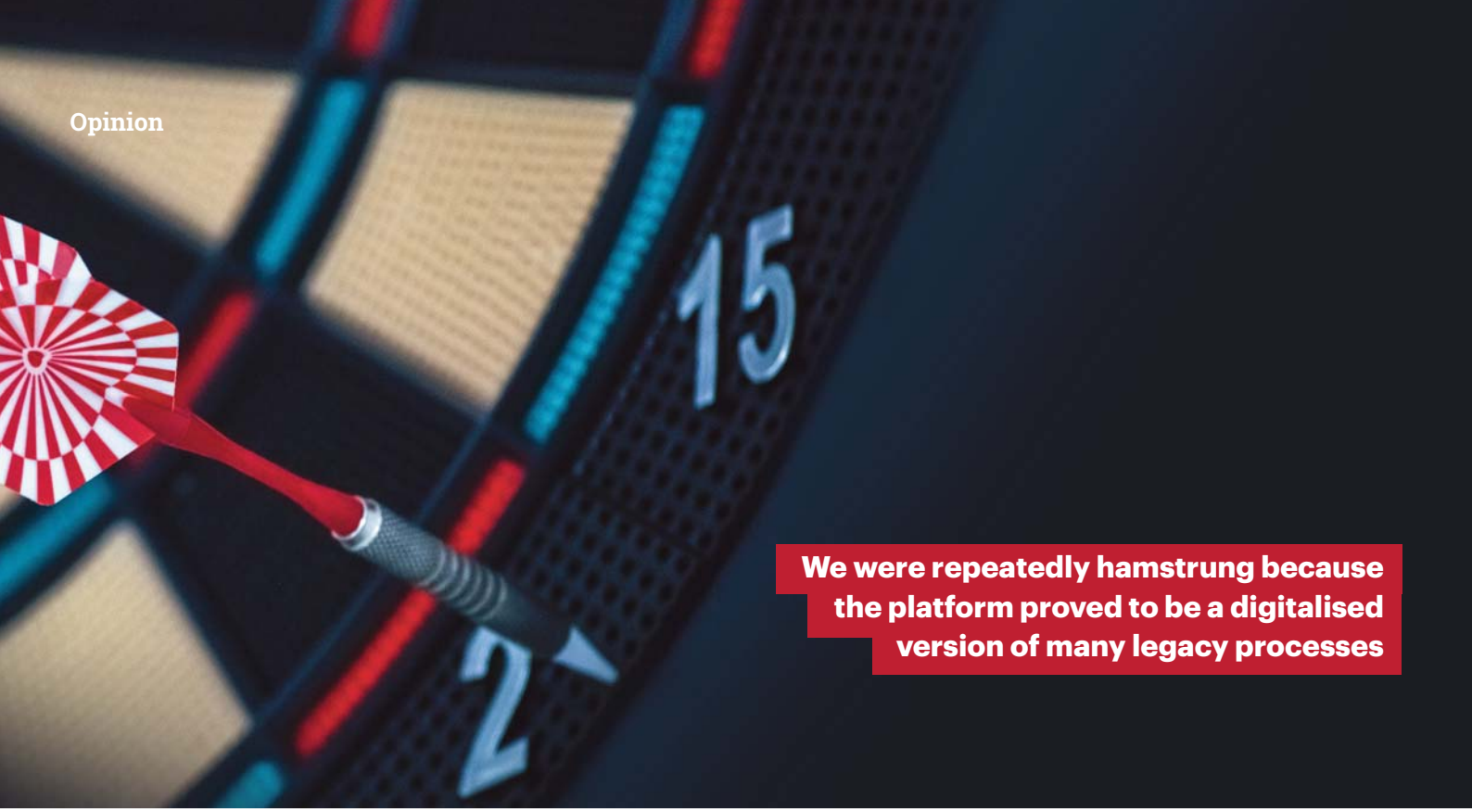
Four years ago, I had the privilege of working one-on-one with a *Fortune 100* CIO on an early digital initiative that aimed to transform his company's mobility channel. It was a superb learning experience as this CIO not only foresaw but could articulate at a detailed level the pressures that his and his customer's businesses would face as a result of digital disruption.

I led strategy for a small digital start-up at the time, which had just come off a smashing success powering **Sprint**'s "Cut Your Bill in Half" customer acquisition campaign. Though our solution aligned well with the CIO's forward-looking plan, circumstances at the start-up (which later failed) killed the acquisition deal and prevented our team from seeing this amazing opportunity through.

Legacy compromise

Three years later, I took a chance on a new start-up venture, building a value-added reseller (VAR) business with a focus on mobility. Leveraging lessons learned from my time with the CIO, we joined his company's partner program in order to gain access to vast resources, skilled people and world-class products.

We invested early money – the most expensive kind – in a ready-made e-commerce platform accessible only through this partner program. Our intent was to provide digital pop-up stores to clients who could in turn open them to their customers or



We were repeatedly hamstrung because the platform proved to be a digitalised version of many legacy processes

members for discounted pricing on a variety of useful products. While the concept was powerful, it soon became clear that the e-commerce platform was too compromised by the large company's legacy to obey rules fundamental to digital success.

On paper, the platform was designed to enable a fully functional e-commerce storefront on any website with a simple integration. On initial assessment, the boxes all seem checked. The platform was pre-integrated with a robust product catalogue; automated payment and shipping; pricing controls; custom bundling; coupon codes; and more. The concept was truly digital and aligned with the vision the CIO had described years before.

As we dug into our implementation, however, we were repeatedly hamstrung because the platform proved to be a digitalised version of many legacy processes. For example, basic user experience tenets were violated. The store would require customers to "call for availability" when a product was out of stock, with no ability to filter out such products or change the call to action; the developers explained this was a legacy compromise.

Similarly, many products required the visitor to request a price quote. While this approach is typical in a legacy, business-to-business (B2B) setting, it doesn't fly in a digital setting. Imagine this as an employee or member store; if it can't beat **Amazon** on both price and user experience, it's not much of a perk. Had the platform been offered with a common, digital approach – a 30-day free trial – we would have sorted these limitations out much more quickly.

Not mobile first?

The storefront also failed to work smoothly on a mobile device. Resizing the display would create content presentation problems that sullied the shopping experience. A list of other legacy-derived issues emerged as well including: limited payment options; costly shipping with added handling fees; and a lack of integrated shipment tracking and notification. These are staples in the digital world. Lacking these capabilities while adding incremental costs undermines one's ability to compete in the digital market, especially against marketplaces like Amazon and **eBay**.

Legacy processes also impacted the administrator's experience negatively. For example, orders would not flow through automatically; they had to be reviewed manually and then submitted to the provider. Bundles were difficult to create because the management console did not provide price and margin visibility. A half dozen offline workarounds had to be created to facilitate price and margin analysis; to test pricing models; and to ensure products were not offered below cost.

The reasons why these problems persist can be summed up in one word: legacy – legacy catalogue rules; legacy shipping processes and fees; and legacy fulfilment processes.

As powerful as the concept was, in practice it restrained small, innovative partners with an appetite for risk from competing in the digital economy's brutal jungle. The digital economy will not forgive legacy compromises, nor will agile partners who could break new ground in digital transformation, but only if they are unshackled from legacy compromises. ■

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What is Digital Transformation and why is it worth $5 trillion?

Digital Transformation (DX) has been hitting the headlines in the tech world recently. If reports are to be believed, every large corporation is going through a technology-driven change that will transform every aspect of how it does business. The truth is rather more complicated. Report by Transforma Insights.

IT has started to become, and will continue to be, increasingly strategically important to every sector: The core products of the organisation are being changed by new technology in meaningful ways. Think of how the internet changed retail. This type of fundamental technology-based change is coming to almost all industries and it will radically shake up how they do business. It is also stimulating a lot of spending, with the latest Transforma Insights forecasts estimating that enterprises will invest US$5 trillion in DX technologies by 2030.

Digital Transformation Spectrum

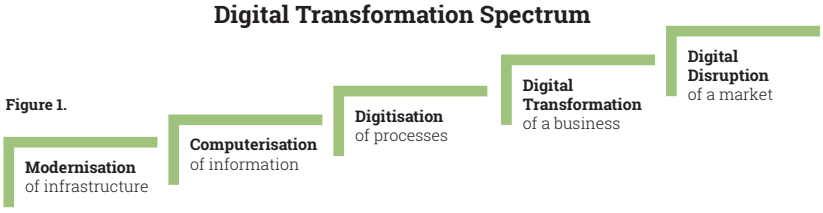


Figure 1.

A spectrum of transformation

DX exists on a continuum of technology-driven change within enterprise, as illustrated in Figure 1 above. Modernisation is characterised as the incremental application of new technologies in already existing environments, for instance deployment of new types of software container, or leveraging cloud infrastructure or software defined networks. It does not radically change business processes or value propositions, but techniques to achieve the same results are upgraded.

The first tier of transformation is Computerisation, which concerns rendering information from the analogue world to digital. Examples include analogue sensor readings, or even scanning physical documents. This is about using digital formats, but not necessarily changing associated processes.

Next is Digitalisation, which involves reengineering those corporate processes to use digitised information, for instance allowing employees worldwide to access and act upon the digital data mentioned above.

True DX involves new business propositions, or the overhaul of operational processes in such a radical way that it gives a competitive advantage. This is often closely focused on end user needs rather than being a simple iterative evolution of the existing products and services. At a macro scale, there is Digital Disruption, which is DX at an industry level. Technological change within the industry alters the market dynamics, radically affecting some organisations, for instance Kodak being overtaken by the advent of digital photography.

What is Digital Transformation?

DX is a useful umbrella term for a diverse set of technologies that can be applied in specific ways to effect a change in the way that an enterprise operates. Companies, despite the headlines, do not really enact a 'digital transformation'. In reality, it is shorthand for the adoption of specific technologies to implement particular capabilities which it has identified as valuable for competitive differentiation, cost reduction, compliance or some other relevant business issue. This is likewise the case for most of the various technology hot topics, such as IoT or AI: the headline typically belies a narrow implementation aimed at solving a very specific need within the organisation.

The key enabler and driver of DX is the emergence of new disruptive technologies or the use of existing technologies in disruptive ways. It's worth noting that even older technologies can become disruptive in certain circumstances, most notably where the price to implement them falls below a certain threshold, or they become significantly more user-friendly. One example is in publishing, which historically was owned by large publishing houses, but decreasing costs and the arrival of new enabling platforms have allowed it to become much more democratised with the likes of print-on-demand services from Amazon.

Transforma Insights considers Digital Transformation to comprise 12 families of new technologies, each of which incorporates numerous concepts that can be applied by organisations to improve their prospects. See table below. Collectively, they bridge the gap between the real and the virtual world and involve the handing over of autonomy from human to machine.

In some cases, the activity concerns sensing real world processes. IoT, for instance, is at its most basic level about a network of sensors converting the real world into data which can then be applied to other processes or fed back into actions. The same is true of technologies such as Augmented Reality / Virtual Reality (AR/VR), which we include in the category of Human-Machine Interface (HMI), which senses human behaviour and blends it with data from the virtual world. Much of the latest generation of Product Lifecycle Management (PLM) is also concerned with taking real world data about the performance of products, and feeding it back in the form of, for instance, Digital Twins.

Other technology groups work in reverse, translating the virtual world into the real world. Clearly, this is the case with 3D Printing, for instance. Autonomous Robotic Systems such as drone fleets can also be considered in this way.

