Digital Vision for Banking

Global opinion paper - March 2019

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Atos

Atos Digital Vision series aims to provide a thoughtful and informed view of the opportunities brought about by digital services. It demonstrates how these opportunities are being harnessed by governments, markets and businesses to help deliver innovative solutions that benefit their customers and citizens, today and into the future. This opinion paper features contributions from Atos global experts and from leading thinkers from other major industry organizations and leadership bodies.

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Foreword

Thierry Breton
Atos Chairman & CEO

Banks are at a crossroads. Continuous innovation and new technologies are disrupting the market. While it creates threats, it also creates opportunities. The ability to harness the potential of new technology will be the deciding factor in which organizations thrive.

Those organizations which are able to use data, the internet of things and analytics to better personalize services and offerings, together with platforms, robotic process automation and artificial intelligence to make it easier to do business, will win.

This change is about fundamental transformation. As well as contending with global economic factors and new and changing regulations, the emerging data-driven world and rise of non-banking platform companies are disrupting the most profitable parts of the banking value chains and compressing margins as competition rises. But these changing times also bring major opportunities for building next-generation, data-driven banking ecosystems. Banks that leverage digital to reinvent their approach to customer experience, operations, business model design and trust and compliance have extraordinary opportunities to thrive.

Atos is investing in this sector as a partner/broker to banks, FinTechs and technology incubators. This paper explores their key challenges and examines innovations that are redefining this industry forever.

Mark Ingleby,
Group Senior Vice President, Global Financial Services & Insurance Sector, Atos

The market is moving with rapid pace like never before. With the global mega-trends of increased competition and changing ownership of financial infrastructure, all are having to adapt faster and go deeper to win in their respective markets. This applies to incumbents and new players as they look to drive increased profit and gain share.

In this newly disrupted space, organizations, while different from each other, must strive to adapt in order to achieve similar goals regardless of their starting points. Key differentiators in execution include resilience and flexibility in this changing landscape with an eye toward delivering outstanding customer experiences, efficiency in operation and the use of data for growth. There are also specific challenges unique to different organizations. Incumbents require agility and innovation, while smaller FinTechs require the ability to innovate with scale and comply with regulation. Perhaps most important is that these two communities must work together to realize their full potential as they address the market.

Carlos Von Prabucki, Chief Operating Officer, Financial Services

The importance of ethics in transforming the banking industry

We've relied on people to make the banking industry more responsible. On the banks themselves, governments and regulators. But, ten years on from the global financial crisis, has that strategy worked? It might be time to look to emerging technologies to provide more responsible banking.

In our recent thought leadership paper, Journey 2022, we talk about the digital dilemmas businesses will face in the coming years. We argue that organizations that balance the introduction of emerging technologies with the needs of people and society will find the most success.

I believe that emerging technology – used the right way – can be a driver of fairness and equality.

For the banking industry, I believe that technology can and will be a force for good. Driving the customer to the center of processes, bringing equality to decision-making by taking advantage of smarter decision systems and building true objectivity into the financial system.

It is true that we must proceed with caution. Emerging technologies are at a tipping point and could have a negative impact on society. The obvious examples would be automation and job losses, branch closures as services move online and even insights from personal data putting individuals at a disadvantage when it comes to banking.

As banks move forward with their transformations, these issues will need to be kept in mind. The banking sector needs to make sure they have carefully considered all the implications and ethics of their digital strategies.

Right now, we are all watching the GAFAs of this world struggle with these dilemmas but in the next few years every business will need to think about these. Making the right choices now will leave business in a strong and stable future position.

Key drivers for change in the banking industry

There has never been a time of such change in the banking industry, nor such a wave of innovation and renewal. The strength of the drivers for this change are formidable. New technologies are advancing at blistering pace. Customer expectations shift as their digital experiences advance month by month. The imperative to maintain and improve returns on investment in fiercely competed markets drives decisive leadership and long term investment. Here are just some of the key drivers.

Digital Transformation

2/3

of financial transactions are now made online

Operational efficiency

30%

increase in operating profits could be gained by banks through digital by 2020

Automation

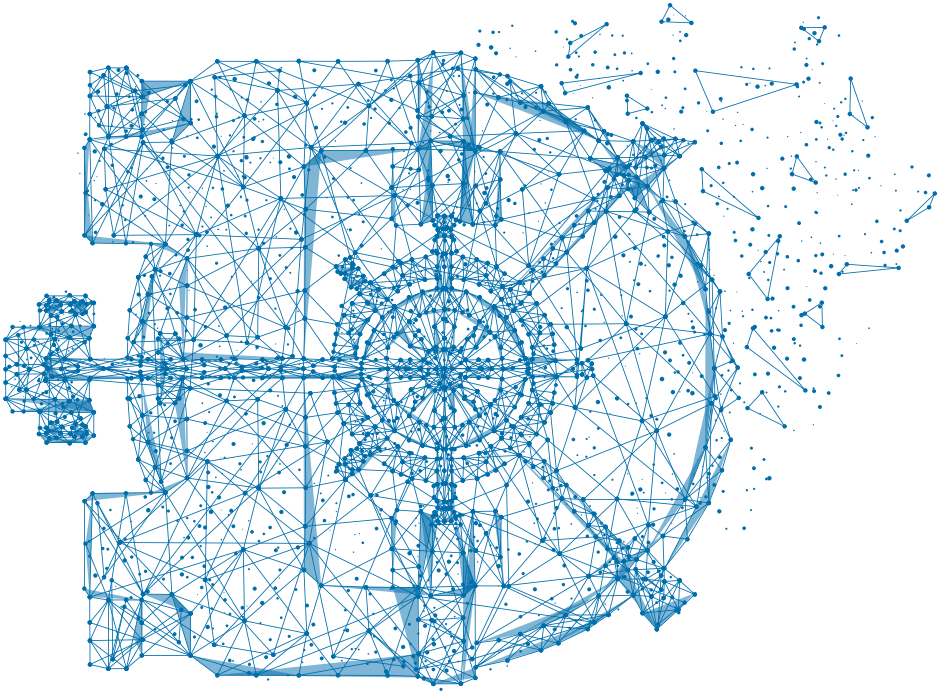
40-80%

of customer requests being automated results in raised client satisfaction and cost reduced

FinTech

$50bn

is invested each year in FinTechs ($=USD)



Sources: BCG, Deloitte, McKinsey, Atos

Franck Coisnon, Industry Solution Director, Atos

Artificial intelligence: the new power in banking

Artificial intelligence (AI) is one of today's fastest-growing technological advances. Between 2017 and 2025, global investment in AI is expected to increase 30-fold. Financial services, along with the telecoms and high-tech industry, is one of the two leading sectors investing in and adopting AI.

In a recent PwC survey[1], 52% of those in financial services said they're currently making 'substantial investments' in AI and 72% of business decision-makers believe that AI will be the business advantage of the future.

But first, let me first define what we mean by AI. While there are many forms, we consider here four main types: voice and facial recognition; natural language processing; machine learning; and deep learning. These can be used in various domains through chatbots, document analysis, process automation, or predictive analysis.

Intelligent automation

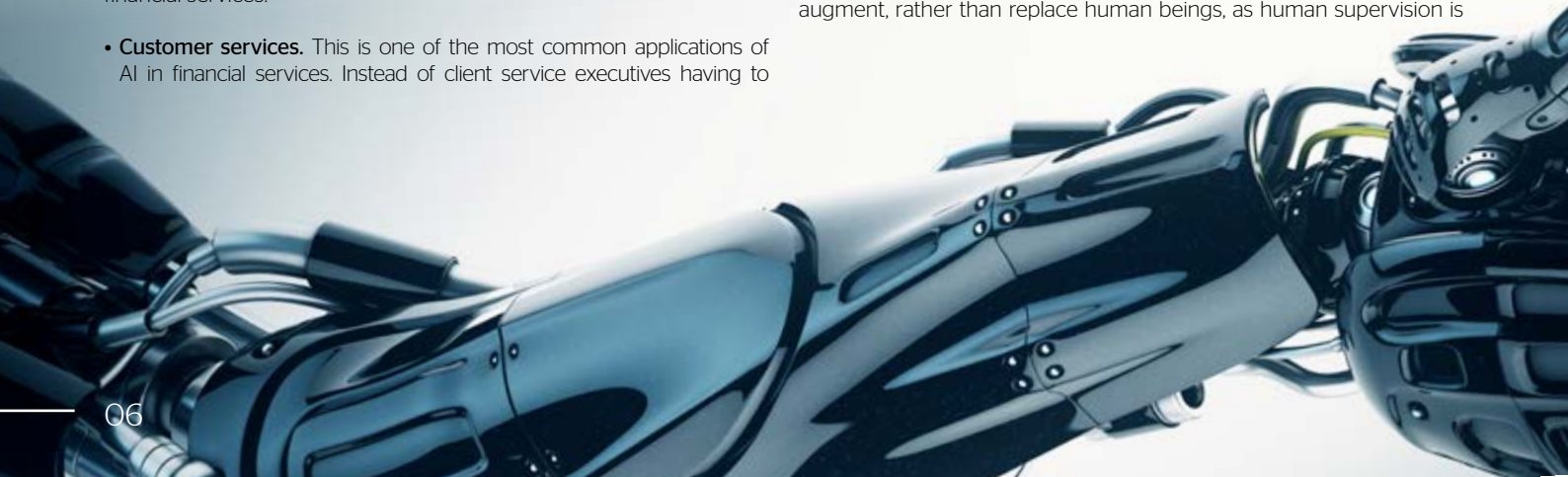
In financial services, robotic process automation (RPA) is increasingly common. This technology is perfect for automating relatively simple, repetitive tasks. In contrast, AI can be used to automate more complex tasks that require cognitive, or 'intelligent', processes.

This kind of intelligent automation is now in high demand. While RPA is appropriate for back-office and accounting processes, when it is combined with AI, any process including customer facing activities can be automated.

