The rise of machines

HOW PEOPLE AND TECHNOLOGY WILL
SHAPE THE FUTURE OF FINANCE

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Machine learning and Artificial Intelligence (AI) is already prevalent across financial services, but only a fraction of its potential is being used. And it's no longer a matter of if AI will change the face of the industry, but when.

The accelerating pace of technological change is considered by some to be the most creative and destructive force in finance (PWC), and the industry is facing great pressure to keep up. In fact, 70% of financial services leaders state that the pace of technological change as a primary concern going forward, the percentage is even higher in banking at 81% (PWC).

12% of financial institutions not using AI cited "siloed data sets, fear of failure and unclear internal ownership of emerging technologies" as main factors thwarting innovation (Forbes).

So how will these forces for change and rapid technological advances affect the future of finance? What will be the big challenges facing institutions? What will the workforce of the future look like and what should business and IT leaders be doing right now?

In this report, we'll be looking at the parts people and computers will play in the future of finance, how this relationship will evolve and what this means for financial institutions today and tomorrow.
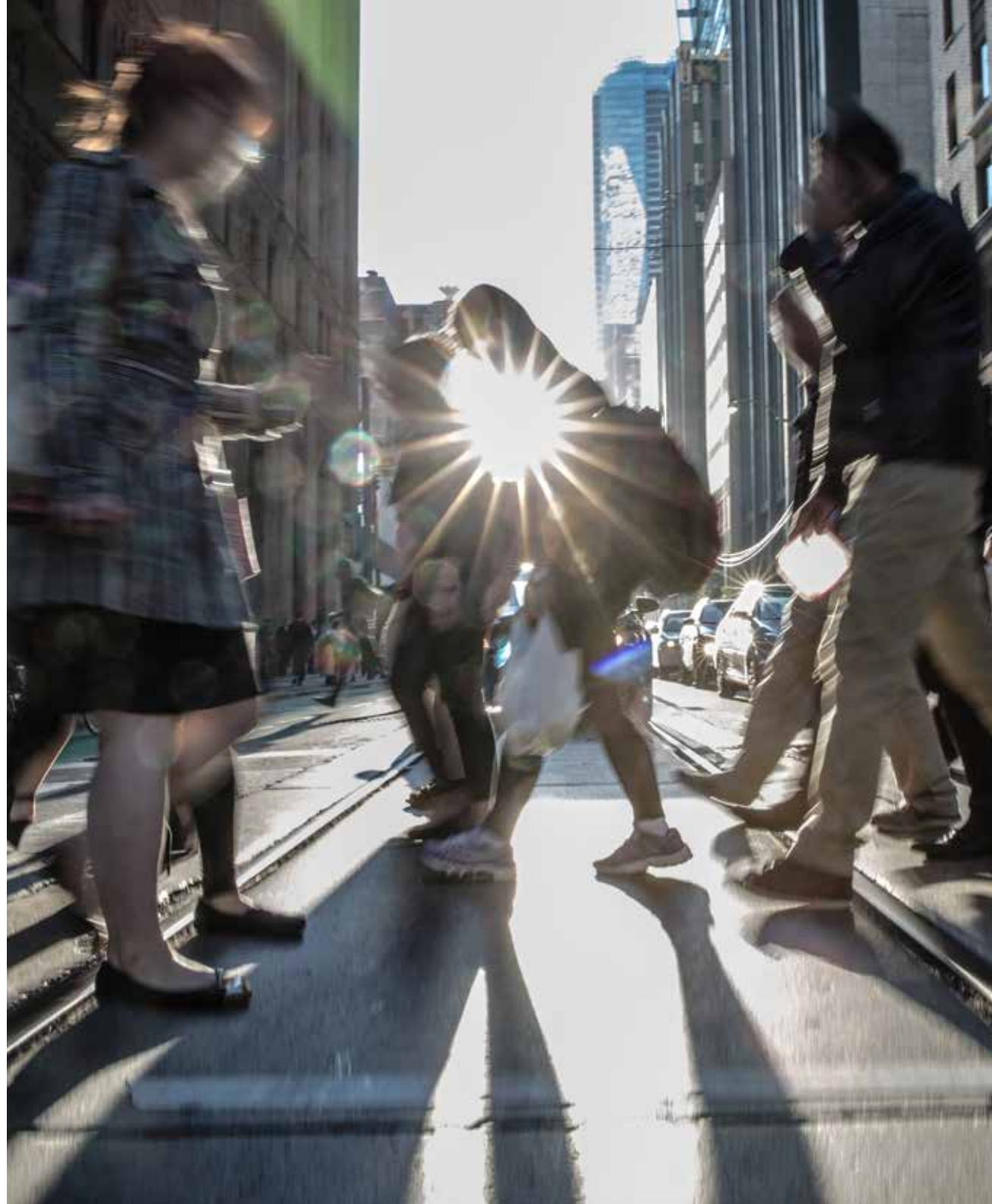
MACHINES AND MONEY