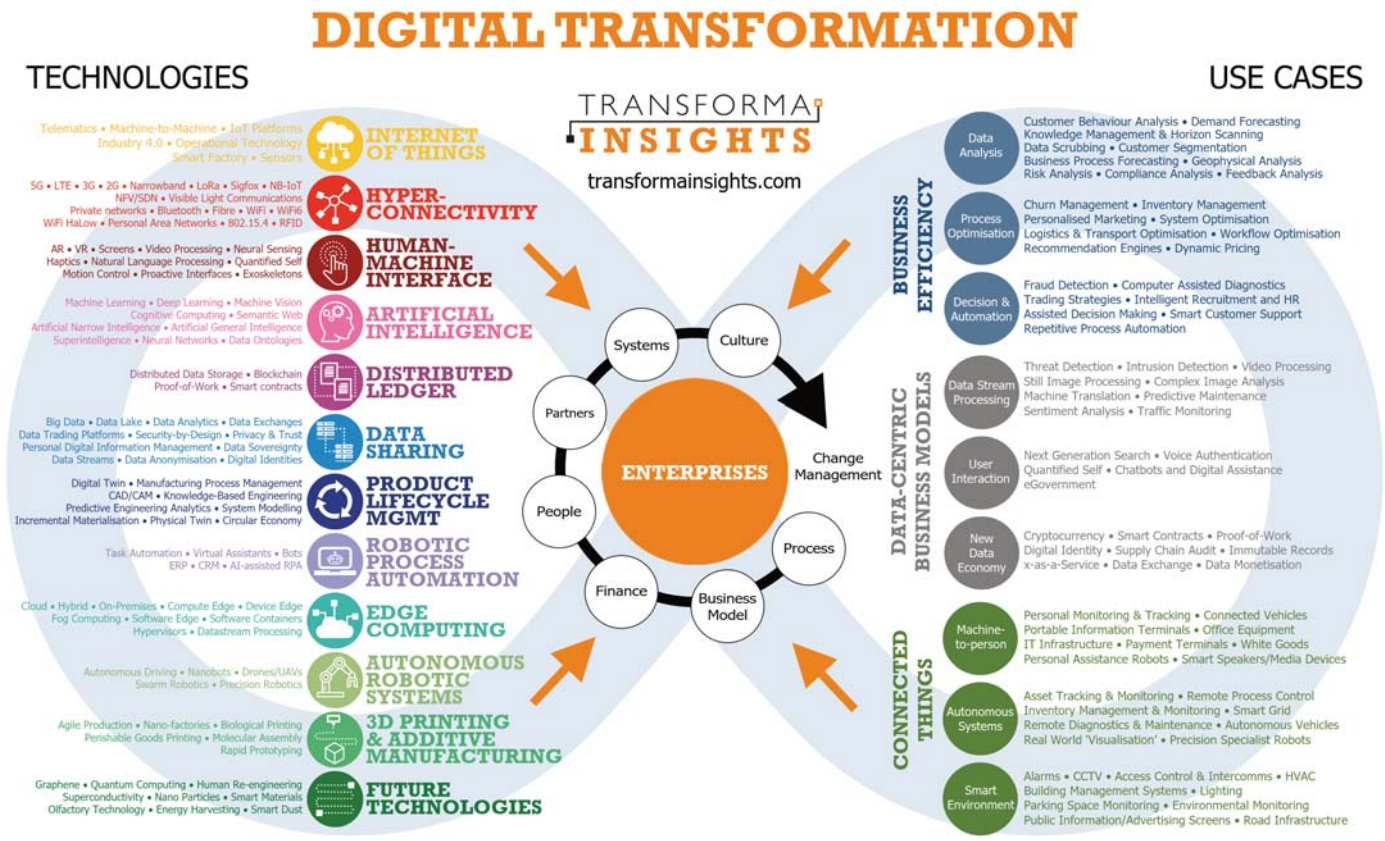
The third category is those technologies that exist only in the virtual domain but convert processes previously undertaken by humans into those performed by machines. Artificial Intelligence, in all its diversity, is essentially intended to do this. Also, Robotic Process Automation (RPA) takes manual human activity performed in the virtual world and replicates it to remove or reduce the need for human intervention.

There are a further set of technologies such as graphene, quantum computing and nanobots, which we categorise as 'Future Technologies' that are not really being commercialised today but offer interesting opportunities in future.

A vast array of use cases

The next dimension to consider in DX is that of use cases. *Transforma Insights* has identified 76 categories of use case spanning business efficiency (for instance process automation, churn management and workflow optimisation), new data-centric business models

The authors are Matt Hatton and Jim Morrish, co-founders of Transforma Insights, the analyst firm specialising in digital transformation. Their track record includes the founding of Machina Research, which focused on the Internet of Things (IoT) and was successfully sold in 2016 to Gartner.



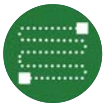
	Technology Family	Description	Key vendors	Investment* 2020-30 (US$ billion)
	Internet of Things (IoT)	The Internet of Things (IoT) describes a diverse range of technologies used to connect various devices for the purpose of monitoring and controlling those devices and exchanging data. In our definition it includes Operational Technology (OT), simple machine-to-machine (M2M) data gathering, Industry 4.0 use cases, and many similar use cases.	Amazon, Bosch, IBM, Microsoft, PTC, SAP, Siemens	2,698
	Hyper-connectivity	Hyperconnectivity describes an environment of ubiquitous connectivity, often with specialised functionality adapted to the demands of a particular application. This includes all cellular technologies up to and including 5G, LPWA technologies such as LTE-NB1 and LoRa, short range technologies including the 802.15.4 family and fibre-optic communications.	AT&T, China Mobile, Deutsche Telekom, Qualcomm Semtech, Verizon, Vodafone	242
	Human Machine Interface (HMI)	Human-Machine Interface (HMI) covers all mechanisms by which humans interact with machines. This includes direct user interfaces such as screens and AR/VR as well as verbal and motion.	Microsoft, PTC, Scope AR, Toshiba, Wakingapp	211
	Artificial Intelligence (AI)	Artificial Intelligence (AI) relates to the creation of intelligent systems that can imitate (and potentially exceed) human intelligence. It includes all of the progressive developments towards Artificial General Intelligence and Superintelligence, including machine learning and deep learning.	Facebook, Google, IBM, Microsoft, DataRobot, H2O.ai, Dataiku	1,096
	Distributed Ledger (DL)	Distributed Ledgers are distributed databases potentially with permanent immutable records, the control, validation and authentication of whose data records is handled via consensus-based systems. Includes Blockchain.	Bosch.io, Hyperledger, IOTA, IBM, Microsoft	92
	Data Sharing	Data Sharing comprises the infrastructure and frameworks for organisations to handle the exchange of complex, critical, valuable or near-real-time data within and between organisations. It includes data storage, analysis, exchange, validation, rating, and trading, amongst other things.	Chordant, Hitachi, KPN, Telia, Terbine, T-Systems	185
	Next-Generation Product Lifecycle Management (PLM)	Product Lifecycle Management involves managing the development of a product from concept to ultimate redundancy and disposal. It includes all aspects of development, including computer aided design, as well as various techniques associated with managing the operational phase of the devices including Digital Twin. It also includes monetisation techniques that apply through the full product lifecycle. In the context of Digital Transformation we are really interested in next-generation PLM activities such as AR and ERP integration, Digital Twin and xaaS.	Dassault 3DS, Hexagon, PTC, Siemens	84
	Robotic Process Automation (RPA)	Robotic Process Automation takes business processes and streamlines and automates them through intelligent agents. This category also includes lesser business process automation activities that handle the automation of regular business tasks.	Automation Anywhere, Blue Prism, UiPath	78
	Edge Computing	Edge Computing refers to a few concepts associated with devices or network elements that are located near the edge of a network. It typically refers to locating compute power away from the core network, either on the end devices itself where the data is created, or somewhere nearby. In considering Edge Computing we also give consideration to Cloud, Fog, On-Premises and Hybrid solutions.	Bosch.io, Cisco, Cloudera, HPE, Huawei, Nokia	87
	Autonomous Robotic Systems (ARS)	Autonomous Robotic Systems consist of distributed physical machines, such as drones and autonomous vehicles, that are able to operate autonomously and potentially collectively.	ABB, Da Vinci, Delair, DJI, Intel, Kuka, Omrom	127
	3D Printing & Additive Manufacturing	3D Printing & Additive Manufacturing relates to production facilities capable of producing either previously 'unmanufacturable' components or customised products, including in unique materials and potentially using generative design techniques.	Autodesk, Carbon, Stratasys	100
	Future Technologies	Future Technologies is our umbrella term for a diverse set of new and emerging technologies that have yet to be truly commercialised, but which might potentially have a significant impact in the medium term. Leading examples include Graphene, and Quantum Computing.	Google, IBM, XG Sciences	n/a

Table 1: Digital Transformation Technologies [Source: Transforma Insights, 2020]

*Investment relates to enterprise investments in Digital Transformation software and services.

(including chatbots, data exchanges and video image processing), and those associated with connected things (such as smart grid, asset tracking and AR/VR), as illustrated in the chart on page 17.

These use cases involve the application of one or more of the technologies discussed earlier to effect some change within the organisation's processes. Many are simple automation projects, for instance relating to the processing of invoices. These tend to be relatively easy to implement, requiring a simple calculation of return-on-investment and a well bounded IT project. These are the low-hanging fruit of DX. At the other end of the spectrum are those use cases that are fundamentally transformational to the organisation.

One example is that of x-as-a-service (XaaS), which involves the organisation switching from selling a product to providing it as a service. This is increasingly common for industrial equipment manufacturers. While it might seem straightforward, the reality is that making such a change has significant implications for almost every facet of the organisation including sales, customer care, finance and operations.

People and process trump technology

This brings us on to the third and final leg of the DX stool: People. The adoption of new technologies and the implementation through new uses cases often requires substantial organisational change. This includes new skills, new processes, culture changes and partnerships. All of this can be challenging to implement.

Few would counter the view that the people and process changes implicit in DX are the hardest things to effect. While every project is different, there are some common approaches that will help to ensure success:

- **Prioritise**. You cannot undertake every conceivable project. Often the low-hanging fruit of process automation bring the best returns before more fundamental overhauls of the organisation should be considered. But such short-term initiatives should be consistent with long term objectives.

- **Set clear objectives for the project**. Do not try to implement a hazy grand concept of 'Digital Transformation', rather specific projects aimed at achieving a well-defined set of objectives. Projects must be couched in terms of improving efficiency, or some other similar impact, rather than 'deploying AI', for instance.

- **Involve the C-suite**. DX projects that are led by a C-level executive are much more likely to succeed. DX projects are usually more than just IT projects and must involve input from all aspects of the organisation.

- **Run commercial and IT considerations in parallel**. Every IT decision must be supported by an assessment of commercial value and the two need to be considered together. For instance, using AI for fault prediction of a particular component may prove a less effective or more expensive approach than simply replacing it with a more robust alternative component.

- **Have a structured change management process**. Many DX projects will be transformational to the activities of the organisation. Consider every facet and include these in a formal change management programme. This might involve dedicated teams across the organisation.

- **Bring the workforce with you**. Many projects involve substantial change to how the organisation operates, which results in anxiety in the workforce. Seek feedback from the team, particularly those that are customer-facing. Clearly signpost the change process. Redefine individual workers' objectives and communicate those early. Demonstrate the value of the change to the workers affected.

Enterprises will invest US$5 trillion in DX between 2020 and 2030

In January 2020 *Transforma Insights* published its *Digital Transformation Investment* forecast which looks at the investment by enterprises in the various technologies that sit under the DX umbrella. Overall investment in DX software and service will amount to US$5 trillion between 2020 and 2030. Of that, IoT will account for the lion's share (54%), with AI representing 22% of spend. There are three major geographical poles: North America (accounting for 35% of global investment), followed by Europe (24%) and China (18%). Japan accounts for 10%.

Over the forecast period, annual spend will grow from US$94 billion to US$961 billion, a Compound Annual Growth Rate (CAGR) of 26%. The fastest growth technologies will be 3D Printing & Additive Manufacturing (50% CAGR) and Autonomous Robotic Systems (49%).

Manufacturing (accounting for 37% of all global spend between 2020 and 2030) is easily the biggest sector, followed by Retail (15%) and Utilities (15%). Primary and secondary industries including Agriculture, Mining, Manufacturing and Utilities will all invest greater than 60% of their total DX software and services spend in IoT. The service sectors, in contrast, are much more focused on Artificial Intelligence, with Real Estate, ICT, Professional Services and Education all spending over 70% on AI.