Given this potential, there are a wide variety of uses for AI across financial services.

- **Customer services.** This is one of the most common applications of AI in financial services. Instead of client service executives having to work through hundreds of emails manually, AI can ingest the emails, understand their meaning, and prepare an appropriate answer that the client executive can check and submit with one click.
- **Sales and customer intelligence.** Again, a fast-growing area, AI is deployed to gather and analyze customer data and intelligence to give business development teams new insights, sales leads and recommendations for the 'best next action' to develop the relationship and drive forward a sale.
- **Operations.** Intelligent automation is a potent way to drive efficiencies and improvements across end-to-end processes.
- **IT services.** AI can pinpoint whether an application or piece of hardware is likely to fail, massively increasing effectiveness and resilience of IT infrastructures.
- **Fraud prevention.** AI is increasingly critical to effective fraud management, by detecting and eliminating fraudulent payments or claims.
- **Cybersecurity.** As cyber threats grow and get more sophisticated, AI can be used for predictive analytics that can detect cyber attacks, even before they happen.

Despite what we may see in the news, AI does not, and should not, replace human beings. There are two dimensions to this: AI is here to augment, rather than replace human beings, as human supervision is

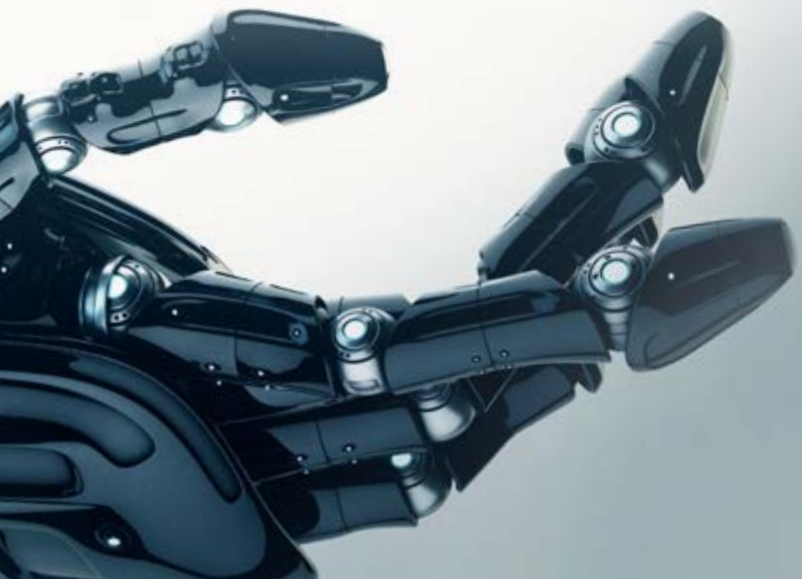


needed to ensure that AI algorithms deliver the expected results; and secondly, AI is still in the learning curve and will not do everything after day one.

Improving interactions

Many of the stand-out benefits of AI are around customer satisfaction. For example, with AI, if we interact with a company online (usually via the website), our questions get answers that are instantaneous, accurate and relevant to our situation. This is what many of today's customers, especially millennials, want.

And there are other major benefits. Quality and accuracy improves significantly by ruling out the potential for human error (again enhancing customer satisfaction and service). And, of course, there are cost savings. If you can use AI, you can increase efficiency and productivity and reallocate your workforce to higher value roles.



Making AI a success

While some banks are building centers of excellence in AI, many are still exploring the benefits, looking at how to accelerate delivery and identifying what the technology can do – and what it can't do. Whatever the maturity level in terms of AI, there are a couple of lessons to be learned:

Focus on business pain points

As with any new digital disruptor, it's important to focus on what you want to achieve rather than the technology. Building a team of AI experts and then asking them to deliver value can make it extremely difficult. Instead, starting with a real understanding of the business and the right pain-point, such as 'I have a customer satisfaction problem in this area', then using AI to solve the problem will prove the benefits of AI and gain more traction.

Manage expectations

It's also important to manage internal expectations: AI is not about replacing the human brain.

Knowledge integration

Another recipe for success is to consolidate all the intelligence or ontologies in the same place in the organization, rather than spreading it across all entities. This will accelerate the industrialization of AI, as knowledge will be capitalized and the scope of use cases that can be managed will expand. AI is rising up the agenda for banks because of its huge impact both on customer satisfaction and operations, as well as its fast return on investment. In two or three years' time, expected return will at last be evidenced at company level, but for companies who delay - will it be too late?

[1] Source: www.pwcartificialintelligence.com

Microsoft

Wayne Bartlett, Chief Industry Strategist UK, Financial Services, Microsoft

Is artificial intelligence the way to a better future?

As artificial intelligence (AI) becomes increasingly sophisticated and embedded into our lives, public opinion about its impact on the workplace is still divided. While there are concerns about the effects of job displacement, as Bill Gates has pointed out, the macro picture is surely one of greater opportunity.

A force for good

Throughout history, technological progress has changed the way we work. Given the speed of the digital revolution and the scale of change now happening in private businesses and public services, the response of companies and governments should be to anticipate and plan for the disruption, not just react to it. AI is a good example of this. The power of this technology is huge, but the way organizations use that power is the choice of leaders and decision makers. And with the vast potential for AI to increase the output and value of each human, there are real opportunities now to deploy it as a force for good.

In financial services, as in other sectors, socially responsible employers will be looking at how to use technologies to evolve and improve the workplace, not merely to drive the bottom line. Robotic process automation (RPA) enables the move from paper-based processing to digital. Overlaying that with AI means that machines can make the corrections and adjustments that would have been made by people. In this way, technologies are removing the more mundane tasks and freeing workers to move onto other activities.

Broader vision

AI can also dramatically improve accessibility in the workplace. Microsoft's Seeing AI project, for example, has at its heart a machine learning application that narrates the world around us. Designed for the low-vision community, it recognises and describes people, text, documents, currencies, scenes and objects. As well as this step change in accessibility (and for health and safety in industrial settings), these same technologies can be used elsewhere, for instance in a retail branch of a bank, to see how customers interact with the sales environment then 'learn' from those interactions and prompt a bank employee to initiate a relevant conversation.

Technology industry leaders have an important part to play here and Microsoft is committed to innovating in areas such as AI to help solve real-world problems, and most importantly, to serve people and communities around the globe. Looking beyond efficiency, organizations can consider how AI fits within their broader vision, strategy and corporate responsibility agenda. This means assessing and anticipating what they can do to increase the positive impacts, such as upskilling and re-skilling the workforce to broaden and develop capabilities.

Exploring the promise of new technologies and how they impact our society is a shared responsibility. Building a consensus on the ethics of AI and how to embrace it as an enabler is something that business leaders, organisations, academics and governments can work together to advance.

Remco Neuteboom, SVP, Chief Digital Officer, Global Financial Services, Atos

Success will come to banks that maintain a socially conscious ethos in their transformation journeys

We believe that many technologies have reached a tipping point and that we're now entering a time when the 'art of the permissible', will begin to balance the 'art of the possible'.

This will be especially true for Internet of Things and artificial intelligence, two technologies that can have a far-reaching impact on social issues like privacy and equality.

This emerging crossroads of ethics and technology, is a fantastic opportunity for the banking industry. Many of the big high street banks have long included a socially conscious message in their ethos; and well they should. More than any other industry, the banking sector has the power and the opportunity to do good. To build business models that support both the economy and people.

In order to achieve this, we believe that right now is the time for the banking industry to start to build a digital code of ethics into their business models, which will be a unique selling point for banks.

So, what is our advice for the banking sector as they adopt emerging technologies?

Data dangers

The speed of business transformation has left governments and legislators behind the curve in terms of understanding the wider impact these digital disruptions will have on society and people. In no area is this more the case than in the use of data. As more and more means of generating data emerge (including IoT networks, drones, social media platforms, autonomous cars, etc), questions on data ownership, data usage and privacy protection demand an answer.

Banks will need to do more to protect their customers' privacy. After all, banks must never have access to personal data that may work against an individual. If this ever happens, the consequences will be dramatic, and the sector will have irrevocably broken its sacred bonds of trust with society.

Can you undo?

Proper handling of all that data coincides with the maturing of artificial intelligence, which gives us a tool to not only cope with the sheer volume, but also helps us to draw the best conclusions and make the best business decisions.

As you build a machine learning algorithm for AI, it begins to learn and evolve and eventually draw its own conclusions. However, algorithms are only as unbiased as the person who built them! In the end, an organization will still be responsible for justifying the decisions its takes, whether they're made by a machine or a person.

Banks must adopt an 'ethics by design' principle, which allows for reversal or even a total switch off function.

To automate or not?

Realistically, a bank must automate. The volume of data that needs to be handled and the growing strain of industry regulation would mean that manual processing of banking functions is unsustainable.

The balance between automation and human work can be explored though. For example, the physical bank is an important differentiator for the traditional players which can offer a real personalized experience through direct human interaction. The question is not if AI can replace the bank's contact with clients, but how AI can best be applied to improve the customer's experience with their bank.

Create the culture you need

Culture will decide how much digitalization we are willing to embrace, even though it is difficult to change, it will naturally evolve. We therefore recommend building a code of ethics (either self-regulated or imposed by a regulator) that is flexible enough to deal with continued technological change – because it focuses on principles, giving the right direction on how to deploy emerging technologies without fixating on specific examples.

Adopting Corporate Digital Responsibility – Corporate Social Responsibility (CSR) for the digital era – is the right thing to do, and will position a bank as a leading force for our society's digital journey and so set it apart from its (emerging) competitors.

As our CEO Thierry Breton has stated: *wait and see cannot be a viable option for digital transformation.*

BACKBASE

Martijn Janssen, Global Alliance Manager, Backbase

How banks can stay relevant in a digitalized world

When today's customers compare banks, they actually look way beyond the financial services sector. Everything in their consumer lives tends to work easily, with real-time smart services available every day over a range of devices. Buying products or using services takes a few clicks and importantly, unhappy customers can switch providers instantly.