Technological advances in finance have gone into overdrive in recent years, with many aspects of banking, payments and key operations almost unrecognisable from 20 years ago.

With all this new technology comes new opportunity, but also new challenges. Adopting new technologies has never run completely smoothly. Just look at the slow uptake of contactless payments – now it is common place and moving from card to phone and even sunglasses with an NFC-enabled chip by Visa (Business Insider).

The next big advances in finance will come from machine learning and artificial intelligence (AI). Banks are deploying AI for managing risk, combating fraud, devising investment portfolios and placing trades (House of Bots). We should soon see it mature into a core function of many organisations, helping to create significant strategic advantages ranging through efficiency breakthroughs to service differentiation advantages and insights.

Protecting your reputation with the use of machines is key to long-term growth. UBS's risk-management platform requires enormous computing power to run millions of calculations daily on demand. Cloudera helped them move to Microsoft Azure cloud which sped up calculations by 100% and saved 40% in infrastructure costs. Head of technology services Paul McEwen: "Increasing the agility and scalability of our technology infrastructure is crucial to the bank's strategy" (Finextra).

56% of financial services respondents have used AI in the last one to three years (House of Bots).

Linking the machine to experiences also comes to life with AI. Mizuho bank's robot, called Pepper, entertains customers with multimedia, while providing product information on request. Mitsubishi's Nao greets customers at branches and answers questions about the services they might need (Chatbots Magazine).

More sophisticated systems, will have capabilities far beyond what's currently available, increasing their potential to revolutionise the financial services sector. Future computers will be able to perceive, understand, plan and navigate in the real world, helping them work autonomously in a dynamic and complex environment such as finance.

Machine learning and AI promise to deliver the next big revolution. Going forward this approach will be a key differentiator between organisations who succeed and those who fail.

Gartner predicts by 2020, customers will manage 85% of their association with a business with no human interaction (Chatbots Magazine).

THE POWER OF PEOPLE

Whilst technology and machines are having a huge effect on the world of finance, people are still playing a vital part.

Machines will have an increasing ability to learn from and collaborate with humans. Progress will be based on practical application of machine learning to drive growth through efficiency. The innovation is less about sci-fi and more about applying a human's hypothesis of correlations to find patterns of behaviour. This in turn helps to reduce risk and flag trends to drive insights.

> **"Banks can out-imagine the competition and imagine an ecosystem that doesn't exist today."** (Forrester)

Entrepreneurial individuals have been driving technological innovation in recent years, spotting opportunities in the sector and moving in before the bigger banks and institutions have had chance to react.

Traditionally, smaller players had found it hard to break into financial services, with the market dominated almost entirely by large, well-established names with the scale and financial backing to operate. But, as with so much of the industry, this has changed. A powerful combination of technological innovations and entrepreneurial spirit has driven the growth of finance start-ups. These companies don't have the scale or finances in reserve that the big players do, but they do have the agility and ability to move fast enough to catch a trend on the way up or beat a big institution to an opportunity.

