Fintech Trends & Predictions

'How emerging technologies are changing the banking, insurance and payments industries'

Blockchain - Big Data - Analytics
Open APIs - Artificial intelligence

Inhoud

Executive summary

Fintech has made financial services and data available anywhere and at any time. Technology, apps, and mobile services give customers access to their accounts whenever they need it. Many have come to expect these types of mobile services and rely on fintech to provide them. Presently, fintech covers a diverse array of companies, business models, and technologies used in lending, payments, wealth management, money transfer, capital markets, equity crowdfunding and insurance.

Today's customers are turning to fintech because of speed and accessibility. Technology changes quite rapidly. But traditional financial institutions are usually quite slow to adapt. The bigger they are, the slower they change. Customers who expect certain services turn to fintech to get them. Fintech companies are usually at the forefront of technology innovation. While it can be difficult for a startup to compete with large financial institutions if they fill a need they can become quite successful. Established financial companies are starting to display a growing interest in emerging technologies, that are quickly becoming critical to improving the customer experience in terms of personalization, agility, and simplicity to retain customers.

The customer journey is an increasingly important strategic aspect of the digital banking transformation. In fact, removing friction from the customer journey has been named the number one priority for this year in the 2018 Retail Banking Trends and Predictions. Self-service technologies, robotic process automation and artificial intelligence are just a few of the emerging technologies used by banks in their transformation.

Following in the steps of fintech innovation, the insurance industry is also finding new ways to create hyper-relevant services and access new markets with the help of technology.

Developing new models of interacting with customers and partners, today's digital insurers are providing customer experiences that adapt to individual needs and context. They use data and smart business platforms to rapidly launch value propositions adapted to the changing roles of customers and business ecosystems. Automation is a key driver in minimizing complexity, time-to market, cost and risk in these new business models, along with other technologies such as telematics and cognitive technologies.

When it comes to payments, digital adoption is growing exponentially. Global digital payments volumes are predicted to increase by an average 10.9 percent through to 2020, reaching nearly 726 billion transactions, according to the World Payments Report 2017. This growth is fueled by emerging markets, changes in consumer expectations and advanced technologies such as connected homes, contactless bank cards, open APIs, wearable devices and augmented reality.

Blockchain is perhaps the most popular technology in the fintech space, due to its connection to cryptocurrencies. Applications of the technology are becoming more and more common, ranging from banking applications to insurance networks, blockchain payment systems, and open blockchain APIs.

The comprehensive and lasting impact of fintech in the global economy is recognized by practitioners and companies alike. In this white paper, we'll be taking an in-depth look at the technologies shaping the fintech movement and their contribution to the progress of the banking, insurance and payments industries.

1. The evolution of Fintech

The many definitions of Fintech

The popularity of the term fintech has created somewhat of a FOMO (fear of missing out) amongst financial institutions of all sizes. Many CIOs (Chief Information Officers) have been put on the spot to make well-informed decisions that can determine the future strategy of their companies without a common understanding of what fintech is among the other board members and meeting participants. Before answering questions such as why their banks are not using fintechs, competing more aggressively with fintechs or acquiring fintechs, the entire C-Suite needs to understand what the term entails and how they can communicate with other entities to reach these objectives.

> 'Fintech is a portmanteau of financial technology that describes an emerging financial services sector in the 21st century. Originally, the term applied to technology applied to the back-end of established consumer and trade financial institutions. Since the end of the first decade of the 21st century, the term has expanded to include any technological innovation in the financial sector, including innovations in financial literacy and education, retail banking, investment and even crypto-currencies like bitcoin.'
>
> Investopedia

> 'Fintechs are startup technology providers that deliver emerging digital technologies that approach financial services in innovative ways or can fundamentally change the way bank products and services are created and distributed, and generate revenue. The term may also refer to the technologies these providers offer.'
>
> Gartner

'Financial technology (FinTech) describes the evolving intersection of financial services and technology. It refers to startups, tech companies, or even legacy providers.'

PwC US

The comprehensive and lasting impact of fintech in the global economy is recognized by practitioners and companies. However, despite the consensus on the major impact that fintech has and will continue to have, no common definition of the term exists. In an attempt to extract a consensual meaning of fintech, Professor Patrick Schueffel from the Institute for Entrepreneurship & Small and Medium Enterprises in Switzerland analyzed more than 200 scholarly articles referencing the term over a period of 40 years. His attempt at a definition was featured in Volume 4 in the Journal of Innovation Management:

> *'Fintech is a new financial industry that applies technology to improve financial activities.'*

Reaching a similar common definition is a first step in decreasing the likelihood of misunderstandings and increasing

the efficiency of communication on the topic for academics, companies and policymakers within the financial space.

The Fintech Bubble

Early fintech supporters bet on this trend to change the way every consumer spends, saves and invests his or her money. Fintech doubters, on the other hand, were pointing out that this type of digital platforms cannot achieve the scale and competitive edge they needed to compete with major banks and financial institutions. They implied that fintech was a bubble and they were partly correct.

Fintech is a technology bubble, not a speculative bubble. Speculation bubbles – like the tulip fever or the subprime bubble – mark the resounding end of a cycle. A technology bubble, on the other hand, marks the beginning of a cycle. A bubble like this, which changes the market fundamentally, occurs at the start of each technology disruption, which is the case for fintech.