Staying relevant

The competitive playing field for banks now includes the likes of Uber or Facebook, who have made themselves the go-to for their line of business. They constantly innovate and introduce clever new functionality at zero marginal cost. They are structured to go above and beyond customer expectations without any major implementations, upheaval or cost implications. They are agile, can tune into what customers want, respond quickly and change on a whim. In fact, companies like this are no longer responding to market realities, they create them in conjunction with their customers.

If there is one thing that the Ubers and Facebooks of this world are, it's relevant. Staying relevant is now vital for banks, and this is about so much more than nice interfaces. An integrated approach is essential, one that spans the entire user experience and a host of back-end systems and procedures.

The right framework

Banks must unify everything within one smart framework that connects all the parts of the bank to optimise the customer experience. We call that framework the Customer Operating System (OS), a kind of one-stop-shop for customers.

A strong Customer OS has four pillars: omni-channel banking, smart banking, modular banking and Open Banking. Having the right Customer OS in place will ensure banks can not only respond to these developments, but tap into the huge opportunities they present.

Owning the customer experience

Key to success with the Customer OS will be owning the customer experience. That happens when banks embrace their new future as a platform – a place where customers can easily manage their financial lives. The four pillars of the Customer OS must be aligned to support this effort.

- **Omni-channel banking.** True omni-channel experiences are crucial, where customer journeys are seamless and sensible. This means optimizing all digital and traditional touchpoints to make life easy for customers.
- **Modular architecture.** Agility in the form of modular architecture is vital; banks must put the right building blocks in place to be flexible enough to compete.
- **Smart banking.** Artificial intelligence and machine learning combined with dynamic processes and smart forms will empower employees and customers, saving time, paper and costs.
- **Open banking.** Banks must open up their application programming interfaces (APIs) to interconnect with the open banking ecosystem and add value to their offering, without walking into a data give-away.

Using the Customer OS to win

The need to build a strong Customer OS is real, but this is also a fantastic opportunity. Streamlining customer journeys, for example, not only cuts out friction, it reduces overhead. Creating a strong Customer OS offers huge cost reductions, whilst making a bank's offering more relevant and accessible.

Banks that understand and develop a strong Customer OS will be best placed to deliver true excellence to their customers. By doing so, they secure their place within a banking industry that has just stepped into the future.

Backbase is a growing FinTech software provider that empowers financial institutions to accelerate their digital transformation through state-of-the-art digital banking software that unifies data and functionality into a seamless digital customer experience.

Neil Winchester, Infrastructure Solutions Group Director, Dell EMC
Dave James, Managing Director, Creative Solutions Space Ltd

Better, faster, easier: a step change in computing

While digital technologies have revolutionized financial services, behind the scenes, a key development in computing can transform what's possible – especially in the use of analytics and artificial intelligence (AI).

Powerful computing already provides the capability for digital technologies to transmit, process, analyze, store, present and learn from very large and complex data sets. Given this, financial institutions everywhere are unlocking the power of analytics and artificial intelligence to tackle fraud, improve their risk management, more accurately forecast investments, enhance their customers' experiences, increase the security of their IT... and the list goes on.

The High Performance Computing (HPC) platforms that make all this possible are themselves evolving fast. One step change is the adoption of a computer chip called Field Programmable Gate Array (FPGA). These chips, essentially, are embedded into hardware and create a step change in the power, speed, agility and energy efficiency across a wide spread of computer processes. Since Intel, a leading chip manufacturer, brought FPGA into the mainstream, these technologies are available to financial services companies.

Step change in performance

Deploying FPGA components dramatically improves performance, throughput and processing speeds, not least because on-chip resources can now approach 100% utilization. This has never before been possible – even with the most advanced and optimized computing platforms. This, in turn, massively increases efficiency and cuts costs and energy usage.

In the finance sector, FPGA technologies can return useful results sub microsecond and calculate derivatives or other complex computations and algorithms in milliseconds. In fact, anywhere where there are high volume, high velocity dataflows and workloads, FPGA technologies can help: to analyze data much more powerfully, conduct performance analysis, process high trade volumes, and pinpoint anomalous payments per second.

Early adoption

Early adoption by larger banks and smaller FinTechs is already underway – especially in the financial markets. One investment bank in the City, for example, introduced FPGA as an efficiency measure. The results are startling: a computationally intensive derivatives valuation that took 2.3 seconds on a modern, highly-optimized computing platform now takes just 18 milliseconds – that's 128 times faster. And the impact of this? 1.2 megawatts of power consumption cut to just 13 kilowatts – that's 92 times less, with CO_2 emissions falling by the same factor. With two-thirds of data center costs spent on energy consumption, these are very significant sums.

Yet it's not just about cost: it's also about speed. In the case of that investment bank, if speed had been the key objective, then the speed of calculation could have been accelerated by a further 18 times.

Faster to market

A number of technology partners and cloud providers are investing in FPGA to deliver competitive advantage to their customers through pre-configured solutions and implementation support. Financial institutions can bring in third parties to help them exploit these opportunities, or retrain and redeploy their own teams to adapt.

What is significant from a procurement and development perspective is that where historically, IT providers or banks had to buy separate hardware to incorporate the chip, this is no longer the case. Applications can be developed faster and retasked in just 0.2 seconds to perform different applications. This lowers costs and accelerates times-to-market for new services.

Embarking on the journey

Given that next generation technology typically offers improvements of around 20%, the scale of these gains is exceptionally rare. As a result, financial services organizations will be able to recalibrate both what can be achieved in the business, and how quickly this powerful computing can be developed and deployed.

While we are still early on the FPGA journey, given its huge power, the most forward looking financial organizations will be pushing the edges of what's possible, especially in markets where high speed, high capacity and real-time analysis give organizations the edge. Critically, for any organization, FPGA will make high performing analytics and artificial intelligence capabilities much faster and cheaper – transforming large and smaller organizations' ability to improve and compete.

Owen Wheatley, Partner & Head of Banking, Financial Services & Insurance, ISG

I made the investment, now where's my return?

I was surprised recently when a senior executive at a well known financial institution told me his digital transformation was almost finished. In today's constantly evolving world of emerging technology and increasing customer demands, are transformations ever really finished?

It is true that all major financial institutions are on a journey toward greater automation and digitization - they need to be agile so they can provide a better customer experience across multiple channels. But if an organization is thinking of digital transformation as something with a start and an end date, it is being merely tactical. Which is to say, it is approaching the initiative in a way that – at least to some degree – will not optimize its investments.

Consider three examples.

Robotic Process Automation (RPA)

First, companies are rushing to implement robotic process automation (RPA) to improve efficiency and reduce costs through workforce rationalization. But, even in what many deem successful RPA deployments, organizations are not fully realizing the business case. Staff are being re-purposed as opposed to being released, and the firms are failing to link RPA with more intelligent automation and analytics to drive top-line growth. A bank recently showed me its new chatbot, which could quickly and accurately answer a common online customer question: "What is the interest rate on my current account?" This was mildly interesting, but what about the next step? Why not plug the bot into a data and analytics platform so it can better understand why the customer is asking this question? If the customer is evaluating the returns on her portfolio, shouldn't the bank seize the opportunity to upsell other savings or investment products? Shouldn't it mine the data to identify all customers with similar patterns and demographics to offer them the same? Introduction of robotic process automation can't merely be to create a single response – it must be seen as a lynchpin within a pathway of responses developed together with business and marketing to grow revenue and cement customer loyalty.

A new governance model

This brings me to my second example. While most financial institutions are busy automating as many processes as possible, few are putting concentrated effort toward figuring out how to manage a blended workforce of humans and robots. To maximise their investments, organizations must develop a new governance model that accounts for appropriate retraining and motivating of workers, identifying and acquiring of new skills and prioritising and accurate routing of workloads. Too few financial institutions are implementing robust change management to communicate and align expectations across the organization. Consider a recent announcement by a CXO at a large bank who said he was going to automate more than 15,000 jobs. Not only was this factually inaccurate – most workers were re-purposed and it was tasks not jobs that were being automated – but the message was toxic for employees. Moreover, the person running the bank's automation Center of Excellence was blindsided by the announcement, highlighting the degree of internal misalignment.

FinTech investment

The third example relates to the number of established financial institutions clamouring to work with FinTech startups, including a large European bank I know well. Their intent is admirable. They are hoping to insulate themselves from external disruption and disintermediation from their primary customer contacts and preference data. But they are finding it difficult to determine the right way to engage with these unconventional and often young tech companies; acquire, invest or simply partner. In many cases, the rush to spend money eclipses a clear and well thought-out strategic plan. Instead, banks should follow a three-step process to leverage a FinTech investment: 1) honestly analyze their own operations to identify areas of their business most vulnerable to disruption, 2) scour the market and run a rigorous process to find the most appropriate FinTech partner; and 3) determine the most suitable engagement model as well as the most comprehensive and secure integration plan.

Despite the relatively healthy outlook for most financial institutions within a relatively encouraging macroeconomic environment, it's clear that "finishing transformation" is not an option. Optimizing investments and setting yourself up for success takes strategic thinking now and for the long haul. In fact, digital transformation may be a journey with no end at all.

Frederik Kerling, Senior Quantum Expert, and member of the Scientific Community, Atos

Quantum computing in banking, worry or be happy?

In December 2014, the Commonwealth Bank of Australia (CBA) became one of the first commercial organizations to invest significantly in quantum computing. This was long before the large American companies Microsoft, Intel, IBM, and Google, made the topic popular. In April 2017, they increased this amount with an additional $14 million on top of the original $5 million. In November 2017, Allianz and RBS joined the $45 million investment group for quantum computing, with Fujitsu, CME group and Accenture.