Share of vertical sector investment in Digital Transformation 2020-30 split by technology

(Source: Transforma Insights, 2020)

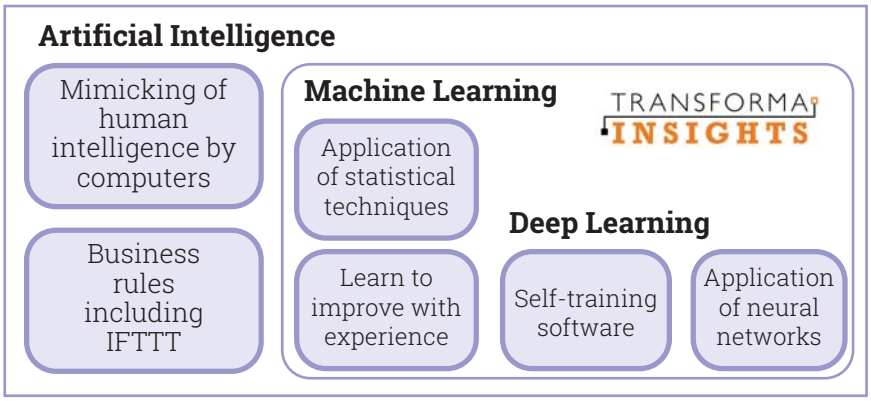
	3D Printing and Additive Manu-facturing	Artificial Intelligence	Autonomous Robotic Systems	Data Sharing	Distributed Ledger	Edge Computing	Human Machine Interface	Hyperconnectivity	IoT	Product Lifecycle Manage-ment	Robotic Process Automation
Agriculture, Forestry & Fishing	3%	6%	4%	5%	1%	3%	5%	5%	67%	1%	0%
Mining & Quarrying	0%	13%	0%	6%	1%	2%	7%	5%	63%	2%	1%
Manufacturing	5%	8%	6%	3%	1%	3%	4%	5%	61%	4%	1%
Electricity, Gas, Steam & A/C	0%	8%	0%	2%	0%	2%	4%	6%	76%	1%	0%
Water Supply & Waste Management	0%	8%	0%	2%	0%	2%	4%	6%	76%	1%	0%
Construction	5%	14%	6%	2%	1%	2%	8%	5%	57%	0%	1%
Retail & Wholesale	0%	20%	0%	4%	1%	0%	7%	6%	59%	0%	1%
Transportation & Storage	2%	16%	5%	4%	1%	1%	4%	7%	59%	0%	1%
Accommodation & Food Service	0%	20%	0%	4%	2%	1%	25%	5%	41%	0%	2%
Information & Communication	0%	76%	0%	8%	5%	0%	1%	0%	4%	0%	5%
Finance & Insurance	0%	42%	0%	5%	7%	0%	3%	6%	35%	0%	3%
Real Estate	0%	85%	0%	5%	5%	0%	1%	0%	0%	0%	5%
Professional, Scientific & Technical	0%	72%	0%	9%	10%	0%	1%	0%	0%	0%	7%
Administrative	0%	19%	0%	3%	1%	1%	2%	6%	68%	0%	1%
Government	0%	51%	0%	6%	2%	0%	4%	2%	32%	0%	2%
Education	0%	87%	0%	5%	2%	0%	1%	0%	0%	0%	4%
Health & Social Care	2%	40%	3%	3%	1%	1%	5%	4%	38%	0%	2%
Arts & Entertainment	0%	81%	0%	5%	5%	0%	1%	0%	0%	0%	8%
Other Services	0%	80%	0%	7%	5%	0%	1%	0%	0%	0%	8%
Total	2%	22%	3%	4%	2%	2%	4%	5%	54%	2%	2%

AI: Waiting to be unleashed?

The goal of Artificial General Intelligence is elusive and even Deep Learning is challenging, but AI unleashes plenty of applications to address functional tasks, says Matt Hatton.

There are dozens of different ways to categorise AI. One of the most common is the Artificial Intelligence / Machine Learning / Deep Learning triumvirate which looks at the broad approaches taken. Artificial Intelligence (AI) is generally accepted to be the umbrella term for several types of activities, all aimed at mimicking human intelligence.

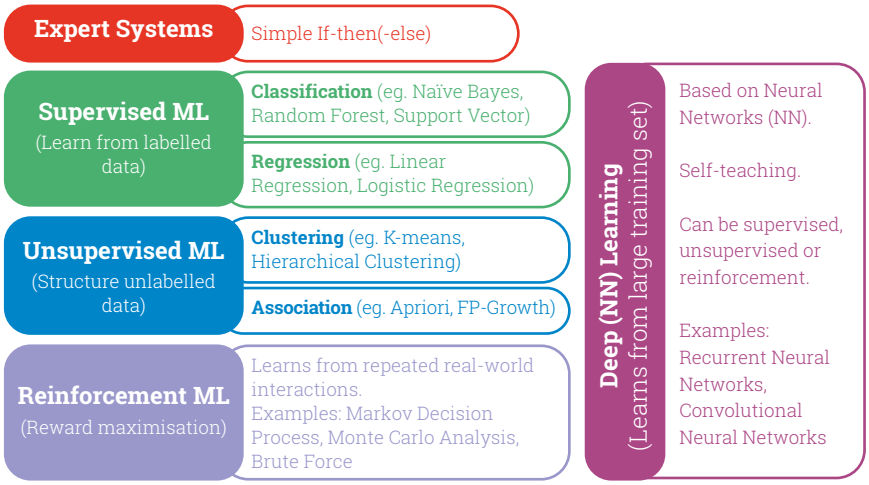
Figure 1: Artificial Intelligence, Machine Learning & Deep Learning



[Source: Transforma Insights, 2020]

The most commonly discussed sub-set is Machine Learning (ML) which is specifically about applying complex algorithms and statistical techniques to existing data to make decisions or predictions. An important subset of ML, where much of the latest thinking is focused, is Deep Learning (DL), which uses a combination of very large data sets and Neural Networks, which seek to imitate the behaviour of the human mind, for instance through the use of reinforcement learning.

Figure 2: Machine Learning Techniques



[Source: Transforma Insights, 2020]

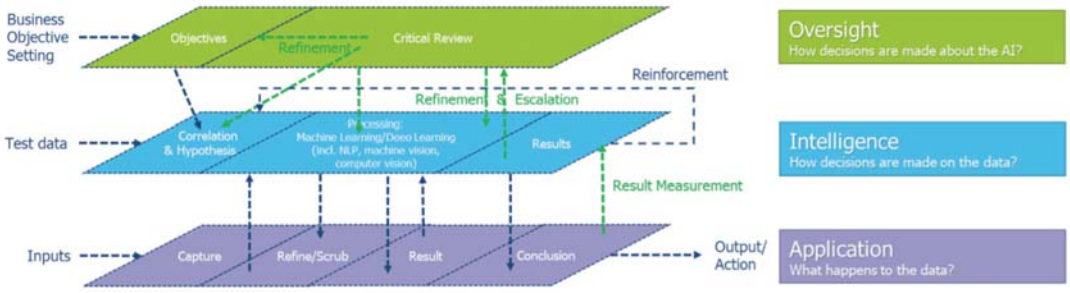
Another alternative looks at the type of intelligence that is being developed. Artificial General Intelligence, for instance, is attempting to create the capability to perform a range of tasks based on independent decision-making. Artificial Narrow Intelligence, in contrast, seeks to perform a specific task, often extraordinarily well. The concepts of 'Strong' and 'Weak' AI are somewhat analogous.

A third useful categorisation looks at the methods, in the form of specific techniques, for applying AI, in the form of Supervised, Unsupervised and Reinforcement learning and the associated algorithms.

Most AI implementations until now have focused on Machine Learning, and specifically supervised ML; signposting for a machine the activity that needs to be performed and indicating the best ways that it might be achieved. This is the simplest to implement, the most easily understandable and the easiest to validate. It is unsurprising that most of the success stories in AI to date have focused on the automation of time-consuming yet relatively simple tasks. These promise the quickest return on investment. Good examples include legal document analysis or medical image analysis.

One form of applied AI which has focused squarely on these supervised approaches that remove manual tasks is Robotic Process Automation (RPA) which takes IT-based tasks that were previously handled manually by a human, observes them being performed and replicates them through intelligent agents. For instance, RPA vendor **UiPath** has been working with **Heritage Bank** in Australia since 2017 automating around 80 diverse business processes. These include back-office and customer-facing processes across customer care, operations and compliance, amongst other things.

In one case, UiPath was able to provide Heritage Bank with a bot to extract and present transaction records for the police investigating financial crimes. It was also able to automate 40-50% of the data mining involved in approving people for loans, a figure that is set to rise to 90%. With an hour's effort required per loan application, reducing that by 90% presents a demonstrable saving. Heritage Bank has plans to work with UiPath on other automatable tasks including document validation and customer care. Heritage Bank reports 98% accuracy in its most recent automation tasks.



Deep Learning

The most interesting cutting-edge developments lie in Deep Learning (DL). The principle with DL is that the algorithms are presented with large volumes of data and then asked to make their own decisions about how to categorise or react to what they see, perhaps in order to achieve a particular goal. Probably the most prominent area of exploration for DL is in autonomous vehicles. The parameters under which the AI must function are potentially diverse. Therefore, training that imitates humans and makes use of large amounts of data is highly appropriate.

Big potential risks

While AI offers great opportunities there are also some big potential risks. The first and most pressing challenge relates to 'AI bias'. There have been numerous headline-grabbing examples, including David Heinemeier Hansson's campaign about the disparity in credit limits between him and his wife on their Apple Credit Cards, the Tay bot that was shut down for parroting bigoted views, and the HR department which was rejecting perfectly good applications for no apparent good reason.

To tackle the AI bias issue specifically, *Transforma Insights* advocates the implementation of a robust oversight layer with responsibility for objective setting and critical review to ensure that the AI is not only doing what it's tasked to do, but also doing what's right.

The challenge is partly one of maturity. The use of AI is immature and will naturally become more refined over time, but it isn't clear that AI companies have the opportunity to learn on the job.

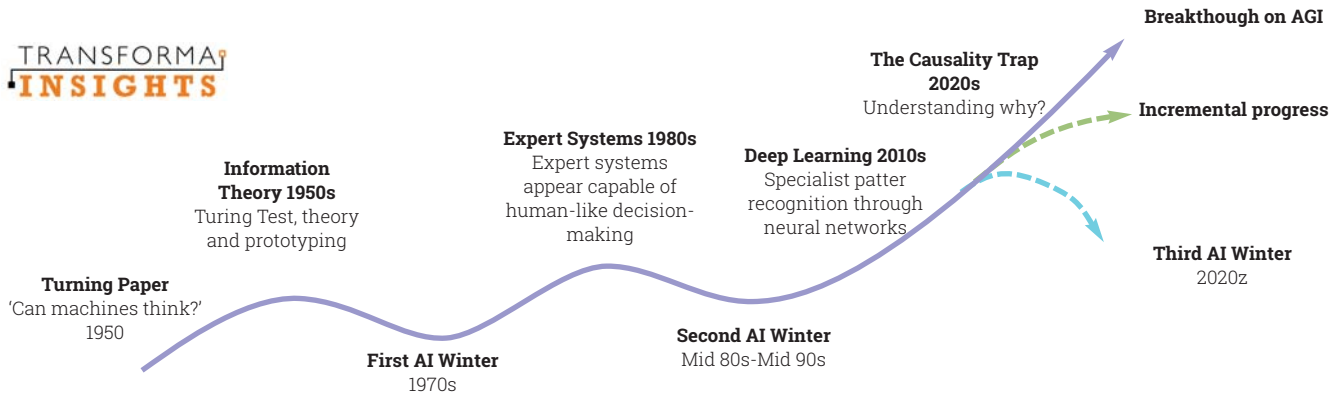
AI already receives enough negative PR over how it will remove the jobs of millions of workers. While it might be a net benefit to society, that is precious little comfort to those directly affected. We are likely to see continued push-back against AI which may also create some challenges. The concept of the 'adversarial patch' is an interesting one to look out for: something created specifically with the intention of fooling an AI.

The final risk is more fundamental, concerning diminishing returns on investment. The last decade, particularly with the development of deep learning, has been a good one for AI. However, the history of AI is one of boom and bust with two 'AI winters' so far. There is a strong possibility that the benefits stimulated by deep learning will soon be all but exhausted and we might face a third AI winter in the 2020s.