Over 6,000 fintech start-ups are taking the opportunity to disrupt every single aspect of the financial services industry such as borrowing/saving (Lending Club, RateSetter), international money transfer (Transferwise), payment process (Apple Pay, Square or Braintree), investing (Betterment, Nutmeg) and banking (Monzo, Atom Bank). Yet it is early days and only 39 are valued at over $1 billion (Capgemini).

"There are many smart people with good ideas and abundant funding trying to disrupt and improve the financial services industry" (PWC).

These new players have been able to make their way into some of the more profitable areas of the sector and eat away at incumbent's profits.

"Financial services institutions are coming to a fork in the road – disregard the disruptors or build your ecosystem to create differentiated services to enrich customers' life events." (Forrester)
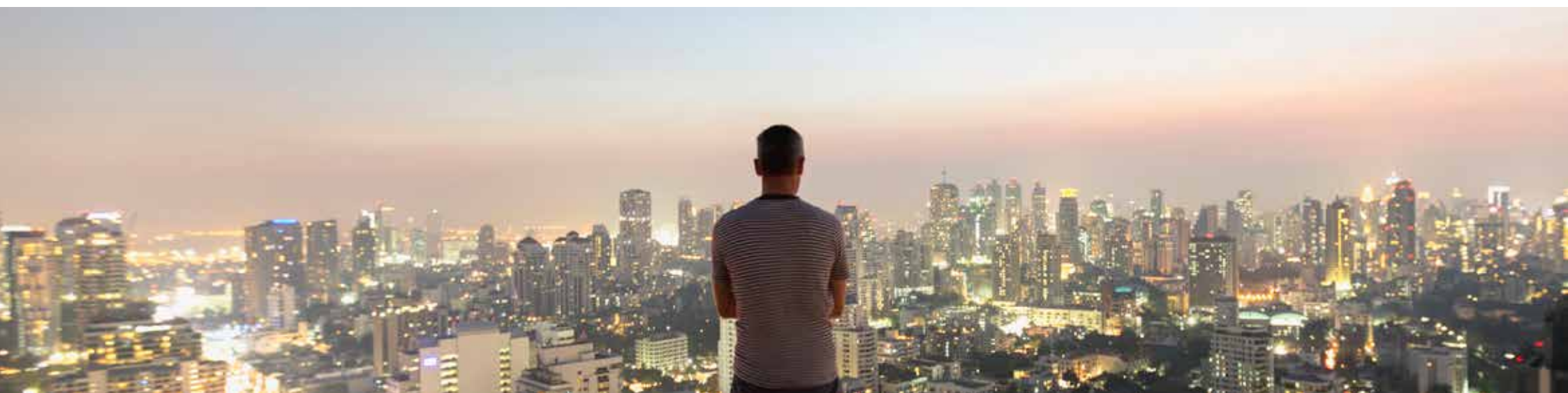
SIZE ISN'T EVERYTHING

So, what's stopping the bigger players from successfully competing with and outperforming these smaller organisations?

01 Complexity
The benefits of size and scale come with the constraints of complex organisational structures, such as complex data architectures and information silos.

02 Ageing infrastructure
Infrastructure has become outdated for the latest customer demands and operational expectations. Those that want to move fast often operate outside the control of IT and data stewards in order to get things done fast.

03 Fear
Change is and has always been frightening, and leaders are concerned about the uncertainty of what's around the corner and about being left behind. They are racing to adapt business models and adopting new technology to provide competitive advantage.

Capgemini reported that banking CIOs lack the job security required to transform IT by replacing decades old legacy systems. They are lucky to get two years in the job, so to take on a multi-year project, as complicated as legacy replacement, is seen as professional suicide.

"Today banks have scale but no speed and Fintech's have speed but no scale." (Forrester)

THINKING AND ACTING SMALLER

The solution for these traditional institutions is to adapt and reshape their business models to match the new environment.