The banking sector is, of all market sectors, the most 'surprising' investor in quantum computing technology. Why is this, and what do they know?

Payment networks and Crypto products

Deploying FPGA components dramatically improves performance, One of the first things that springs to mind is payment networks. The world's economy revolves around digital transaction. If the basis of availability, integrity and confidentiality is attacked via a quantum attack, this is obviously bad for business. Telecom companies like KPN are actively spreading the word that networking as we know it is under threat. And they are right, getting our public networks quantum safe is a major non-trivial challenge that takes a lot of time. However, it is not a technical challenge, and a lot of the crucial financial data is run via low-latency networks. These are often privately owned, and fixing encryption in these networks is a much simpler task.

Then there are the cryptographic products, whose blockchains like trust technologies are notoriously quantum unsafe. They form a challenge, as with major blockchain examples, that updating the formalism almost always causes a hard-fork[1], which invalidates the single source of truth principle. But most banks don't use public blockchain and have the trust and power to transition to quantum-safe trust technologies. So, although there are security worries for the banking sector, it cannot be the leading cause of investment.

Practical use cases for banking

In 2014, a short scour of the internet learned that CBA wanted to use a quantum computer to replace the work currently done by high performance computing via Monte Carlo simulations. Here lies a hint: classical binary computers are not great in handling statistics. There are significant combinatorial challenges where finding an optimum between different risks scales exponentially with the amount of assets under consideration. Right now, these calculations take several hours and are all approximations of possible optimal solutions to a problem, they are rarely the best.

Introducing quantum computers: quantum computers are by their natural properties, statistical machines. Let me rephrase that, they are statistics in their most pure form. This means that whatever you have been taught about statistics are just simple examples that we can humanly fathom. Just imagine trying to calculate the combinatorial possible outcomes of a single share price. There is quickly a near infinite amount of possibilities that could affect this, which we cannot even describe if we had all the atoms in the universe at our disposal. But a quantum computer can, in fact do this with only a small number of qubits. This means that the combinatorial challenge for a quantum computer scales linearly, rather than the present exponential scaling in classical computing, with the amount of assets under consideration and will be available much sooner than the encryption breaking capabilities.

This means you can for instance calculate the Value at Risk, and the Conditional Value at Risk much more quickly and more effectively. This allows you to calculate the financial risks of complicated assets like T-bills or complicated derivatives portfolio accurately, whereas now this is, mathematically seen, just guesswork.

[1] A hard fork is a permanent divergence from a single source of truth, creating 2 distinctly different ledgers. https://www.investopedia.com/terms/h/hard-fork.asp

Quantum computers' impact on the banking sector

Almost all financial business is about evaluating the probabilities of positive outcomes, and eliminating negative outcomes, to achieve an acceptable risk with an agreeable profitable outcome. For over 60 years, the methods used to resolve this have been optimized to fit the available technological capabilities. Now, there are machines available that can do this radically differently and with a much better pedigree. These machines handle these specific computational challenges so favourably that the banking sector must invest to prepare its business for the new functionality. Those that do not, will quickly see their market shares dwindle as they lose competitiveness.

So, there are bright happy applications for the financial markets, that will make the sector more profitable, and less risky. It can even potentially stabilize the global economy as actual financial risks are becoming more predictable and more transparent. In our recent Thought Leadership publication Journey 2022 we describe how we get to these solutions for the Financial Services sector, and why they will be available sooner than you might think. I was hence perhaps wrong to say there is nothing to worry about, after all; can you afford to be late with the technology or not?

Deborah Dillon, EU Data Privacy and GDPR Leader, Atos Consulting

A gaze at GDPR in 2019

Businesses across all sectors struggled to get ready for the May 2018 deadline and we now know that many organizations are still having difficulty complying with aspects of GDPR. In 2019, organizations need to focus on how GDPR compliance could be a driver of increased customer trust and overall business growth. This could be the year when the ways companies comply with GDPR become more uniform across industries, positively affecting customer perspectives.

What's happened so far

The number of GDPR-related complaints to the regulators about lack of compliance has risen substantially in numerous countries across the EU. Some affected entities merely received a warning or were required to investigate the complaint. Once complied, the regulators are looking at how the issues are handled internally. However, if businesses don't show they are in line with GDPR in the first instance, they should not expect such leniency from the regulator.

The expected GDPR fines have appeared to be slow in arriving after the initial scaremongering that took place regarding fines of 4% of an organization's annual turnover or €20 million. One of the likely reasons for the uneven issuing of GDPR fines across the EU countries, as well as the slow associated process, is that those in charge of making the legal decisions don't have legal precedents to assist them with their actions. However, in 2019, people should expect regulators to become more concise in their application and interpretations of the law. Case law is now being gathered and we expect to see more Privacy Law test cases come before the courts this year.

However, data protection authorities will – and already have – started to make a distinction between those companies that have at least tried to comply with the GDPR requirements and those which are just not willing to make any effort. It's one thing to be able to tell the regulator and the public, 'We did our best, but still suffered a breach,' and it's quite another to say, 'Sorry, we just weren't prepared yet.' It's in those latter cases that we can expect to see the large fines starting to come in. The organization's that have seen GDPR as merely a tick box exercise and set up a project to deal with implementation will now be at risk if processes and procedures are not properly embedded.

We have seen particular issues for organizations in complying with individual customer data requests. Organization's using legacy systems are struggling to gather personal information spread across various systems within the new 30-day timescales, highlighting that a lack of an effective process impedes GDPR compliance.

So, while 2018 may have been the year of GDPR implementation, 2019 is the year where we will see increased scrutiny from the regulators. The Information Commissioner Office is already flexing its muscles; however, this is the year we may also see them bare their teeth!

Koen Pelgrims, Director, Customer Experience Solutions and Open Banking, Global Financial Services, Atos

Open Banking: the landscape by 2025

Open Banking is here. The Second Payment Services Directive (PSD2) now requires banks to give any third party access to use payments data and launch transactions from a customer's bank account, subject to permission. It's a radical idea; and while there will undoubtedly be impacts, the exact nature and timeframes of the disruption are still becoming clear.

Getting the measure

Although the range of possibilities and changes around Open Banking may sometimes seem confusing, essentially, they fall into five key categories.

1. Payments. PSD2 gives merchants direct access to consumers' bank accounts to take payments, thereby diverting transaction fees (which can be up to 3%, or even more, of the cost of products) away from the chain of banks, credit-card companies and payment processors and onto the merchant's bottom line (or passed onto the consumer). Merchants will start leveraging the benefits of this in the next two years, with some – such as ticket-sellers, online retailers, transport operators – growing and diversifying what they choose to sell.

2. Cash management. Given that most small- and medium-sized businesses hold accounts with at least two banks, these new services will offer to dynamically manage and optimize their cashflow between accounts – something that previously was only extended to corporate customers. So, if a business signs up with four or five banks, its money will be automatically moved between these accounts by one intermediary to avoid overdraft fees, maximize the benefits of interest rates and so on.

3. Loans. Any business with money to invest will now be able to extend loans based on the ability to access the borrower's bank account to assess risk and then regularly monitor cashflow. In exchange, lenders can offer more favourable interest rates. Perhaps the third most disruptive change, this could create new loans markets and push up competition.

4. Personal financial management. This is one of the most commonly cited examples of Open Banking. Instead of having an app for each of our bank accounts, we will be able to use just one app to get an overview of all our finances, with useful graphs and trackers to monitor our spending, flag any potential problems, help us set goals, and offer us solutions, such as loans, to help us meet our goals a little faster. Instead of the incumbent bank, a new third party will own the direct relationship with the customer.

5. Know your customer. This is about meeting regulatory requirements to vet customers, financial counter parties and others for credit rating and to fight crime, fraud and terrorist activity. Now, the vetting process is faster and easier – and enables financial institutions to offer this as a service to customers.

Rapid shifts and slower burns

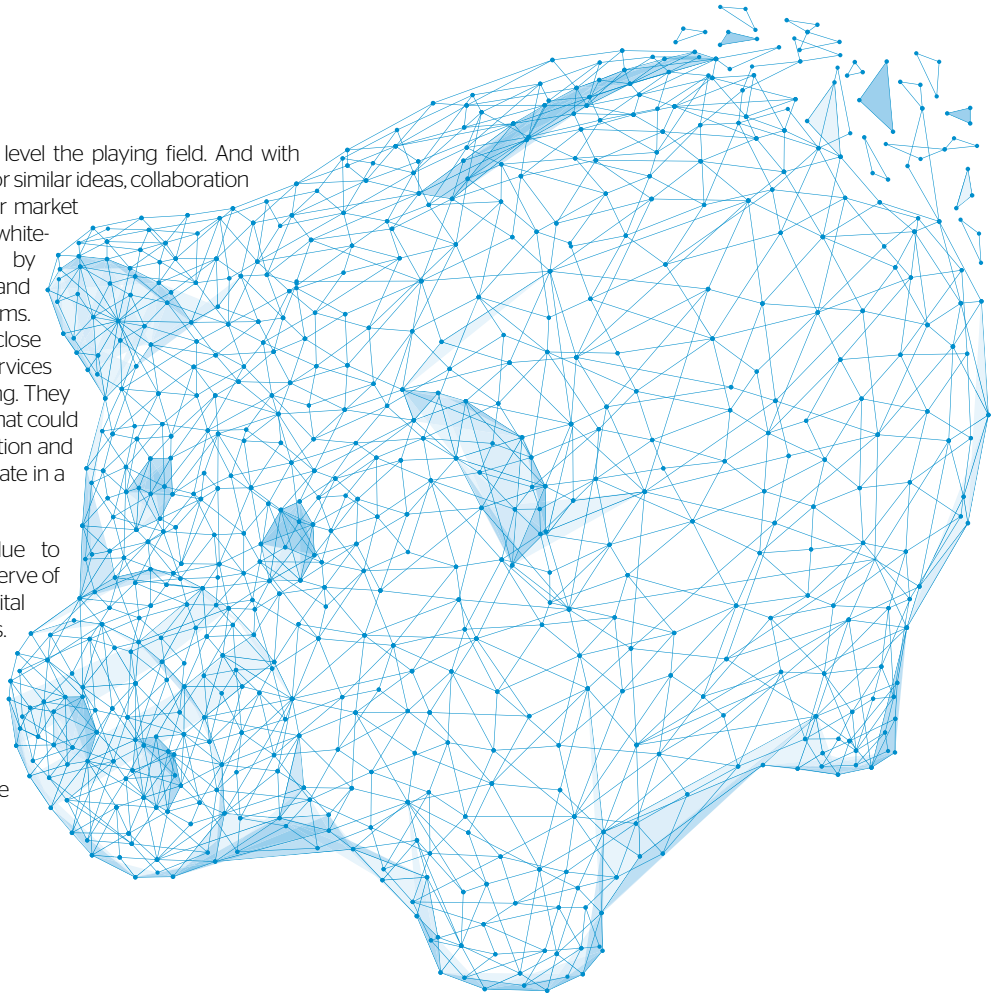
So, how disruptive are these different types of service likely to be by 2025? On the one hand, the first two will clearly have major shorter term impacts as merchants and new players reinvent the value chain. On the other, it's easy to see the potential for new lending and personal finance management facilities that extend consumers' power and choice and give new players ownership of direct customer relationships. However, the success of these types of services will heavily depend on take-up.