Much of the stimulation for the last decade's success has come from the availability of unprecedented cloud compute capability. There is no apparent trigger for the next breakthrough which might lead to Artificial General Intelligence, although that doesn't necessarily mean it won't appear. Perhaps the sheer scale of Deep Learning investments will trigger progress to AGI. However, the most likely scenario is continued incremental progress of existing deep learning capabilities.

Advances are being made in hardware, large investments made in sweating data assets, and more AI platforms are coming on stream, which helps to democratise the use of AI amongst more organisations. The 2020s will be an AI decade, but Artificial General Intelligence remains elusive for now. ■

The author is **Matt Hatton**, co-founder of DX analysts Transforma Insights.



Aeris Fusion IoT Network + LTE-M

LTE-M is poised to dominate the Internet of Things (IoT) for years to come, replacing GSM and CDMA protocols. One reason is the cost — to date, cellular technologies have not been optimised for IoT deployments, leading to higher hardware and operational costs.

LTE-M is a bi-directional, standards-based protocol within the same spectrum as LTE. It provides carrier-grade security, long battery life, and low-cost modules. Another strength is that LTE-M does not need a new infrastructure as it can piggyback on existing LTE networks. As such, a carrier can update software on its network to enable LTE-M, with savings that can be passed directly to the customer.

LTE-M is a much simpler technology than standard LTE and it offers unique capabilities that significantly extend battery life. For most IoT devices, operating in a low throughput LTE-M environment is not an issue as they are only sending small amounts of data on an intermittent schedule. However, there can be issues when sending large amounts of data (for example, an OTA firmware update) while bandwidth constrained.

The resulting network congestion can lead to high failure rates, thereby prolonging the time-to-update as well as increasing costs. With the Fusion IoT Network connectivity-aware APIs, these issues can be avoided, ensuring that the update campaign is conducted efficiently and quickly, with complete information about the underlying network status.

LTE-M is today's standard, meeting security and power conservation levels suited for deployments in multiple business sectors. With low-cost modules, extended battery life, better signal penetration, and the ability to use existing infrastructure, LTE-M has the potential to improve all IoT business models.

Launching New IoT Programmes

Get to market faster using the best connectivity network for your needs. Investing and planning a large-scale project can be daunting as enterprises have high expectations for their IoT business. That's why it's vital to make smart investment choices about infrastructure now, in advance, to ensure future viability and success.
Aeris connectivity solutions are designed from the ground up exclusively for the rigours of IoT, not retrofitted from an existing consumer system. Aeris provides a single portal for managing every device — one login for billing, support, APIs, VPN, and more. And everything is backed by our top-rated customer support teams dedicated to your success.

Transitioning to New Technologies

Gain optimal efficiencies and new functionality with the latest IoT networks, such as LTE-M. Whether you are dealing with a technology sunset, wanting to lower hardware and battery costs, or just trying to reduce overall operating costs, the Aeris Fusion IoT Network provides the pathway to higher functionality with greater cost savings. It is a dynamic and flexible connectivity solution that adapts to a rapidly changing environment. And it comes with the highest level of support in the industry.

Whether you're new to IoT or a veteran of the industry, Aeris can help you get connected.

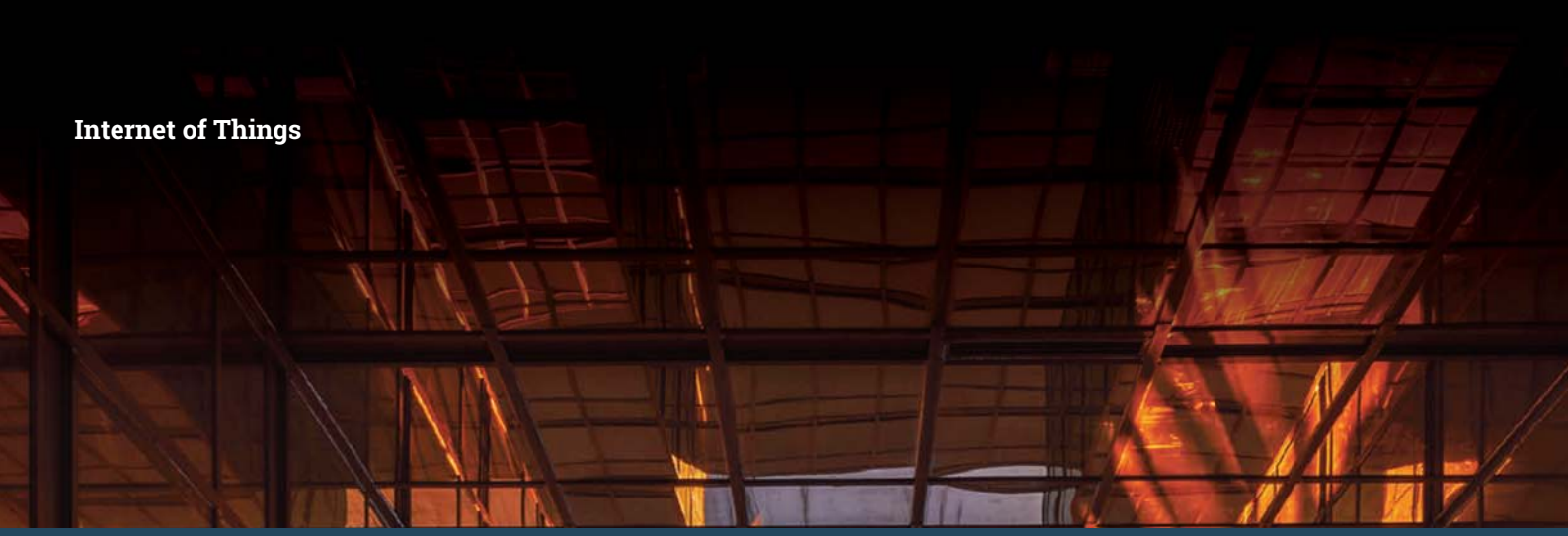
Replacing 2G/3G Technologies

There are many reasons companies switch technologies: Sunsetting of older technologies, controlling costs, or simply improving your IoT deployment. Businesses will need to look past the protocols and technologies of today and deploy a solution that's future-proof — dynamic, flexible, and adaptable. Adopt next-gen connectivity technologies (LTE, LTE-M, NB-IoT) to improve cost and functionality of any IoT business model. That's the Aeris Fusion IoT Network.

Improving Your IoT Deployment

With the Aeris Fusion IoT Network, you stay ahead of the competition with industry-leading, cost-effective, and flexible cellular IoT solutions. Expanding to new coverage areas is made simple by managing multiple networks through Fusion's unified dashboard. All in all, customers save 60% in connectivity costs, reduce over-the-air (OTA) update charges by 50%, and achieve 30% faster problem resolution.

With the Distribution Channel Package, customers simplify a complex, business-critical function by creating an organised and secure environment for managing IoT solutions. The delegated billing and reporting capabilities result in a reduction of operational costs for OEMs. The Aeris Fusion IoT Network lets you do all this and more.



Data and Device Security

Any device that is connected to the internet is at risk of being hijacked. That's the standard assumption. Businesses deploying IoT solutions are responsible for protecting data and devices, as well as any corporate proprietary data. In the context of IoT, privacy and security protocols need to ensure that access is limited only to appropriate and authorised personnel. To that end, the Aeris Fusion IoT Network provides in-depth data and device security, including:

ConnectionLock™

ConnectionLock prevents access to unauthorised endpoints or IP addresses, creating an additional layer of security for IoT devices. If the SIM card is stolen from the device, Aeris ConnectionLock ensures that the SIM card can connect to no other IP address or URL.

- Connect, send, receive only to/from preselected IP addresses or endpoints.
- ConnectionLock acts as an additional firewall within the Aeris Fusion IoT Network.
- Aeris SIM cards cannot connect to other devices, thereby reducing security risks.
- Our solution is implemented at the network level, without added complexity or work for the customer.

Connectivity-Aware OTA APIs

Over-the-air (OTA) updates can be deployed to thousands of IoT devices at once rather than requiring each device in the field to be manually modified. OTA updates eliminate the need to send technicians into the field, save owners time and money, and make IoT deployments vastly more scalable.

The ability to make changes to many devices remotely is important, especially for operators of large-scale IoT deployments where updating devices manually would be a nearly impossible

- Up to 50% reduction in time-to-completion for OTA campaigns.
- Up to 50% reduction in OTA failure rates and data costs.
- Scale for large deployments with ease.
- Significantly reduce manual operations.

Visibility and Control

The Aeris Fusion IoT Network provides robust IoT lifecycle management, bound together with heightened customer support. Device traffic management provides customers with the ability to analyse performance and cost drivers and, when combined with alerts management, allows for a wide range of pre-defined or option-driven system alerts and reports, thereby ensuring optimum performance. Additional Aeris Fusion IoT Network functionalities include:

AerPort / APIs

The Aeris AerPort™ dashboard provides a single portal for managing global deployments, including end-to-end device lifecycle management, billing status, connectivity analytics, and access to customer support. Aeris also offers a rich set of REST APIs, enabling easy integration into other management frameworks.

IoT Analytics

By identifying devices with connectivity issues, analysing usage activity, and focusing on outliers or devices behaving abnormally, you can reduce equipment outages and downtime, resulting in decreased business expenditures. The Fusion IoT Network Analytics capabilities find insights, issues, and potential security vulnerabilities before you do.

IoT Billing

The Fusion IoT Network's robust billing functionality enables a high level of flexibility in enabling new business models, including delegated billing to distribution partners and diverse rollover and pooling policies.

Whether you're new to IoT or a veteran of the industry, Aeris can help you get connected. ■

Visit www.aeris.com or follow us on Twitter @AerisM2M to learn how we can inspire you to create new business models and to participate in the revolution of the Internet of Things.

Sustaining Service Performance in the Video and Gaming Age

How can MNOs ensure consistent quality and experiences for the ever-growing number of video and gaming users, across hybrid networks?

Author: **Inna Ott**, Director of Marketing at Polystar

2020 is set to be a busy year for mobile network operators (MNOs). Not only do many have to contend with investments in 5G, many are also focused on the opportunities and challenges presented by the growth of mobile video and gaming. A clear understanding of these challenges is essential so that MNOs can capitalise on the opportunities.

"Demand for mobile video is expected to exceed 75% of all mobile data by 2025"

The growth of demand for mobile video is well-known – it already accounts for more than 60% of all mobile data, according to the latest edition of Ericsson's Mobility Report (October 2019). This is expected to exceed 75% by 2025. While some of this traffic is related to MNO video packages, much is from providers such as Netflix and YouTube. Customer expectations have also surged – the ability to stream video in real-time and to deliver a high-quality viewing experience are now critical factors in differentiating MNO offers.

Gaming has also become an increasingly important element of the mix, as mobile has become the preferred interface for many.

That's because mobile devices provide a convenient means to access games and are cheaper than traditional gaming consoles. Analysts at NewZoo suggest that more than 2.4 billion people played mobile games in 2019.

This growth translates to revenue. NewZoo also estimates that mobile now provides the largest contribution to overall global gaming revenue, delivering 47% of the $134.9 billion generated in 2018, up more than 12% from the previous year. With Microsoft and Google launching streaming platforms for games and lower cost smartphones becoming increasingly available, this growth is set to continue. Investment firm Wedbush reckons that mobile has the potential to triple the size of the overall global gaming market by 2030.

All of which means that MNOs must ensure that they can deliver the best experience to their mobile subscribers for both video and gaming applications, regardless of whether they provide them directly or simply enable access via their networks.

5G complicates the situation. On the one hand, faster data rates and reduced latency promise an enhanced user experience. On the other, few if any MNOs can deliver nationwide 5G coverage yet. This means that users are likely to move between 5G cells and existing LTE infrastructure, which will change the performance obtained. Think about the needs of passengers on a train or in a car, for example. The experience they obtain from video and gaming services will likely change, due to different connectivity conditions, demand from other users, latency, and more.

Factors that negatively impact user experience will significantly undermine efforts to capitalise on this growth. Sadly, users won't really care about this – they'll expect a great experience regardless. So, MNOs have a problem. They need to be able to deliver the most consistent experience to video and gaming users, whenever and wherever they try to access such services – and to maintain this experience as they move from one location to another – from 5G to LTE and back again.