They must be able to behave in the same flexible and agile ways that the start-ups moving into the sector have been. This transformation sounds seismic and complicated but much of the change needed will be easier to implement than financial services leaders may believe.

Integrating to innovate
To be as nimble and agile as start-ups, larger organisations need to adopt an integrated approach to data and analysis. A centralised and integrated data platform will break down the silos and complicated structures that have hampered progress and halted innovation for many.

There are plenty of opportunities for traditional players and fintech start-ups to coexist. For instance, UK business funding firm that provides loans to SMEs, Ezbob, white labelled its platform to banks, enabling RBS to use the technology to create Esme Loans (Capgemini).

Some banks are looking at their IT departments to change the way they provide services to the business. This process of providing services that business units can mix and match according to their needs is called Service Oriented Architecture. For example, employees are only provided with one way of signing onto applications throughout the IT estate reducing duplication and effort, and allowing greater investment in state-of-the-art, strategic services that banks need to move ahead quickly (Capgemini).

FOCUSING ON PEOPLE

Where start-ups have really excelled is in learning from customer behaviours and delivering enhanced customer experiences.

Convenience and experience have become increasingly important as the standard increases across the board with innovations like Uber and Apple Pay.

Customers now expect more than ever from banks and feel more empowered to take their business elsewhere. And, thanks to intermediaries and online guides, it's easier to find a better deal and switch banks than ever before. This should be a pressing concern for traditional institutions.

In conversations with Forrester, bank executives say, "Attrition's fine. We're worried about our ability to achieve sustained, long-term growth". The problem is that customers will continue a relationship with the big bank and begin to add services from the start-ups. Over time this affects the lifetime value of the customer.

Consumer trust is also a big issue, with financial services identified as the least trusted sector in the 2017 Edelman trust barometer (Edelman, 2017). This atmosphere for low trust, combined with a more competitive customer acquisition landscape and decreasing margins for many banks highlights the need for greater understanding of customer needs and behaviours immensely.

The key to understanding customers is creating a complete 360 view of each one. But as the world becomes increasingly connected, customer are creating more data than ever and in an wider variety of formats.

Organisations will need to process, analyse and learn from this wealth of data to create the kind of customer insights that build exciting new products and innovations – the kind of developments that will drive a business forward and redirect the sector once again.

The real winners will be those who have recognised this shift and are already working on a more customer-centric service model.

> **"Financial organisations can start to take a leading role and help to design and build ecosystems of value for customers."** (Forrester)

BANKING IN THE CLOUD

Alongside the developing relationship between man and machine there is the changing balance of physical and digital banking. As the age of cash and even plastic appears to come to an end the fate of physical bank branches and other financial services physical presences seems sealed. All of these changes and developments have brought with them more and more valuable data.

The changes have come thick and fast. Going to a branch was replaced with going online, and then going online was replaced with mobile banking from a centralised app. Monzo in the UK has done just that and has the ambition that all banking services will be offered in the app without a brick & mortar presence. Founder Tom Blomfield thinks Monzo can be safer from hacks than its bricks-and-mortar rivals. "If you start from scratch in the 21st century it's not easy but at least it's less complex than having to secure this crazy giant". (Standard)

The answer to managing all this data and creating the data infrastructure required in the modern marketplace is the Cloud. Cloud and mobile first banks are making banking easier and more seamless for customers.

To be truly flexible as data grows, you'll need to choose a hybrid cloud environment which offers the flexibility to work with both a public and private cloud and on-site servers. This will allow you to move your applications (in whole or in part) without friction, using the most fit-for-purpose solution to meet specific analytics requirements to lead to a truly agile process (Cloudera).

Capital One foresaw early on that agility will become a key competitive edge; so they migrated a significant part of their operations to the cloud. Next, they infused both back-end infrastructure and customer-facing channels with machine learning and natural language processing to launch a new chatbot named Eno in March 2017 (Topbots).

These new models benefit organisations too. Mobile and online banking create datasets that, even when anonymised, can be paired up with conventional and unstructured data from other sources such as social media trends to build a rich platform for advanced analytics, from which deeper insights and new opportunities can be mined.