Broadly speaking, when it comes to banking, consumers often stick to what they know – in fact, it is said that we're more likely to change our life partner than we are to change our bank. It's useful to look to the de-regulation of the energy market as an indicator. It took a few years for a critical mass of consumers to act, and a yearly saving of around £290 before people switched utility providers.

Staying agile

PSD2 does, however, go a long way to level the playing field. And with incumbents and new players all looking for similar ideas, collaboration is the best way to gain the edge. Smaller market entrants should look to develop white-labelled services that can be branded by governments or bigger institutions and seamlessly plugged into larger ecosystems. In turn, incumbents need to keep a close watch on the kind of differentiated services and innovations that FinTechs are devising. They also need to evaluate what is core, and what could be outsourced to reshape their organization and infrastructure to be agile enough to operate in a more open and dynamic environment.

The ability to engage and add value to consumers will no longer be just the preserve of banks; it will be shared with FinTechs, digital companies, retailers and other innovators. As well as being the advent of Open Banking, PSD2 is the prelude to ongoing disruption as regulators liberate other parts of banking into the market. Any institution needs to act now – not just to embrace PSD2, but to be ready for future directives.



Tony Rich, Head of Vertical Solutions, Unify – Atos Collaboration Solutions

Digital by default: unifying communication and collaboration

Customers' everyday interactions with banking and insurance companies have been undergoing a steady process of transformation for some time. Far fewer people now regularly visit or phone the local branch of their bank than even a decade ago, assuming there is one close by. I can pay money into my account at an ATM and arrange transactions just using my mobile app and a thumb print as security.

Seamless communication

But bigger change is still to come. Today, when I interact with someone at my bank or insurer, I can choose to make a phone call or have a web chat, but as soon as I need a document or to speak to someone else, that conversation stops. Interactions can still be fragmented and time consuming. If I need to sign or check something, even if the document is held for me on a secure portal as some insurance companies now do, the process is very disjointed.

Let's roll the clock forward a little to a time when cloud-based collaboration technology will make things much more seamless. Imagine I want to apply for a mortgage, or file a complaint, or make an insurance claim. My initial contact will start in the same way as now (say, a phone call) because it's the one I am most comfortable with. But from there, things look very different.

I am immediately sent a link to a secure digital space where all interactions, conversations, documents and transactions about this particular process (my mortgage, complaint or claim) are stored and instantly accessible. Now, at any point, I can switch to a voice call, or a chat box, or a video call with two or more people. All this is done within the same secure online space, accessible through my mobile, tablet or PC. Here, at any time, I can hear a recording of the original call, see any documents I need to review and sign, talk to other relevant contacts, and so on. And when my case is complete, it can be archived to meet all auditing and compliance requirements.

This is a leaner procedure, with less to-ing and fro-ing, and document distribution and version control is easier. For customers and staff alike, it's a more joined up, better and faster experience. For the company, a streamlined, friction-free process increases efficiency and drives down costs.

Multiple benefits

Given the challenges that all banks and insurers face – getting costs under control, protecting their brand, retaining and attracting customers and staff, achieving leaner agile operations while meeting regulatory requirements and compliance – it's easy to see how this kind of immersive omni-channel experience could help address every single one. So, what's needed for online communication and collaboration to be the norm?

The airline industry has already blazed a trail in creating more joined up omni-channel customer experiences. When I fly, part of my journey now is my ability to print or download my own travel documents, choose my seat, check myself in online or at a kiosk, and so on. I feel more empowered and in control – and the airline has enhanced its brand and achieved major efficiencies at the same time.

Key differentiator

In financial services, perhaps, things are in a state of transition. Internally, delivering more immersive customer experiences requires organizational and cultural change to think, connect and collaborate digitally by default. As far as customers are concerned, success depends on making sure the experience is easy and available to them in whatever channel is right for them. Older people, for example, might prefer phone calls and printable web pages. Digital natives, on the other hand, are savvy at reading and absorbing information direct from the screen and are more likely to initiate any communication digitally, including via social media.

Circuit, Unify's omni-channel communication and collaboration platform, is already in use at banks and insurance companies and we are exploring new uses all the time. Extending platforms out into the customer space is a logical next step as the world becomes ever more connected. And in a fast-changing market and with the arrival of Open Banking driving new services, unified omni-channel experiences could be a key differentiator for any player looking to compete.

VERSIVE

Jason O'Shaughnessy, Head of International Business Development, Versive
Open Banking Working Group 2017

Personal finance management: new outlook

Some of the biggest impacts of the Second Payment Services Directive (PSD2) are likely to be around personal finance management, and they look set to fundamentally change the relationship between European consumers and their banks.

FinTech booms

For insight into what's ahead, it's worth looking back at developments in the US this century. With large numbers of institutions all competing for business, US banks are well ahead of other countries in sharing data and finding creative ways to get competitive edge. For years, data was shared by established banks as a means to offer their customers better products and services. But in the wake of the 2008 credit crunch, things changed. Consumers became more receptive to alternatives and there was a FinTech boom as newer entrants seized the moment and put pressure on the incumbents to adapt.

In Europe, innovative third party aggregators and intermediaries are already delivering new and interesting digital tools to help us save, borrow and make our money go further. Now, with the Open Banking mandate, more barriers have been removed and banks will be driven to compete.

Personalized services

As a first step, if I can use one mobile app to view and manage all my different bank accounts, surely that will make my life easier. And for some of the more conservative banks, that may be as far as it goes. Others will incorporate additional functionality, such as real-time dashboards and graphs offering comparative breakdowns of my spend, or integration with my business accounting software.

To take things further, if one company has the data on all my accounts, then it will be able to offer me better targeted products and, on the basis of monitoring my cashflow, give me better rates. Given that banks can now share data to verify who I am and get my credit scoring in real-time, applications for loans or credit will take seconds instead of days. Add in a 'robot' financial advisor, and I'll be able to get comprehensive and accurate advice and information in just a few minutes in the comfort of my home, all based on my data. And there are many other examples of tools and services to manage my cash in a more dynamic and personalized way.

Choice and confidence

For banks, a lot of customer acquisition has traditionally been done by locating branches close to universities to attract students who will stay loyal. In the digital age, young people will be more likely to choose the bank that makes it easiest for them to manage their money, or apply for a student loan, offer them a great bill sharing service, promise to save them money through a free cash management service, and so on. These are new reasons for consumers to choose their banks.

Critically, the trust model is also evolving to give consumers more confidence in smaller players. Until now, for security reasons, banks have not encouraged customers to share personal data; but with Open Banking, banking terms and conditions are changing to reflect the new landscape. This more open mindset will create more switching of consumers between different banks and services. Whereas in the past, staying loyal to a particular bank may have been the way to increase our chances of obtaining a loan, these old loyalties will no longer apply as informed consumers choose their best mix of products and services.

Grasping the opportunity

Right now, there are still limitations: PSD2 only applies to transactions and payments data. Yet longer term, we'll see mortgages, credit cards, loans and investment accounts opened up – as they are in the US – to offer even more benefits to consumers. Given this, if banks don't take action, they could run the risk of becoming payment platforms for consumers who are choosing more useful, value-add services from other providers.

In response, while some banks may develop their own services, many others will be scanning the FinTech horizon for partners who are distinctive, deliver value, and can help them to be agile in this fast changing domain. All this potential is certainly exciting, and the banks who grasp the opportunity to make their data available to third parties will reap the benefits by being able to offer more innovative and competitive services to their customers.

> To succeed, there has to be a flightpath laid out for the move to the future state, with common objectives and shared risks for the contributing companies.
>
> **Peter Roe, Research Director, Financial Services, TechMarketView LLP**

Peter Roe, Research Director, Financial Services, TechMarketView LLP

Realizing the digital vision of process transformation

The rapid and continuous advance of digital technology means that we stand on the brink of another industrial revolution, where large-scale industrial processes can be transformed. Service quality and customer experience can now be raised to unprecedented levels, costs and systemic risks reduced and cycle times accelerated. This potential transformation will be realized most visibly in financial services as sector participants, governments and regulators embrace new FinTech business models and digital technology to revitalize the complex systems that underpin trade, savings and investment.