To deliver a better, more consistent experience, regardless of the underlying network, MNOs need,

MNOs need to be able to obtain analytics insights into service performance, which must extend to video and gaming services

first, to be able to understand service performance from the perspective of the customer and, second, to be able to take proactive steps to maintain and protect this. They need to be able to achieve this both for individual users, as well as for the complete subscriber base. How can MNOs accomplish this? The answer lies in advanced analytics.

MNOs need to be able to obtain analytics insights into service performance, which must extend to video and gaming services. In turn, such insights can be used to construct KPIs that reflect the required experience levels they need to deliver for each service. For video, relevant indicators include data such as resolution, video and audio bitrates, while latency is particularly important for interactive gaming.

"The necessary analytics information can be obtained by monitoring service streams and sessions through the use of passive probes and processing engines that can extract relevant performance and service information"

With the right solution, quality indicators, statistical information, such as average play time or session duration, as well as the transitions between different bitrates can be obtained – creating a comprehensive overview of individual and audience behaviour and how services are experienced.

Monitoring video and gaming streams also requires the ability to examine encrypted content. This is necessary because new, encrypted transport protocols, such as QUIC™ ("Quick UDP Internet Connections"), as well as existing solutions, such as SSL, are typically used to support video and gaming sessions. By understanding the performance demands of individual sessions, MNOs can provide better services – predicting degradations, understanding demand for specific applications and content, and so on. Cumulatively, this data builds a real-time and historic picture of both individual and overall service performance levels.

Not only is this application-specific data now mandatory, MNOs also need to correlate performance across different network interfaces, ranging from UMTS to LTE and now to 5G NSA and, ultimately, to 5G SA. This requires the ability to monitor across all interfaces, as well as to extract the rich information contained in specific packets. Such information can be used to understand demand in specific locations and to predict future consumption patterns. It can also guide future investments, directing capacity to where it is actually needed.

Mobile video and gaming will dominate future network traffic. Users have an almost insatiable demand for content – and will expect to be able to obtain a consistent, high-quality experience. MNOs provide infrastructure critical to obtaining these experiences, so must take action to deliver, even if other stakeholders provide the content and games users enjoy.

"The deployment of advanced analytics solutions for both video and gaming traffic is now essential, so that MNOs can understand performance, troubleshoot effectively, and take the necessary steps to satisfy future demands – while also driving investments for coverage rollout"

Without the ability to access such analytics information, MNOs will be unable to capitalise on surging consumer demand, undermining their role in the ecosystem while losing subscribers to rivals that are able to deliver. ■

Your perfect jeans are only a 3D body scan away

Artificial Intelligence is not simply the stuff of science fiction. It is here now and public attitudes to it are warming. A Swiss company has launched an online 3D Virtual Dressing Room using smartphone body scanning technology that creates a 3D body model in seconds. The app calculates a comprehensive list of up to 45 body measurements.

Meepl's smartphone-enabled 3D Virtual Dressing Room (VDR) solution is designed for e-commerce sites, transforming the online shopping experience, providing a customer-centric solution to the problems of garment sizing and fit, and preventing unnecessary order returns – a big issue for retail businesses.

Product fit is an ongoing concern for online clothing shoppers, with 21% of consumers said to be avoiding online clothing purchases because they do not know how items will fit – in size, suitability or look. This barrier is also leading shoppers to order multiple sizes with the intention of returning one or more items.

The meepl Virtual Dressing Room solution allows customers to virtually try-on clothes using a 3D body avatar. This much is not new, but the technology behind meepl uses an Artificial Intelligence (AI) engine to simulate 3D garment models - in real-time - on to 3D body avatars. This helps to represent gender, fit, size and shape realistically.

With just two pictures, taken from a smartphone app, online shoppers can create a personalised meepl in seconds. Meepl then calculates a comprehensive list of body measurements, as if you were measured by a professional tailor.

Ferdinand Metzler, CEO of meepl says, "The addition of this experience to the online shopping journey will help to tackle the need for unnecessary returns, and improve the purchase success rates."

Over the next few months, meepl will be adding a Body Scanning solution and Size Recommendation tool. These will give online shoppers a more personalised shopping experience, with the goal of increasing satisfaction rates and bringing further value to the customer.

'Moneyball moment' as MicroStrategy partners with DataRobot to ease the way to AI-driven insights

To make it easier for businesses to integrate artificial intelligence (AI) into their most popular applications and core processes, MicroStrategy® Inc. (Nasdaq: MSTR), a worldwide provider of enterprise analytics and mobility software, has formed a new technology partnership with DataRobot, a specialist in enterprise artificial intelligence (AI).

Using HyperIntelligence cards to deliver AI-driven insights and recommendations injects trusted and predictive analytics directly into popular business applications on both web and mobile. These include Google's G Suite, Microsoft Office 365, and SaaS applications such as Salesforce, Workday, and Confluence. According to the partners, this reveals insights to users instantly, without interrupting their existing workflows.

MicroStrategy 2019, in combination with DataRobot's Enterprise AI platform, aims to speed decision-making and enhance employee productivity with AI-driven insights and recommendations, delivered into the tools, apps, and devices that people rely on every day.

Marge Breya
senior executive vice president and CMO
MicroStrategy Incorporated

In addition, with MicroStrategy's open-source packages for Python and R, data scientists can use DataRobot to automatically train, optimise, and deploy machine learning models on trusted data, securely and at enterprise scale. With DataRobot and MicroStrategy, data scientists can reportedly obtain quicker time-to-value, solve complex problems, and deliver AI-driven insights to business users across multiple form factors.

Marge Breya, senior executive vice president and CMO at MicroStrategy Incorporated says, "This is a 'Moneyball' moment for organisations looking to successfully shift to AI to better serve their customers and boost the bottom line. Actionable insights into complex business problems can now be gleaned in seconds, as well as correlations that would take a person weeks or months to pinpoint. Our technology partnership with DataRobot delivers a powerful, game-changing solution that fully leverages enterprise data assets and enables people on-the-go to act on it, unlocking new sources of growth and opportunities to move forward in today's AI-driven era."

"Organisations want to extract value from their enterprise data, yet often struggle with adopting AI in a way that drives measurable business impact due to lack of technical skill or dedicated data science resources," comments Seann Gardiner, EVP of Business Development at DataRobot. "Through our technology partnership, organisations can now leverage best-of-breed technology to develop thoughtful applications that integrate predictive and prescriptive modelling across all areas of the business."

'Generation AI' study by IEEE shows millennial parents' trust in AI for their kids' health

The world's largest technical professional organisation dedicated to advancing technology for humanity, the IEEE, recently unveiled *"Generation AI 2019: Third Annual Study of Millennial Parents and Generation Alpha Kids."*

It may be a bit of a mouthful, but the survey shows the confidence that millennial parents in the U.S., U.K., India, China and Brazil with Generation Alpha children (nine years-old or younger) often have in using AI and emerging technologies for the health and wellness of their children.

Born 2010-2025, Generation Alpha is growing up with AI benefiting their health and wellness, and technology infiltrating nearly every aspect of their lives. (See: **https://transmitter.ieee.org/health-2019**).

3D-printed heart surgery

Others might hesitate, but most millennial parents would allow a 3D-printed heart to be implanted in their children. Human donor organ availability can mean the difference between life and death. But researchers are using 3D printing technologies to develop organs, including hearts that use human cells, collagen and biological molecules.

A majority of parents (U.S.: 52%; U.K.: 60%; Brazil: 75%; India: 92%; China: 94%) would be ready to allow a properly tested/fully functional 3D-printed heart to be implanted in their child if needed in the future.

AI-powered virtual nurse?

There are limits and regional variations, however. Though telehealth, AI and remote monitoring tools are helping nursing expand care beyond in-person bedside monitoring creating a practically virtual nurse, a majority of millennial parents in the U.S. (67%) and U.K. (57%) would not be comfortable leaving their child in the care of an AI-powered virtual nurse during a hospital stay.

Conversely, a majority of millennial parents in China (88%), India (83%) and Brazil (61%) would be very comfortable leaving their child at the hospital in the care of an AI-powered virtual nurse.

AI appeals in later life care

A preference is growing among millennial parents for using AI to live independently during their golden years rather than relying on their Generation Alpha children.

The most dramatic growth in preference for AI to live independently in their golden years is among Brazilian parents, which leapt to 82% in 2019, from 61% in 2018. A similar trend is seen in India, where 90% of millennial parents in 2019 prefer to rely on AI as compared to 79% in 2018. China's millennial parents continue to have the highest preference for AI support as they age - 93% in 2019 vs. 94% in 2018. ■

"Generation AI 2019: Third Annual Study of Millennial Parents of Generation Alpha Kids" surveyed 2,000 parents, aged 23–38 years-old, with at least one child nine years old or younger - 400 each in the United States, United Kingdom, India, China and Brazil. The surveys were conducted October 2 - 9, 2019.
https://transmitter.ieee.org/ai

Bernard Marr

Cultural shift by enterprise leaders is vital for business survival in age of analytics

A cultural shift in attitudes to analytics will be essential for businesses to compete in the age of digital transformation. So says a recent research* report undertaken by Censuswide on behalf of MHR Analytics (www.mhranalytics.com).

A quarter of the 500 professionals surveyed for MHR Analytics said resistance from senior management was preventing their company from adopting analytics, suggesting that many could be left behind as their forward-thinking competitors advance.

A further 23% said their company's traditional reliance on manual spreadsheets was holding them back from taking advantage of widely available technology.

The survey of finance and technology professionals working in large UK organisations was conducted by MHR Analytics and Censuswide to understand the barriers some companies face in progressing their analytics capabilities, and their technological aspirations for the coming decade.

Analytics white paper breaks down barriers

To help break down these barriers, artificial intelligence (AI) specialist, Bernard Marr (www.mhranalytics.com/resources/influencers/bernard-marr/) and MHR Analytics have jointly released a guide entitled *"Advancing with Analytics: Spreadsheets to AI"*. It includes practical tips and examples from a range of organisations that have managed to move away from error-prone spreadsheets and adopt more sophisticated analytics, and even artificial intelligence.

"For me, the examples in the guide demonstrate how the data maturity journey is about taking manageable steps, rather than huge leaps," said Marr.

"From better planning and decision-making, to smoother operations and automated processes, data analytics fuels business improvements. Yet, for the average business, adopting advanced analytics techniques like AI is never going to be an overnight shift," he said.

"Adopting more advanced analytics can seem like a mammoth, unachievable task. That's why I prefer to think of analytics as a journey, with analytics techniques gradually becoming more advanced as you progress further along the road."

"A business advances on this journey one stage at a time, gradually meeting more and more business needs through data analytics."

"Progressing to planning analytics – stage three of the data maturity journey – tends to be a key milestone for most businesses, since this is the stage that bridges the gap between basic reporting and more exciting, forward-looking technologies. Therefore, I have placed more emphasis on planning analytics in the guide than the other four phases," he added.

Skills shortage

Other barriers to advancing analytics revealed in the MHR Analytics survey included a perceived lack of skills within organisations, siloed working practices and concerns about data quality, data protection and security.

In addition to Marr's Spreadsheets to AI guide, MHR Analytics has also provided a data maturity quiz to help organisations find out where they are on the data journey and receive free tailored advice about how to progress with analytics to remain competitive.

MHR Analytics is a specialist provider of business intelligence, analytics and financial performance management. The team enables businesses to capitalise on the data available to them, to identify opportunities and prepare for the future – whatever stage of the data journey they are on.

With an end-to end-suite of quality solutions from IBM, SAP, Tagetik and Microsoft, MHR Analytics supports customers to go beyond intuition and act based on real evidence.

The growing business has been established for 10 years and has a presence in eight countries and more than 20 different private and public sectors, with a proven track record of over 750 successful implementations. Customers include Admiral Group, Rotherham Metropolitan Borough Council, Edinburgh Napier University and Loughborough University.

Bernard Marr regularly contributes to the **World Economic Forum** and is a strategic business and technology advisor to businesses and companies around the globe. ■

**The survey of 500 UK finance and technology professionals employed by large UK companies was conducted by Censuswide on behalf of MHR Analytics in August 2019.*

www.mhranalytics.com

"Progressing to planning analytics tends to be a key milestone for most businesses."