And as not only younger people, but those of all ages become adjusted to the age of internet banking and the idea of dealing with their finances in an online space, the rate of innovation and change will only increase.

POST-CRISIS REGULATION

Since the financial crisis of 2008, there's been increasing pressure on finance from regulators. The cost of this regulation has become an increasing burden too. With spending to meet government regulations up by more than 40% in the US since the early 2000s (FT).

This isn't a trend that's going to go away. Pressure from regulators is set to remain or even increase. One big event on the horizon in the financial services calendar is the introduction of the General Data Protection Regulation (GDPR) legislation in May 2018. The penalties for falling short of the new rules are hefty, with the potential to be fined up to €20million or 4% of annual turnover for the previous financial year (whichever is greater).

But how can institutions best 'future-proof' their business against these changing rules?

Many institutions will need to completely reshape their data infrastructure to be able to meet the demands of GDPR. A crucial first step towards achieving compliance cost-effectively and securely will be having a unified data platform that stores all of an organisations data and enables it to share it amongst different functions and locations with ease.

A FINANCE REVOLUTION

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A more radical and advanced solution, but one that is gaining momentum is that of 'blockchain'.

Originally developed as a platform for the Bitcoin currency, this distributed ledger system, capable of recording anything of value, is set to make a monumental impact on the financial world. It will allow for the movement of money, equities, bonds, contracts, titles, deeds and virtually any other asset securely and privately from peer-to-peer in a decentralised system.

Blockchain represents huge opportunities to limit risk, reduce inefficiency and drive down the cost of infrastructure to improve profitability. Automating the operation of huge classes of tasks would significantly lower the human workload involved, leaving the tasks to instead be handled by a universal, decentralised, globally distributed computing system.

Global funding for blockchain and Bitcoin start-ups reached $550 million in 2016, up 5% on the following year, which despite showing a slow-down in growth from 2014 and 2015, shows the importance of this technology and its perceived value for the future (PWC).

56% of those surveyed recognised blockchain's importance but 57% say they are unsure about or unlikely to respond to this trend (PWC).

The combination of integrated data platforms with blockchain systems as a complementary processing and analysis engine will enable innovators to reap the biggest benefits.

The key to the success of this technology is the collaboration of institutions to combat the current concerns around operational and organisational design, business process management and governance. Once common standards have been established and the many 'Proof of Concept' projects become reality, institutions should see the transformational value this new innovation promises to deliver.

THE RISE OF THE MACHINES?

So, what will the workforce of the financial services sector look like in years to come? Just how many of the people will be replaced by machine learning and AI and what will this mean for the industry and its fortunes?

What is clear is that any tasks that can be automated, will be. In a competitive industry such as finance, any gains in efficiency that can be made will be grasped with both hands by organisations to keep up with the competition.

JPMorgan Chase & Co is using a machine learning programme powered by Cloudera called COIN (Contract Intelligence) to review commercial loan agreements in seconds, a task that would take a team of lawyers and loan officers 360,000 hours each year (House of Bots).

But where will the jobs for humans remain?
In truth, automation will completely reshape areas of financial services. Many administration and organisational tasks will be carried out by machines in the future, this is just the reality of progress. And this will provide efficiency gains for both banks and customers, with application processes and day-to-day functionality streamlined and updated for the modern age.

Accenture predicts that after moving to cloud-based, data-driven solutions the new job growth by 2025 will be:

- New data management guardians for proprietary data architecture and control

- A salesforce that focuses on relationship management and client analytics

- Product managers and trading roles working on machine learning and AI, analytics and algorithms

- An advisory workforce (who are not replaced by cloud or robo-advisors) will focus on high-value client relationships and market analytics

- IT and security architecture teams will design and assemble new services from internal insights

- A new cloud service management team will manage third parties and digitally monitor business operations in real time.