However, the key point to consider is that the move to a completely new, digitally enhanced financial services world will not happen overnight. Systems that connect and enable millions of buyers and sellers, lenders and borrowers and insured and insurers still function well, albeit slowly and often with poor customer experience. Their shortcomings however become ever more obvious as users get accustomed to the quality, speed and user interface of, for example, the latest iPhone or voice activated search device. This increasing 'digital debt' and the commercial reality of competing in a dynamic market inexorably add to the pressure for change within many financial services organizations.

Transforming while performing

The financial services industry generally relies upon the coordination and intersection of numerous ecosystems and, particularly when the larger, more established players are concerned, a multiplicity of IT systems and applications. Modernizing the underlying technology while keeping a business operating has been likened to changing the engines of an Airbus A380 while the plane is in flight. So for real change to be possible, we believe that financial services providers have to work in partnership with the tech provider community. Only this way can they create a shared and intimate knowledge of the underlying process, meet the broad range of customer needs and navigate the necessary changes in the value chain, thereby optimising the rate and cost of progress. True partnership can open the door to substantial, long lasting benefits. When tech suppliers can offer a real commitment to transformational partnering, driving a business growth agenda with shared rewards, together with a focus on leveraging the experience of staff teams, the consistency and scale of business process improvements are both materially improved.

The application of leading edge technology can certainly bring about significant change, but without proper planning, good employee engagement and the right governance, a major reinvestment project can result merely in the building of a new legacy infrastructure and add another layer of scar tissue, bringing yet more inertia and resistance to progress.

To succeed, there has to be a flightpath laid out for the move to the future state, with common objectives and shared risks for the contributing companies. There also needs to be a clear understanding of the limitations of the technology and the risks of change, recognizing the need for the right culture and behaviors within both the financial services organization and the tech supplier community.

Iterate to solve and succeed

Working together through a series of pilot projects can build the necessary confidence for the customer and supplier to take bolder and bigger steps. For example, companies need to create the right foundations for how automation can cut out mundane tasks, freeing up human capital and then take the next step of refining that automation through the application of sophisticated analytics, mining a wide range of data sources to optimize the process and enabling employees to meet the higher level requirements of their customer base.

IT services suppliers also have the very significant opportunity to extend process transformation, by providing scale advantaged, 'utility' services to multiple clients, which individually would not be big enough to reap the economic benefit from a stand-alone facility.

As financial services providers look at the vast array of new technologies at their disposal, they need to consider carefully how they and their suppliers can realize the potential benefits of digital as they modernize their business processes. This requires that each party fully understands the specific business processes, the risks inherent in change and the wider implications for organizational culture and behaviors. Addressing these issues effectively and in partnership will ensure the optimum progress as financial services organizations realize the digital vision of business process transformation.

Michael Davison, Industry Principal, Financial Services, Atos UK & Ireland

Financial climate change: FinTech

It's long been said that just the flapping of a butterfly's wings could cause a hurricane, suggesting that spectacular outcomes can result from the smallest disturbance of large, apparently unrelated systems. If we apply this to the FinTech phenomenon now spreading across the world, tens of thousands of quite separate starting points are causing permanent change in the financial services climate.

There are five key elements at play in the success of FinTech that contribute to this change in the weather.

1 Great diversity

Whilst banking may have been FinTech's initial focus, hard on its heels have come the insurance industry's InsureTech and the regulatory and compliance community's RegTech. Other -techs proliferate with more specific focus, such as Proptech for housing finance. Cultural diversity is also a constant. FinTech thrives on the different perspectives that talented people bring to financial centres such as London, New York and Singapore.

2 Digital nativity

Just as internet natives created consumer commerce in an entirely new mould, so NewTech companies think and create from first principles, without being constrained by established assumptions and with the end-customer at the heart of their digital design decisions. This attribute has, perhaps more than any other, contributed to a steady shift in the direction of industry travel.

3 Distinctive value

No start-up can last for long without a distinctive, compelling value proposition. NewTech companies are no exception but, to their lasting credit, they have displayed a particular ability to turn early, rapidly delivered propositions into something the market wants through a process of constantly learning and adapting. This can often result in a significant change of direction and redefinition of the business model to lock in the value that has been discovered.

4 Collaborative instinct

Just as Bitcoin started life within a counter-cultural community, so FinTech had – and still has – its vocal standard bearers. But what is now happening is a steady increase in the pace and quality of collaboration, with growing confidence about which models of collaboration work best having been tested and refined extensively in practice.

5 Mixed DNA

Industry experienced heavyweights are now just as likely to be coming to market with a start-up FinTech business proposition as a twenty-something with a vision and digital development skills. Banking executives working in 'transformation' have started to dress down as younger FinTech veterans have started to dress up. A CEO of a FinTech is as likely to be an industry experienced ex-career executive as a newly-graduated lawyer. A FinTech venture capitalist or non-executive director is just as likely to bring non-financial experience to the table as a FinTech COO is to bring an unrelated discipline, whether academic, sporting, military or technological.

While FinTech has taken at least a decade to reach its current state, it was identified quite early on as a distinct movement. InsureTech, by contrast, burst onto the global stage after fewer years of relative obscurity and appears to be going through its maturity cycle far more quickly. RegTech captured something which was not new – regulatory compliance – but which was on the cusp of transformation enabled by the convergence of a number enabling technologies; supercomputing, cloud, predictive data analytics and machine learning.

As these NewTechs have appeared from different starting points and grown at different paces and in quite different directions, so the financial services industry has moved from indifference, through denial and imitation to something approaching informed advocacy. This itself is broadening its appeal, stimulating adoption and changing the financial services climate permanently – and for the better.

Ivo Luijendijk, Industry Director for Data Analysis Technologies, Global Financial Sector, Atos

Future of blockchain for financial services

I clearly remember when I bought my first Bitcoins back in 2011: just three, for around a hundred euros, to get a feel for this strange new currency. For me, that moment was career defining; while I certainly didn't become a crypto millionaire, after a few days of hard maths and complex theories, my hundred euro investment led me to a new passion: the revolutionary 'chain of blocks' connecting those digital assets.

Fast-forward seven years and I stand by my original assertion that the underlying blockchain technology actually outvalues the new currency; in fact, it could change the world. So, why do I say that? Let's look at some applications and examples of blockchain in financial services.

Blockchain applications

Blockchain is the first technology that offers a way to fully manage digital assets in a trusted, traceable, automated and predictable way. What distinguishes blockchain is that each 'block' is linked and secured using cryptography. Trust is distributed along the chain, eliminating the need for a trusted third party to facilitate digital relationships.

Bitcoin was an early and famous application, for managing digital assets. The second application of blockchain are 'smart contracts' whereby contracts can be maintained and managed entirely digitally between participants.

Enabling digital transformation

This ground-breaking technology does, however, come at a price, because the whole network needs to invest in it to achieve the necessary levels of trust to make it secure. Given Bitcoin's particular profile and less reputable associations, other blockchain innovations have emerged that have trust built into the network through the power of reputation. The result is a third application of blockchain: the digital ledger. This is a simple distributed database where an undeniable sequence of events can be logged, possibly as a foundation for automated business process handling.

The technology is flexible for all sorts of purposes, for payments, retail banking, investment banking, corporate banking, corporate treasury and risk and compliance. It can truly strengthen (or replace) most of the financial or legal facilitation that is currently offered by banks, governments, or the notary.

Given that blockchain is a versatile automated solution that can be applied to a broad range of business processes, value chains and even business models, its value as the final piece of the puzzle for fundamental digital transformation seems clear.

Summary of blockchain applications

Blockchain application	Early adopters	Examples of key applications for financial services
Asset control for digital asset management	Cryptocurrencies, eg Bitcoin	Global payments management Know your customer (identification and validation of customers/third parties)
Smart contracts for automated agreement fulfilment	Insurance policies, eg crop insurance in Kenya Stock market, eg Australian Stock Exchange	Corporate cash management Tax reporting
Shared ledger of immutable data/records	Triple entry accounting within banks	Governance, risk and compliance Peer-to-peer micro-services