Case Study

ASPINA
Engineered to Inspire

Motoring toward the Internet of Things era

A 100-year-old manufacturer, ASPINA, embraces the data revolution

Making the industrial world turn

For more than a century, **ASPINA** has been at the forefront of industrial innovation. Yukinori Kaneko, its Japanese founder, revolutionised the world of silk spinning back when yarn was considered hi-tech.

Since it turned to motors in the 1960s, its engineering know-how has helped makers of industrial equipment, automotive components, and medical technologies continually push new boundaries. Shinano Kenshi, its long-time corporate brand, means "swordsmaster of goods" — a reflection of its constant evolution, diversification, and embracing of new technologies.

Under the new corporate brand, ASPINA, it continues to aspire to find new ways to grow together with customers, while remaining focused on the future of new technologies. ASPINA innovation technologies are embedded in everything impacting and simplifying human lives from respiratory devices to automotive comfort systems, to robotics — developing the core motor application to a higher-level complete system solution.

Today, giving its customers the best means more than just delivering top-of-the-line components. It also means ensuring its devices are ready to seize the opportunities of the Internet of Things (IoT) era — and enable its customers to build smart products that make the most of big data.

Back in 2017, ASPINA unveiled a new business development unit, based in California, which sought to look beyond the company's core mechanical products and investigate ways to increasingly package hardware and software together. Management soon began looking for a partner to power this intelligent transformation. Cumulocity IoT, **Software AG**'s industry-leading, open IoT platform, turned out to be just what they needed.

Toward an IoT-enabled prototype

The Cumulocity IoT platform wasn't an obvious choice at first. ASPINA had its own software engineers in-house and was considering building a homegrown IoT solution. It then looked into Cumulocity IoT along with three other external platforms.

Cumulocity IoT won the day because it offered the best mix of essential features. It had the power to provide lightning-fast visibility over remote assets, yet its architecture was strikingly simple. It was also cost-competitive and offered edge computation — which meant that data would be closer to IT managers' fingertips.

"Thanks to our Cumulocity IoT partnership, we're no longer just the manufacturers of products. We're building systems that create the perfect world of hardware and software together. And it's positioning us to thrive in the coming 5G era."

— Marcel Azary | Senior Vice President for Business Development, ASPINA

Cumulocity IoT also came with the promise of support from Software AG's IoT Center of Excellence — a perk that proved its value right after a deal was signed in 2018. That's when ASPINA's business development unit began building a sample smart device to test its newfound capabilities. After three months, it had a product; a dashboard-connected prototype industrial blower.

ASPINA then took it on the road to present it to target customers and its own teams in Germany, Japan, and China. According to Marcel Azary, ASPINA's Senior Vice President for Business Development, Software AG's support in this process was critical.

"At the beginning, we definitely needed some hand-holding," he said. "They were supportive and most importantly they were patient. Overall, the chemistry with Software AG has been fabulous."

The sensors that could save lives

The prototyping process led ASPINA to several insights. Most important was the need to target customers whose future products would live or die through connectivity. Many of these were companies developing IoT-enabled medical devices, offering real-time diagnostics that can save and improve patients' lives.

Today, ASPINA is in advanced stages of discussion with three companies over what it hopes will soon become commercialised smart products — including a wearable blood pressure monitor that creates models to predict when a patient is about to undergo heart failure.

ASPINA's appeal, Azary said, is that its bread and butter (motors) are at the core of many wearable devices. And the most accurate data comes from sensors embedded in motors, rather than those that might be added during later stages of assembly.

"We're introducing connectivity to the most basic stage of the design," he said. "By building our motors with sensors in them already, and offering them with Cumulocity IoT's top-notch analytics, we've created a solution that we think will be hard to beat."

As ASPINA works toward bringing these new products to market, it's already testing additional Software AG solutions that could further fuel its emergence as an industrial analytics powerhouse. At the top of the list is TrendMiner, the high-performance analytics engine for data captured in time series. With TrendMiner, Azary explained, process engineers and operators can easily build models based on data as it's being streamed — without the need of an expert data scientist.

Azary called this a "jewel," noting it is especially appealing for new applications, where data is too fresh to manually search for trends. He admitted, however, that is for the future.

For now, ASPINA is embarking on its newfound IoT adventure one step at a time. "With Cumulocity IoT, we are changing our way of thinking," Azary said, noting the company's new emphasis on connectivity lines up perfectly with the launch of early 5G networks. "We're sitting on a platform that's about to take off." ■

Customer profile

ASPINA is a global precision manufacturer that designs, develops, and supplies motors and other top-quality components to business customers across a range of industries. Headquartered in Ueda, Japan, it was established in 1918 as a silk yarn manufacturer.

In September 2019, Shinano Kenshi migrated its corporate brand to ASPINA to strive for even greater contributions on a global scale. Following its mission statement, "Shaping the hopes for tomorrow and providing comfort to the world's people," the company focuses on how it can help better the lives of people through its technology. With a team of 5,000 employees across Asia, North America, and Europe its 2018 sales reached over US$400 million.

software AG
Freedom as a Service

New challenges for ASPINA

- Shift toward diversification in new products and markets
- Need for customer solutions that integrate hardware and software
- Pressure to understand the coming IoT and 5G eras

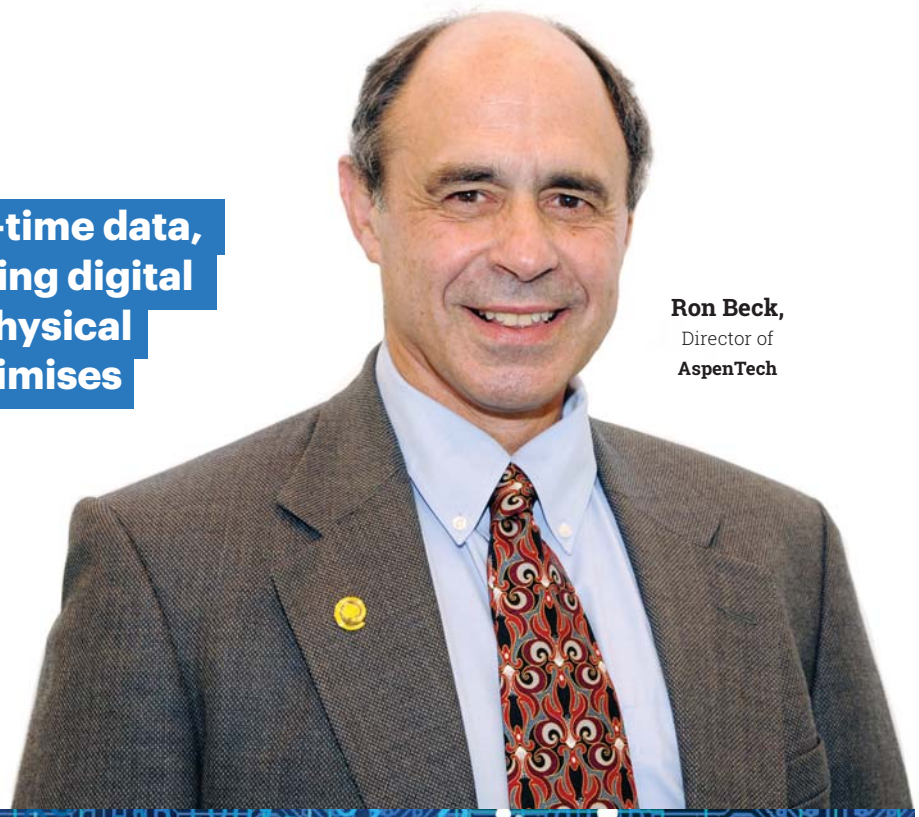
Software AG solutions

- Cumulocity IoT Platform

Key benefits

- Facilitated the design of intelligent, life-saving medical devices
- Enabled game-changing pivot into industrial analytics
- Expanded versatility of ASPINA's offerings
- Created new business opportunities

Based on models and real-time data, the digital twin is an evolving digital profile of behaviour of a physical object or process that optimises business performance



Ron Beck,
Director of
AspenTech

Future-proof your assets with digital twinning

"The debate has ended. Not implementing artificial intelligence (AI) is no longer an option. Every company should have an effective AI strategy, not least because as the pace of innovation accelerates, such an approach will present them with new opportunities to transform their business.

The growing ability of businesses to employ streams of business and operational data to drive machine intelligence and access insights is driving AI's momentum. Currently, companies typically only use a small amount of the data they have collected. This provides huge potential for implementing digital twins (virtual copies of a company's assets and processes,) which can unlock the potential value from all that data.

In 1984, "Neuromancer", a scientific fiction novel by William Gibson, captured the imagination of readers –

as a prelude to the world of AI. Gibson envisioned the massive value and power that digital twins can bring and how they can change the world. More than three decades later, this vision is materialising in the enterprise world. Virtual copies of physical locations and activities provide an insightful way for companies to harness the true value of data, as AI helps humans access this massive world of multi-dimensional data. The power of AI and the interconnected industrial world to unlock critical insights via data mining and by leveraging domain expertise helps technology innovators create turnkey solutions for digital twins.

No longer dreamtime…

The reality is here with advanced technology available on demand. The golden question now is where to invest, as digital twins transform asset-intensive businesses, especially those in energy and chemical sectors. In today's volatile, uncertain, complex and ambiguous (VUCA) marketplace, the deployment of digital twins can help companies achieve sustainability and operational excellence.

Digital twinning technology provides a valuable model of the physical asset to help explore 'what-if' scenarios safely and provide forecasting capabilities and advice on degradation, asset failure events and more. This can be achieved using self-learning systems as well as by capturing the knowledge of experts. Digital twins also function as business models to optimise various business scenarios.

Based on models and real-time data, the digital twin is an evolving digital profile of behaviour of a physical object or process that optimises business performance. This provides important insights into system performance which, in turn, leads to actions in the physical world.

The digital twin takes advantage of asset data to stay updated and is increasingly made more intelligent by AI agents. First, the digital twin ensures that the process plant is modelled vigorously using engineering models, enhanced via AI techniques with embedded cost and risk models.

Second, the operational digital twin ensures that plant operations are modelled and viewed virtually as planning, scheduling, control and utility models. Areas covered include planning and scheduling, demand models, distribution models, energy demand and supply, as well as control and optimisation. We expect autonomously optimised production to be available soon in refining.

Third, the operational integrity digital twin provides tactical and strategic decision guidance around prescriptive maintenance and real-time decision-making to maximise uptime, adjust production, minimise environmental impact and production losses, and prioritise safety. The digital twin also covers asset condition and sustainability. And can feed back to engineering to improve weak points in the asset.

Overall, companies need a future-proof digital reference architecture to structure the implementation of digital twins supporting collaboration and integration across business functions.