THE REAL APPLICATIONS OF ARTIFICIAL INTELLIGENCE

One of the most prominent emerging applications of artificial intelligence in financial services and many other sectors is the development of so called 'chatbots'.

Already in use by many organisations, these virtual communicators offer big benefits to efficiency, customer engagement and experience.

Few industries are not utilising or investing in this tech, and it's not just private business that stands to benefit. Chatbots are predicted to enable the UK government to cut 90% of public service jobs by 2030.

Some would argue that, given the often impersonal and untrustworthy reputation of financial services, leaving customer service and experience to robots is a risk, but the opposite can be true. What's vital is ensuring that the artificial intelligence used is able to learn natural and human language and deliver an efficient service to customers. So instead of removing the 'human touch' from the customer experience, these chatbots are simply improving it with agility, accuracy and speed.

In 2016, one of Sweden's largest banks SEB adopted a "digital employee", Amelia, to solve problems just like humans but in a fraction of the time and even sense emotions (Chatbots Magazine).

Real value will come from combining the data from chatbots with other data sources to create new customer insights that can drive product and service developments. What could you learn from conversations with your customers and a holistic view of their habits and behaviours?

A NEW BEGINNING?

Whilst it may be feared by some, this new dawn for the financial services sector shouldn't be resisted, largely because their adoption is a foregone conclusion. The benefits available are too great for many people to ignore.

> **"The role of humans will be to direct and guide the algorithms as they attempt to achieve the objectives they are given."** (McKinsey)

Organisations are advised to find the right balance between man and machine, ready to offer a human customer service representative should an AI version not be able to successfully deal with a query (PWC, Top Issues 2017).

The Edelman Trust Barometer states that financial services organisations must talk with a 'human voice' when they communicate with customers, highlighting the fact that banks will always need a human edge, because as rational as finance is, people will always have an emotional investment in their finances as well.

And as for the next generation of consumers, who will be even more connected with technology, finance must continue to hit 'fast-forward' to meet their demands. It's the connected efforts of man and machine that will help organisations do this. With people preparing themselves for the new requirements and roles that will exist in an industry so reliant on artificial intelligence.

THE 'FUTURE' HAS ARRIVED

As we've identified, many of the big trends and drivers for change in the finance industry have already made their way into the sector. Whether it's machine learning and AI, innovations in the cloud, blockchain or chatbots with human reasoning, they are all very much on their way. So, to be one of the winners, now's the time to act.

> **"Now is the time to grapple with these issues, because the competitive significance of business models turbocharged by machine learning is poised to surge."** (McKinsey)

The key to operating in this exciting new era for finance will be building organisations around the essentials they need to succeed. Innovating and adapting to the ever-changing environment will be a combined company wide effort, with business models and cultures designed to remain agile and flexible as they grow.

Data will continue to play an increasingly important role, informing business' next steps and driving a more customer focused strategy. Machine learning will unlock the sophisticated artificial intelligence capable of working alongside humans in harmony.

Cloudera is ready to guide financial institutions through this transformation. We have experience with organisations like Barclays, Capital One, Bank of America Meryll Lynch, Royal Bank of Scotland and more.

Our modern platform complements legacy systems and opens new possibilities that empower people to transform complex data into clear and actionable insights.

We provide proactive and predictive support to enable you to overcome challenges before they arise and achieve what sometimes may seem impossible.

We've already helped several global financial institutions harness the power of data, drive innovation and enhance customer experiences, but this is only the beginning. Advanced analytics and machine learning are powering new possibilities and now is the time to take advantage. Get in touch with us today to make your next move.

Not ready for change?

Cloudera customers have already started their journey with machine learning and analytics, optimised for the cloud, experiencing improvements in months – not years.

cloudera®

At Cloudera, we believe that data can make what is impossible today, possible tomorrow. We empower people to transform complex data into clear and actionable insights. We are the modern platform for machine learning and analytics optimised for the cloud. The world's largest enterprises trust Cloudera to help solve their most challenging business problems.

Learn more at cloudera.com

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