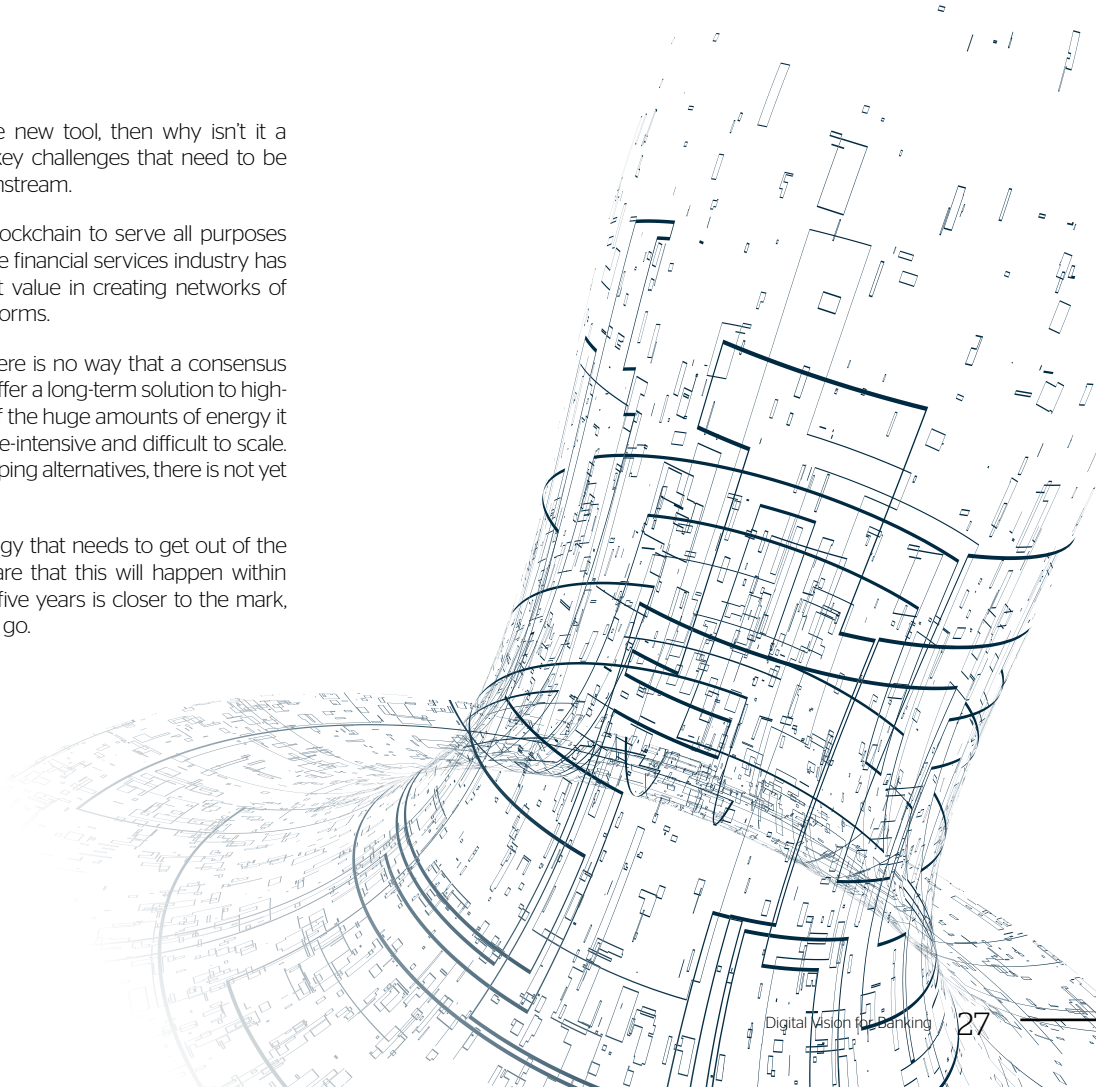
Challenges to address

If blockchain is such a great and unique new tool, then why isn't it a mainstream service yet? There are two key challenges that need to be addressed for blockchain to enter the mainstream.

Firstly, interoperability. There is no one blockchain to serve all purposes and requirements. And on top of that, if the financial services industry has taught us anything, it's that there is great value in creating networks of service providers rather than multiple platforms.

The second challenge is sustainability. There is no way that a consensus protocol like the one used for Bitcoin can offer a long-term solution to high-volume transaction processing because of the huge amounts of energy it consumes. This makes it too slow, resource-intensive and difficult to scale. While some work has been done in developing alternatives, there is not yet one that has gained enough traction.

Blockchain is clearly a promising technology that needs to get out of the lab and into business. Most predictions are that this will happen within five to ten years. While I like to think that five years is closer to the mark, blockchain's maturity still has some way to go.



Aurélie Fon, Product Marketing Manager Digital Banking, Worldline

Voice Banking: finding the right balance between security and convenience

Banks are trying to adapt to rapidly changing behaviors by integrating their services seamlessly into their customers' daily lives, thus moving from product-oriented to customer-centric strategies. They must then leverage new and existing technologies to provide a seamless, consistent and tailored customer experience on any device.

Voice-activated experiences are already a world-class model of customer convenience, allowing anyone to benefit from a personal assistant – able to switch off lights when you're already in bed, brew your coffee on-demand or even answer your existential questions.

But how can those digital assistants be used in banking?

Security concerns

The question we should address first is: how could we exchange sensitive and confidential data through a channel that does not natively support secured authentication methods?

Identity management and control have always been one of the most important challenges faced by Financial Institutions: they must ensure the identity of their customers to protect their finances and guarantee bank secrecy while complying with strict KYC laws (Know-Your-Customer) combating fraud and money laundering.

Given the specific nature of voice-activated devices, many authentication methods seem irrelevant or overly constraining – especially for a use-case designed to simplify interactions with the bank. To reinforce security while reducing frictions, the end-user could already be offered different configurable security options when linking his account to such a device – like setting up an additional voice pin that could be required after a given period of inactivity.

For more complex or sensitive operations, a multi-modal authentication should be assessed to secure transactions by combining a voice pin with some additional security features (voice recognition, behavioral biometrics, multi-devices triangulation, etc.).

The privacy paradox

Broadly speaking, customers tend to quickly consider data collection as inappropriate or excessive while requiring contextual and tailored advices suiting their instant and exact needs. This is especially true in the banking industry, where financial institutions might benefit from their historic position of trusted financial services professional while being heavily pressurized and questioned about their data policy.

Voice could simply be considered as a new channel to process and distribute the exact same data as a mobile device or a computer, subject to the same duties and controls. Clearly communicated advantages combined with a transparent data policy enhance customers' willingness to share more data – and more often – with their bank.tions realize the digital vision of business process transformation.

Maturity and usages

Beside privacy and security, the main factor hindering users' adoption is the maturity of technology – highlighting the gap between customers' expectations and reality.

Current technologies cannot provide customers with the human-like conversation they have been promised, leading them to the "Trough of Disillusionment" (cf: Gartner Hype Cycle). In addition, most people are still not familiar with this channel – existing use-cases are not groundbreaking enough to stimulate adoption.

Alternatively, Voice Banking is a key opportunity for banks to improve customer engagement, and in fine loyalty, through an intuitive and easy-to-use interface that will soon become more and more widespread in our everyday lives. Adoption will then directly be linked with the ability of banks to demonstrate the value of the use-cases they offer that must outweigh security concerns.

Toward "Banking as a Service"

Voice-controlled devices can simplify our everyday life by enabling more natural interactions with our direct, technology-filled environment, even though they have some way to go before delivering a truly integrated and seamless experience. Our reality is set to be reshaped by those new voice-activated experiences, ranging far beyond smart homes, smart watches and connected cars. Use-cases are flourishing in virtually every industry and are now spreading to financial and payment services.

In our recent thought leadership paper, Journey 2022, we discuss the questions being raised by consumers and society regarding certain technologies and how these may lead to, what we describe as, Digital Dilemmas. At the age of data and ultra-personalization, the challenge for banks is to multiply data-points while ensuring security and privacy of the information, to ultimately deliver the tailored and contextual services that customers expect. While convenience no longer needs to be proven, security is the primary concern that comes to mind when referring to Voice Banking. The challenge for banks is thus to design valuable, customer-centric use cases using privacy-by-design technologies to build trust and loyalty.

Voice-activated devices can sometimes be perceived as invasive or non-appropriate for conducting banking operations, but Voice Banking is sketching out the early stages of a "Banking as a Service" era, where customers can benefit from on-demand services in a consistent and channel-agnostic manner.

Rob Price, Chief Operating Officer, Worldline, UK and Ireland

What's ahead for the digital wallet?

When I drive to my local railway station, the station car park recognises my arrival through number plate recognition. I drive straight in, with digital signage telling me how many spaces are free. I walk through the station and get straight on the train. When I return, the car park transaction is quick and easy – contactless card or mobile wallet payment at the kiosk, and the exit barrier lifts as it recognises my number plate.

I like this digitalized experience because it makes things quicker and easier for me.

This is a common theme of the global digital inclusion survey we've just completed, which revealed how people feel about digital technologies – including how they pay for things. It's clear that where the consumer is motivated or incentivised through personal benefit, then there is better adoption. Other than cost savings, the two benefits that stand out for consumers are time saved and improvements to their health.

Card versus mobile

Undoubtedly, the adoption of contactless cards has been a success. In our survey, after accessing the internet, managing personal finances online (60% love it) was the second-most comfortable activity – but it was quickly followed by paperless travel tickets (59%) and contactless card payment (43%). When it comes to contactless payments, Europeans are currently more comfortable and accepting of the technology than their counterparts in the Americas and Asia.

So it's interesting to note that when we look at mobile payments using a digital wallet on a phone or watch – replacing physical cards altogether – comfort is higher in Asia. In fact, users in Asia are more comfortable with the other (perhaps more) future payment types we asked about such as biometrics and cryptocurrencies. Common to all these payment types is the dematerialisation of the card(s) into a digital wallet, irrespective of whether this wallet is associated with the individual user, the merchant (hence multiple wallets) or a third party (such as Android Pay and Apple Pay).

Trust and security

To date, we have seen consumers trying out digital wallets without, necessarily, a wholesale switch to the wallet as the default. This is surprising given that mobile payments involve extra security layers, such as the smartphone PIN or a biometric, usually, thumbprint. This, perhaps, isn't registering with users as a real benefit.

This all points to comfort with existing payment methods, despite the extra security that mobile devices provide. Where contactless cards are established, they are trusted and easy (saving time), so there is less incentive to transfer to a digital wallet. Where contactless is less established, there is the potential to accelerate adoption of completely digital payment methods. One good example of this is India, where following the Demonetisation Policy in 2016, which removed a large percentage of cash from circulation, there were mass roll-outs of digital terminals and electronic payments.

Remember, though, the other benefit that stood out from the survey: health improvement. As I travelled on the London tube the other day with a colleague, I noted that whilst my contactless card entry to the gate was easy and normal for me, my younger colleague simply strolled up to the gate, wafted his arm across the reader and moved through: he had a digital wallet on his watch. Whilst the time taken was similar, his was potentially the safer transaction as I'd had to take out my wallet to find my card.

Cashless society

In this way, digitising payments should help to increase users' physical safety as well as improving transaction speeds. Yet this will only become a reality when there is the incentive, not only for the consumer – time and health, underscored by trust – but also the merchant and the bank. This is where the Second Payment Services Directive (PSD2) will help, improving security and driving innovation so that transactions can be executed more widely. Together with the advent of Faster Payments (ISO 20022) to standardize and accelerate processes for remote banking payments, this will help to increase trust levels among consumers and merchants.