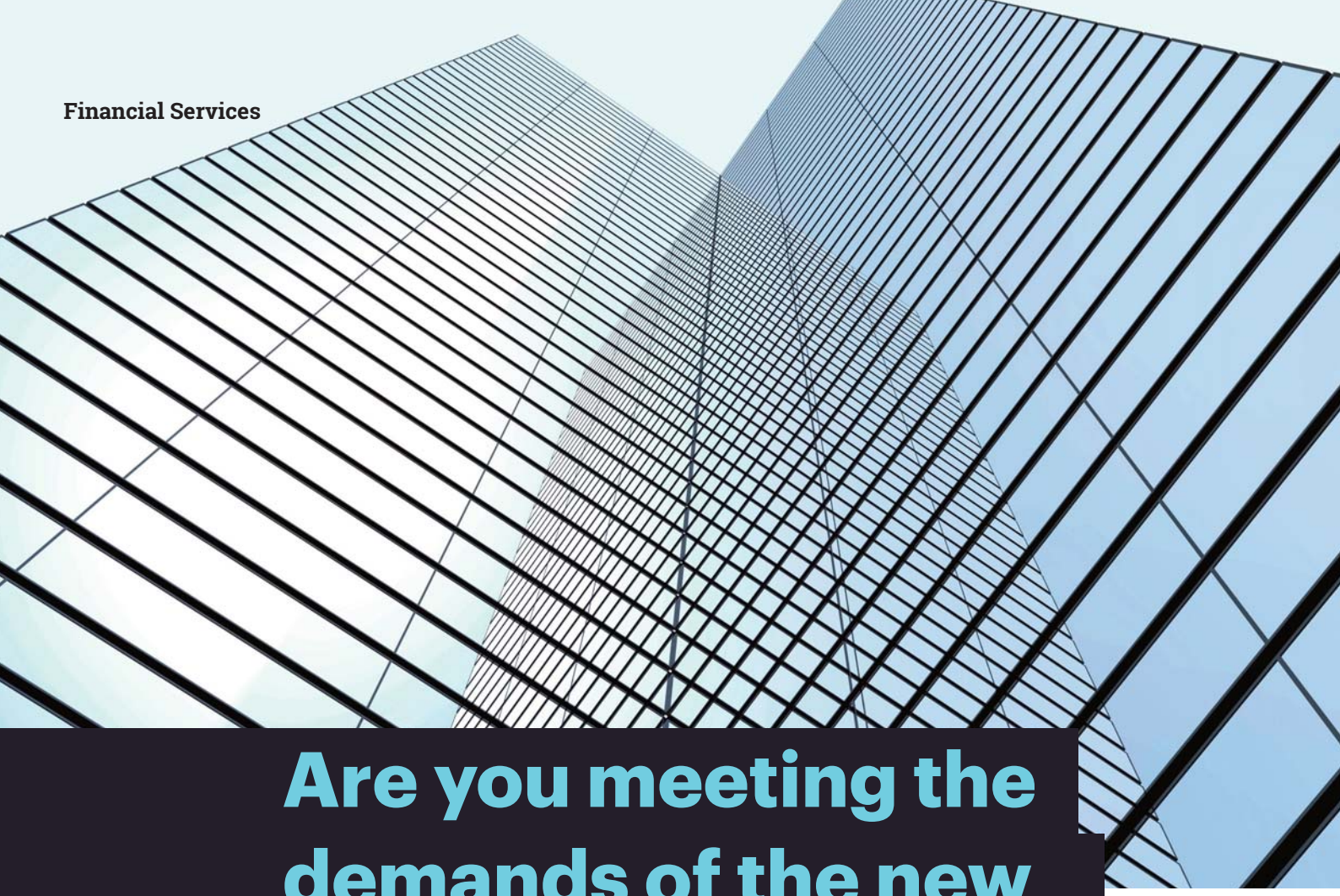
Powered by business value

Scaling up digital twins can deliver significant value for the enterprise. Unit level models, for example, can generate very high value returns for digital twins – involving process, asset condition, control and optimisation online models. Energy and utility models, refinery and bulk chemical planning, speciality chemical scheduling, debottlenecking and de-risking and emissions present high-value opportunities for plants to adopt digital twin models. A new but important area, enterprise-level visualisation tied to actionable work flows, allows rapid analysis of available enterprise profit opportunity options and effectively presents insights and operational status at the executive level.

Examples of success with digital twins include:

- **YPFB Andina**, a Bolivian upstream company, has increased yield by millions of dollars via an asset-wide digital twin model.
- **A major US-based international refiner** adopted machine learning digital twins to improve uptime and margins, saving tens of million dollars in avoided equipment degradation.
- **Bharat Petroleum (BPCL)** implemented an integrated digital twin and achieved 90% reduction in sulfur emissions and derived economic value from recovered sulfur for sale – all within six months.
- **A polymer producer** implemented a multivariate analysis-based digital twin approach which manages a wide range of specialty chemical applications, where product quality is key and often problematic.

Companies are progressing with new, advanced technology – but it is also necessary to be strategic and have a roadmap to get ahead. As businesses invest in digital twins, it is critical to observe at a high level how this technology will help them overtake the competition. Beyond technology, companies should also take note of their organisational change and evolution. Organisational adaption, enthusiasm and readiness must be managed regularly, as business value creation is a key driver of technology."



Are you meeting the demands of the new digital consumer?

It's time to transform your financial services business into a competitor for the modern, technology-based marketplace.

The financial services industry, like many others, is going through a metamorphosis. It is transitioning from complete in-house IT operations to leveraging managed service providers (MSPs) to future-proof a business' infrastructure. Emily Nerland, channel director, EMEA at **Masergy** reports.

While millennials and tech-savvy consumers expect everything to be available instantly, businesses require more flexibility and security thanks to the recent proclivity of hacking; requiring higher bandwidths for operation as well as a higher standard of resilience to ensure greater protection against vulnerabilities that could bring established financial institutions to a halt.

What are the IT and comms trends in this sector?

Over half of businesses are investing in technology intended to develop their customer services*. Since major banks have had half a decade to develop their apps that allow customers to see their accounts, apply for new services or alter existing ones and all at the 'tap of a button', always accessible services have become an expected feature and show no signs of waning.

Recently, digital-only banks have found a niche by taking advantage of much lower running costs and the ability to have thousands of clients running transactions through a small office without the need for customer facing staff and can therefore pass those savings on to customers. This presents new challenges for the established players around how to offer the same level of customer service whilst also providing a competitive service, compared to these new disruptors.

Digital transformation and operational improvements are the two next largest directives* for investment, proving across the industry that businesses are realising that investing in managed service providers, and their recent advances in networking technologies such as SD-WAN, can instigate changes throughout a business and transform them into competitors for the modern, technology-based marketplace.

Moreover, there is a proliferation of cloud-based SaaS products (like Office 365 or Dropbox) and a secure, network foundation is necessary to deliver these. By employing a Software-Defined Wide Area Network, (SD-WAN), businesses maximise the bandwidth of their

* A Digital Transformation white paper is at: **http://bit.ly/2TAbSfo**

network as data is directed through the most effective transport method (private, public, wireless, etc.).

Elevating customer experience

Faster networks also allow for quicker EPOS / E-commerce transactions, real-time updating of records with minimal latency and more efficient CRM systems, as employees aren't hindered by bottlenecks when loading data.

Scaling the business

By their nature, cloud-systems operating in large data centres, manage the heavy computational tasks and send the end-product to an employee's terminal. Therefore, there is no need for expensive servers and powerful desktop machines when opening new sites, the cloud takes that strain away. All that's required is a robust internet connection and a device to receive the data. This gives businesses more flexibility to scale, as and when required, and could negate the need for an in-house technical team.

Providing added resilience

Cloud networks provide an extra layer of security given that data is usually encrypted either end-to-end or via multi-site firewalls, to ensure data is not accessed en route. Having the data off site and managed by a service provider increases resiliency, as even if a host device is compromised the data is still safe at the source. However, no network is impenetrable, and data can still be affected by human error like 'phishing attacks'.

How is the purchasing behaviour of this vertical changing?

Given that hiring strong, technically able staff is becoming more challenging, businesses are starting to purchase more SaaS products to leverage proven applications and reduce staffing costs by eliminating in-house development. Therefore, identifying where to invest requires strong collaboration between IT managers and CIO/CTOs in order to determine where resources can maximise Return on Investment (ROI). These conversations should be focused on elevating customer experience, scaling the business and providing added resilience to networks. Every business has its own unique selling points and leveraging those in your digital strategy is still vital to a successful implementation. Allowing a trusted MSP to effectively supervise your infrastructure can help businesses leverage proven technology that benefits operations and customer experience and ultimately meet the demands of the 21st Century digital consumer.

Big Data is another massive growth area. Businesses are translating vast amounts of customer and market data into actionable information, in order to drive product development. Requiring super-fast data centres to 'crunch the numbers', these analytics can give businesses a clear perception of customer behaviour and spending, which has the potential to guide the next wave of product development, differentiating businesses from their competition. However, the insights that Big Data can provide are only as useful as the way the data is manipulated and understood, thus finding a specialist that can help translate what may be terabytes of data into viable perceptions is essential.

Which products and services are selling well?

Many managed service providers present other benefits based around their core cloud infrastructure. Cloud computing will increase an institution's flexibility as data can be viewed through a web-based portal, from any internet-connected device. Therefore, managers can access reports and analytics at a time to suit them. Cloud platforms are easily scalable too, so acquisitions and new offices can hit the ground running without the need for massive hardware installations.

It may not be feasible to switch to a cloud-only strategy but there are ways to leverage SD-WAN to better compete via a Hybrid WAN. By offloading some of the infrastructure to the cloud you reduce bandwidth requirements for expensive MPLS lines and instead, can route data traffic through the most efficient path whilst keeping vital data on-site. SD-WAN systems present businesses with a cost-saving tool, which will free up resources that could be repurposed for customer retention, amongst other options and offers the opportunity of fully migrating to the cloud in the future, once operational concerns are ironed out.

What are the considerations for partners wanting to enter and succeed in this vertical?

Whether you're an established business or a new disruptor in the market, the focus must be 'how are you meeting the demands of the new digital consumer?' Internet use is only increasing, so ensuring your network increases efficiency and maximises growth in the future is certainly a factor to bear in mind. Thus, utilising the expertise of Managed Service Providers is vital as it allows managers and decision makers to remain as hands-off as possible, so that they can focus on the business' current operations.

Security is a major consideration too, for both those new to the industry as well as seasoned businesses. Increasingly complex regulatory requirements are proving hard for financiers to handle in-house as those talented security experts are few and far between. The continual threat that hackers present to consumer trust in a business, as well as the financial implications if valuable information or assets are stolen, are presenting challenges to the industry. Outsourcing the responsibility to experienced MSPs provides a level of expertise that would be hard to find internally and ensures staff are not distracted by technical issues.

MSPs can provide a level of responsibility, but this does not mean that businesses can wash their hands of discussions around network security and future infrastructure. Decision makers must be continually assessing risks and consumer behaviour to decide where assets and investment should be positioned to maximise their possible return.

Hacking shows no signs of stopping and therefore, businesses in the coming years will only further realise the need for a secure network that enables reliable transactions, cloud services, access to mobile apps and the capability for future growth.

The author is **Emily Nerland**, channel director, EMEA, at **Masergy** (**www.masergy.com**).

How ‘digitally mature’ retailers can stand the test of a digital-first marketplace

Retailers operate in a digital-first marketplace and that means not just using technology but being alert to the fast-changing buying patterns of digital consumers and organisations. Here Mark Bennigsen, service delivery director at Columbus UK, identifies the four technologies that will enable ‘digitally mature’ retailers to not only cope with accelerated changes in the industry but future-proof their business in this digital ecosystem. He warns that those failing to adapt risk joining the growing list of established brands that have fallen by the wayside.

Let me define ‘digitally mature’ retailers. They have a solid commerce platform that enables new and existing customers to easily find products on the device of their choice – and it ensures that promises on delivery, pricing and availability can be consistently met. But the advantages of this type of platform are huge for business intelligence. It allows a business to collect insightful customer data, process it faster and adapt to meet evolving customer demands. Here are the four technologies that are essential for retailers to plot their commerce journey and stay ahead of the digital curve going into the next decade.

1. Product Information Management (PIM)

An effective PIM system has the potential to save businesses time, money and energy. PIM enables

The author is **Mark Bennigsen**, service delivery director of Columbus UK.

businesses to collect all information and material used for marketing in a single location and keep customers' needs top of mind at all times. A PIM system makes a retailer think from the perspective of the customer – considering the type of information customers need during their purchasing journey. This type of solution can then be used to not just gather the data but use it to enrich product information to create and deliver a compelling product experience.

PIM implementations support multiple content types spanning textual materials, product images, videos and more. With the right information in the right place, businesses can improve their product content and category managers can ensure that accurate, timely and high-quality product data is available across all sales channels.

2. Content Management Systems (CMS)

It is essential to create personalised web content that reinforces and improves brand messaging and engagement. An advanced CMS does just this by allowing an organisation to quickly manage and update web content to best align its brand to match buying behaviours.

The journey towards complete personalisation starts with attracting customers via increased SEO (search engine optimisation) efficiency and engaging them through effective seasonal and trending content curation. This converts to increased customer relevancy and personalisation – analytics being a key factor in optimising the journey – which leads onto the creation of content-rich emails that target specific customers.

In this way, CMS helps retailers work more intelligently – delivering a comprehensive customer journey and experience from landing pages through to payment and checkout, while also enhancing product and catalogue management.