There is another finding of the survey that is helpful here. Across all payment related responses, we see a clear difference in degree of trust according to age – in essence, the younger you are, the more likely you are to use digital payment methods. Whilst logical, this evidence does suggest

that targeting certain geographies that are more open to digital payment methods and goods likely to be bought by younger consumers (under 30) will significantly accelerate adoption rates. There was, incidentally, almost no difference between male and female consumers in their trust of payment technologies.

We forecast that when these changes and improvements start to happen, use of the digital wallet will significantly grow in all geographies. At that point, we will be much closer to the ultimate goal of a safer, more secure cashless society.

Worldline digital wallet

More and more digitally connected consumers want to order and pay for goods anytime and anywhere, easily and securely, with a smartphone, tablet or PC that's always at hand. For merchants and businesses, too, the benefits of secure digital wallets are significant, including:

- Higher transaction volumes
- New businesses
- Cost effective delivery
- Better customer intelligence
- Higher customer loyalty
- Faster and more accurate reporting
- Excellent fraud security
- New partnership opportunities.

Digital wallets are at the heart of Worldline's strategy to implement seamless customer experience, while supporting the transactional business of its clients with omni-channel payment services. Worldline Wallet is a single cloud-based server solution that offers in-store and remote payment.

Ben Murphy, Director of Digital and Innovation, Financial Services, Atos

Smart voice assistants in retail banking: lessons from deploying a Retail Banking Voice App

The smart assistants we have in our homes are now entering the business world. We've been working on introducing one of the first retail banking voice applications to the UK market. In this blog I will share our lessons from this achievement.

Firstly, why build a Voice App?

Ownership of voice activated speakers has seen a 100%+ growth in less than a year and now more than 10% of people in the UK own one. At £30 a pop, expect growth this Christmas. That's the numbers.

But let's think about this. Our most natural form of communication is through speech, fact? Our larynx evolved for voice. Our thumbs evolved for, well, certainly not smartphone usage.

Voice interaction is simple. Consider. Whilst I'm serving up the Sunday roast dinner, my wife, with her impeccable timing, says "have you transferred that money to your brother?". I'm now faced with a dilemma. Do I wash my goose fatted fingers to apply my thumb print to my mobile phone and suffer the starved family wrath. Or do I keep serving dinner and forget, again. I know what I'd like to do. I'd like to say 'Alexa (or Hey Google), transfer £20 to Richard for the birthday I forgot'.

What we learnt

1. Designing User Experience for voice is significantly different to designing for web or mobile devices

Speaking with a voice activated speaker is communication in its purest form. When you interact with a mobile or web device, you're forced to interact in the language the device understands. Variants in language and the interpretation of intent is a key element of user design that has limited, if any, consideration in mobile app builds, but is of critical consideration in voice app design.. Holding context of what has happened and what a customer might be referring to is an additional feature of the user design for voice. Some of our key points of design learning are as follows:

- Be clear on the use case. Why is this voice app being built?
- Create conversation flows but then use process maps to understand the details and flush out complications
- Keep it simple. For every element that is added you need to consider error and silence handling as well as process and systems checks
- Understand the device landscape and if you are going to need a visual UI too (e.g. for multi-factor authentication)
- Use a simple prototyping tool when designing. It is quick to add text into an online tool and then hear it.
- When developing, load utterances in sooner rather than later. When you start testing beyond dev teams, testers get frustrated because they don't know the "happy path" words that should be used.

2. Work out early your test strategy

How do you intend to test? What about the data you will use and the test environments? How will you represent the use cases and customer journeys?

3. Hardware and intent needs consideration

As users perform differently, so does hardware. There are a number of parameters within the hardware that define how a device hears. This is to distinguish between "two", "too" and "to" or "four" and "for", as an example.

4. The value of delivering fast and joint teams: Use Agile!

Release early and learn, or spend years hypothesising perfection. I would argue that agile is a mandatory delivery method as the underpinning technology enables it.

What next?

1. "Familiarity breeds customer satisfaction"

Let me explain. You go to your website bank login page. Button expected top right. You make an application. Progressing through the form you expect button on the right to progress, button on the left to go back. If these "familiarity standards" are not met, it impacts CSAT.

In voice applications, those standards have not yet been established. Early movers will find themselves either setting the standards or quickly knowing how to pivot to meet the new standards. There's a first mover advantage.

2. Experimentation, insight and analytics

A/B or Multi-variant testing is a common principle employed by many with an online presence. One that we don't see much of across voice channels. Experimentation will certainly be a route to learning what works and what doesn't.

3. Cracking the case for compliance

Registration, (end point and multi-factor) authentication and logging and redaction of data are challenges I can see in moving to fully serve customers through voice assisted channels.

4. Device agnosticism

I would expect to see the customer and user experience and, de facto the underpinning technology, to harmonise on anything that uses voice as the means of customer service.

5. Treating Customers Fairly

For many retail banking customers, an app is their preferred channel of choice, available 24-7. However, more than two million people in the UK live with sight loss and that is predicted to rise to 2.7 million by 2030[3]. Treating customers fairly and in particular, a digitally underserved segment of the population, is a clear use case for voice apps on voice activated speakers.

Lexicon

Algorithm: A mathematical formula placed in a software program that performs an analysis on a dataset. The algorithm often consists of multiple calculation steps. Its goal is to operate on data in order to solve a particular question or problem.[1]

Analytics: a process in which a computer examines information using mathematical methods in order to find useful patterns.[2]

Application Programming Interfaces: Part of a server that has defined ways to communicate between various software components.

Artificial Intelligence (AI): The theory and development of computer systems able to perform tasks normally requiring human intelligence, such as visual perception, speech recognition, decision making, and translation between languages.[3]

Automation: The technology which enables a process or procedure to be performed without human assistance.

Big Data: Extremely large data sets that may be analysed computationally to reveal patterns, trends, and associations, especially relating to human behaviour and interactions.[4]

Bitcoin: A type of cryptocurrency which was the first available and remains the most commonly traded.

Byte: A unit of data that is eight binary digits long. A byte is the unit most computers use to represent a character such as a letter, number or typographic symbol.[5]

Terabyte: 1,000 gigabytes of computer storage – equivalent to approximately 212 DVDs.
Exabyte: 1 million terabytes
Zettabyte: 1 billion terabytes. The combined space of all computer hard drives in the world was estimated at approximately 160 exabytes in 2006. As of 2009, the entire World Wide Web was estimated to contain close to 500 exabytes. This is one half zettabyte. The volume of worldwide digital data is projected to reach 44 zettabytes by 2020.[6]

Challenger Banks: A small retail bank which is established with the intent to compete against larger and well-established national banks.

Chatbot: A computer programme which can conduct a conversation using audible or textual methods.

Cloud Computing: The practice of using a network of remote servers hosted on the Internet to store, manage, and process data, rather than a local server or a personal computer.[7]

Cognitive Computing: The simulation of human thought processes in a computerised model. It involves self-learning systems that use data mining, pattern recognition and natural language processing to mimic the way the human brain works.[8]

Convergence: Convergence is the coming together of two different entities, and in the contexts of computing and technology, is the integration of two or more different technologies in a single device or system.[9]

Cryptocurrency: A digital currency which is kept secure by using cryptography.

Cryptography: A method of storing and transmitting data in a particular form so that only those for whom it is intended can read and process it.[10]

Cyber Security: The body of technologies, processes and practices designed to protect networks, computers, programs and data from attack, damage or unauthorised access.[11]

Deep Learning: In the field of machine learning where artificial intelligence can learn from data that has no context and without supervision.[12]

Distributed Ledger: A consensus of replicated, shared, and synchronised digital data geographically spread across multiple sites, countries, or institutions. One distributed ledger design is through implementation of a public or private blockchain system.[13]

[1] http://www.techrepublic.com/article/mini-glossary-big-data-terms-you-should-know/
[2] http://dictionary.cambridge.org/dictionary/english/analytics
[3] https://en.oxforddictionaries.com/definition/artificial_intelligence
[4] https://www.google.co.uk/#q=define:+big+data
[5] http://searchstorage.techtarget.com/definition/byte
[6] http://uk.atos.net/content/dam/global/documents/we-do/big-data-with-atos.pdf
[7] https://www.google.co.uk/#q=define:cloud+computing
[8] http://whatis.techtarget.com/definition/cognitive-computing
[9] https://www.techopedia.com/definition/769/convergence
[10] http://searchsoftwarequality.techtarget.com/definition/cryptography
[11] http://whatis.techtarget.com/definition/cybersecurity
[12] https://en.wikipedia.org/wiki/Deep_learning
[13] https://en.wikipedia.org/wiki/Distributed_ledger

General Data Protection Regulation (GDPR): A new UK Regulation which enforces the way organisations collect and process customer data. It includes additional transparency for individuals on how their data is used and processed.

High Performance Computing: The aggregation of computing power that delivers a higher performance than a normal computer.

Open Banking: A term which refers to increased transparency choices for financial customers through the use of open source technology and Application Programming Interfaces.

Robotic Process Automation: The application of technology which enables the capturing and interpretation of data using existing applications.

Second Payment Services Directive (PSD2): An European Union Directive which requires banks to give any third party access to its payments infrastructure and customer data assets. Third parties can then develop payments and information services to those customers.

About Atos

Atos is a global leader in digital transformation with 120,000 employees in 73 countries and annual revenue of € 13 billion.

European number one in Cloud, Cybersecurity and High-Performance Computing, the Group provides end-to-end Orchestrated Hybrid Cloud, Big Data, Business Applications and Digital Workplace solutions through its Digital Transformation Factory, as well as transactional services through Worldline, the European leader in the payment industry. With its cutting-edge technologies and industry knowledge, Atos supports the digital transformation of its clients across all business sectors. The Group is the Worldwide Information Technology Partner for the Olympic & Paralympic Games and operates under the brands Atos, Atos Syntel, Unify and Worldline. Atos is listed on the CAC40 Paris stock index.

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