3. Customer Relationship Management (CRM)

According to Gartner, 81% of purchases will be based on customer experience by 2020, so ensuring that experience is right is essential to future success in the digital marketplace. Modern CRM systems enable retailers to effectively engage with customers throughout their entire lifecycle – from marketing and sales to customer service and advocacy. An effective CRM solution supports the automation of manual tasks, but more importantly it allows businesses to better understand their customer base and provides the opportunity to engage with them.

As the market evolves and new technologies continue to be embraced, businesses must assess how they are interweaving digital tools with sales, marketing and customer service, and a CRM solution will be a key component for any retailer on their commerce journey.

4. Artificial Intelligence (AI)

Retailers can use AI to help them digitally transform and provide their customers with the best experience possible. AI is key to creating a highly personalised customer journey by using customer history to predict future needs and purchases. Powerful, connected algorithms lead to intelligent content suggestions, product recommendations and customer profiling which all help to accelerate business growth. These algorithms can ensure customers are provided with relevant content, while business dashboards can be used to monitor and direct algorithms to ensure their effectiveness. In this way AI can also provide an intelligent solution to basket abandonment, as well as a personal touch when it comes to chatbot interactions.

The way consumers interact with brands is changing as the retail market keenly adopts emerging technologies, and businesses must take advantage of AI to drive product innovation and enhance their processes to advance in this digital world.

Sink or swim in today's digital marketplace

Operating a commerce platform made up of these four technologies will help businesses secure their futures in today's digital marketplace. Businesses must redefine their market proposition and harness valuable insights generated from emerging technologies to shape their future brand messaging. Those who can adapt their operations to meet ever-changing customer demands and market trends will benefit from increased sales from existing customers, and consistently attract new customers to grow their customer base. ■

What's On

IoT Evolution Expo
https://www.smartiotlondon.com/
11-14 February
Fort Lauderdale, Florida USA

The Smart City Event
https://www.thesmartcityevent.com/east/
11-14 February
Fort Lauderdale, Florida USA

The Industrial IoT Conference
https://www.iiotevent.com/east/
11-14 February
Fort Lauderdale, Florida USA

MWC Barcelona 2020
https://www.mwcbarcelona.com
24-27 February
Barcelona, Spain

Smart IoT London | Excel
https://www.smartiotlondon.com/
11-12 March
London, UK

IoT Tech Expo Global 2020
https://www.iottechexpo.com/global
17 - 18 March
London, UK

5G MENA
https://tmt.knect365.com/5g-mena/
29 – 31 March
Jumeirah St, Dubai, United Arab Emirates

FutureNet World, London
https://www.futurenetworld.net/
24 - 25 March
London, UK

Hannover Messe, Germany
https://www.hannovermesse.de/home
20 - 24 April
Hannover, Germany

Internet of Things World
https://tmt.knect365.com/iot-world/
6 - 9 April
San Jose, California, USA

Mobile 360 Security for 5G
https://www.mobile360series.com/
29 - 30 April
The Hague, Netherlands

MVNOs World Congress
https://tmt.knect365.com/mvnos-world-congress/
27 - 30 April
Berlin, Germany

5G Latin America
https://tmt.knect365.com/5g-latin-america/
27 - 29 April
Rio de Janeiro, Brazil

Smart Transportation & Mobility
https://tmt.knect365.com/smart-transportation-mobility/
May
London, UK

Big 5G Event
https://tmt.knect365.com/big-5g-event/
18-20 May
Irving, Texas, USA

Digital Healthcare & EHI Live
https://www.digitalhealthcareshow.com/
24 - 25 June
London, UK

MWC Shanghai 2020
https://www.mwcshanghai.com/
30 June - 2 July
Shanghai, China

IoT World Europe Summit
https://tmt.knect365.com/iot-world-europe/
10 - 11 June
London, UK

AR&VR World
https://tmt.knect365.com/ar-vr-world/
10 - 11 June
London, UK

Blockchain for Business
https://tmt.knect365.com/blockchain-business-summit/
10 - 11 June
London, UK

Cloud & DevOps World
https://tmt.knect365.com/cloud-devops-world/
10 - 11 June
London, UK

Digital Transformation World in Copenhagen
https://dtw.tmforum.org/
16 - 18 June
Copenhagen, Denmark

Mobile 360 Latin America
https://www.mobile360series.com/
2 - 4 June
Mexico City, Mexico

Mobile 360 MENA
https://www.mobile360series.com/
9 - 10 June
Cairo, Egypt

5G World
https://tmt.knect365.com/5gworldevent/
9- 11 June
London, UK

IoT Tech Expo Europe
https://www.iottechexpo.com/europe
1 – 2 July
Amsterdam, Netherlands

Digital Transformation North America
https://dtaw.tmforum.org/
21 - 25 September
Dallas, Texas, USA

The AI Summit Singapore
https://tmt.knect365.com/ai-summit-singapore/
22 - 23 September
Singapore, Asia

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Jim Morrish
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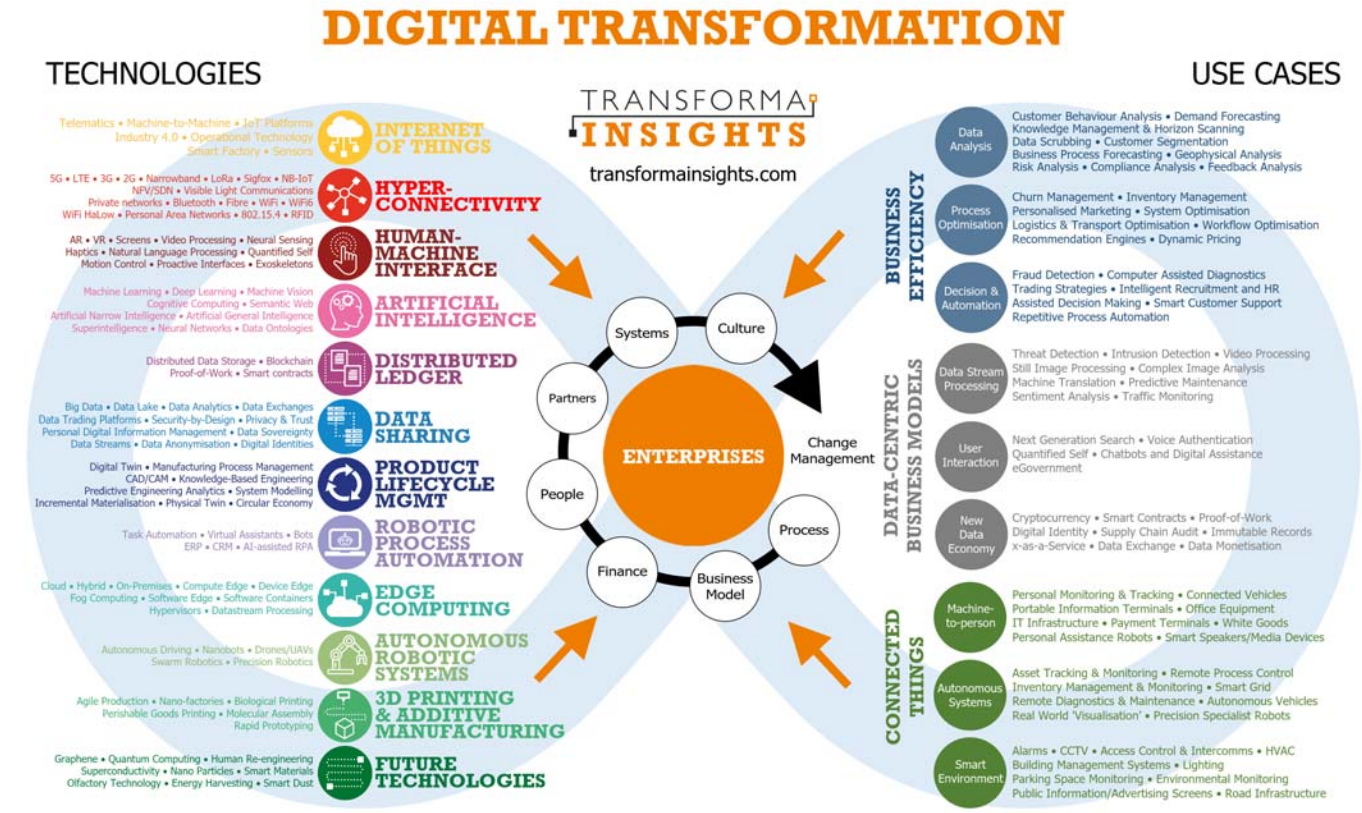

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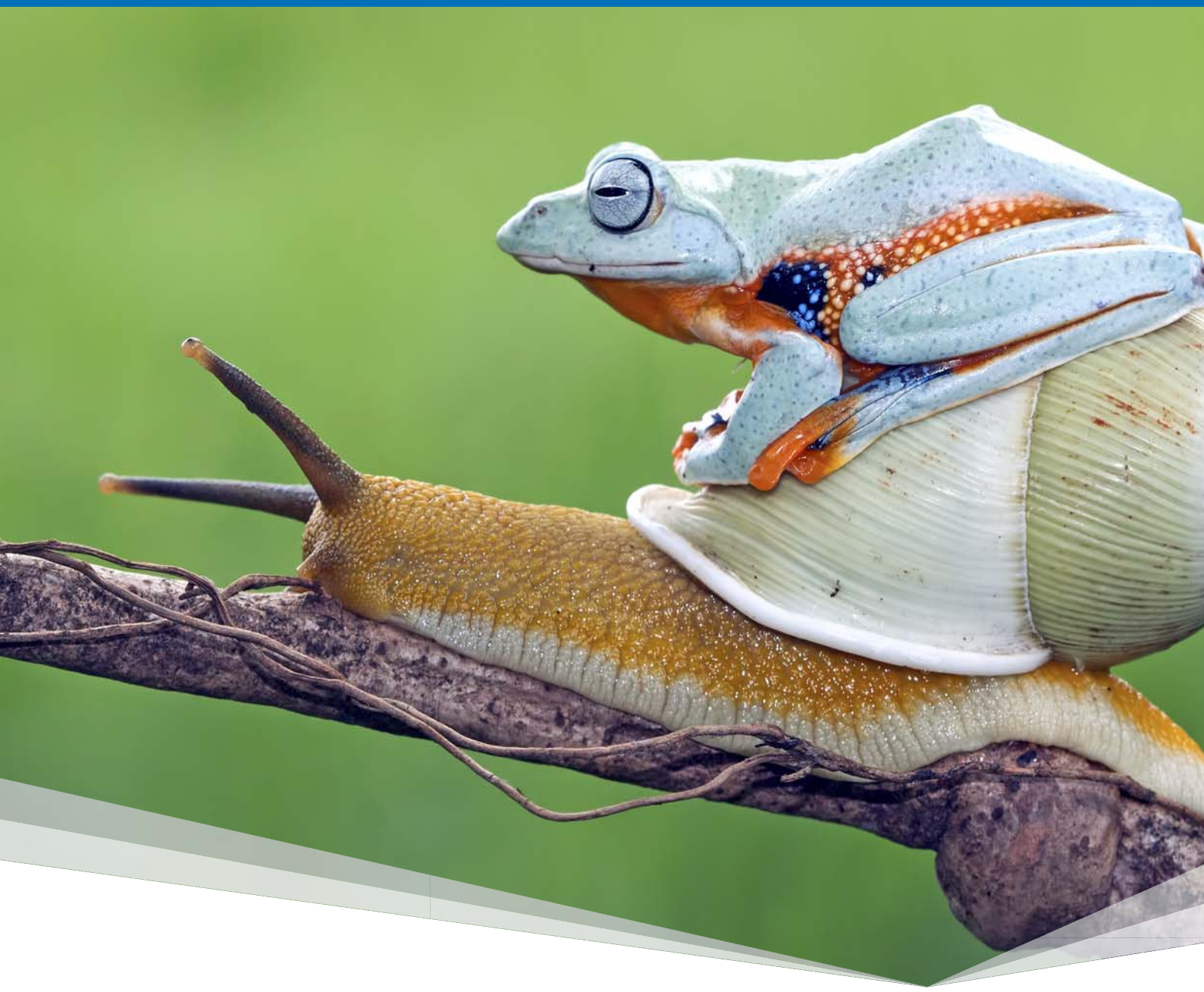

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