Technology itself is more beneficial to fintech than to traditional institutions. Technology allows fintech companies, which are looking for new ways of doing things, to provide various solutions. As technology evolves, fintech companies will be able to innovate financial services faster than the slow-moving institutions. The speed of technology itself gives an advantage to fintech.

Then

Fintech has made financial services and data available anywhere and at any time. Technology, apps, and mobile services give customers access to their accounts whenever they need it. Many have come to expect these types of mobile services and rely on fintech to provide them.

Ever since fintech became a point of interest for investors in 2014, people have been speculating about the disruption that this phenomenon will bring to individuals and businesses. As with any new trend, expectations began to rise as fintech startups started to form, to the point where futuristic scenarios were advanced to keep the trend going. In 2015, the number of investors in FinTech jumped to 25% more than 2010. JPMorgan Chase CEO at the time, Jamie Dimon, warned in his annual letter to shareholders: "Silicon Valley is coming." His plan was to study the competition revolutionizing lending and payments with the help of Big Data and learn from them. But understanding an opportunity and being able to take action proved to be two very different things.

Now

Now, fintech covers a diverse array of companies, business models, and technologies used in lending, payments, wealth management, money transfer, capital markets, equity crowdfunding and insurance. The traditional financial ecosystem, on the other hand, continues to be in a state of transformation. While traditional providers are trying to adjust to the realities of digitalization, advanced technology, and increasing consumer demands, new fintech entrants are coming into the marketplace regularly. Global fintech funding has surpassed US$31B mark in 2017, sustaining the high level of investment seen in 2016, according to the KPMG Pulse of Fintech report, while total investment into the fintech industry is expected to reach approximately $46B by 2020 according to projections from Deloitte.

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2. Redefining The Customer Journey

Consumer buying behavior has transformed in a significant way to the point where it influences the way products are being developed and consumed. The digital consumer is dictating when, where and how they are engaging with companies, and even how others should engage with brands by sheer influence. Customers of all generations increasingly demand from their financial providers an omnichannel, tailored, and personalized experience, which matches the digital experiences they have when they interact with technology companies and providers in their everyday lives. They expect intelligent and contextual services to become a part of their daily interactions with their banks and insurers.

This power that the digital consumer holds is consolidated by an almost unlimited access to information, an ever-growing choice of goods and services, and opportunities to make their choices known so that others may use them as a reference. As a result, customers' choice of service provider is increasingly influenced by ease of digital access and ease of integration with higher-level services.

## Putting the customer at the center of innovation
The Fintech revolution is more about people than it is about technology. At least, that's what we've come to believe after working on hundreds of projects and software solutions. The complexity of technological solutions is, or rather it should be, designed to deliver simplicity for people using them. And not only simplicity but real assistance. Exceptional customer experience starts with understanding the customer but it moves beyond that. The rise of cloud-based services and data center investments by large technology players such as Amazon, Google, and Microsoft, coupled with advanced analytics and predictive modeling, is now driving low-cost data availability and

analysis. This enables financial companies to react to customer behavior in real-time and to deliver an instant and a more fulfilling customer experience.

> "Customers don't care about financial products. They care about what products do for them. When you think about customer-centricity, it's about building an experience that puts customers' needs first. Then, you build a product to deliver the experience".
>
> Ed Maslaveckas, CEO and Co-Founder of Bud for The World Fintech Report 2018

Emerging technologies across data and analytics, front-end interfaces, infrastructure, and operations are quickly becoming critical to improving the customer experience in terms of personalization, agility, and simplicity to retain customers.
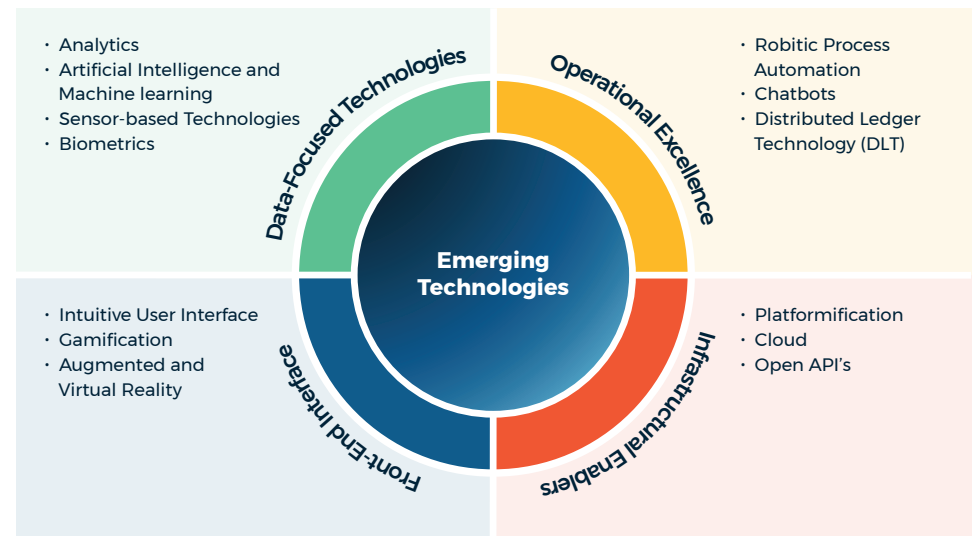

Source: Capgemini Financial Services Analysis, 2018

3. Banking

The rise of fintech startups and the new digital customer mindset have been contributing to a digitalization of the world's banking systems. The customer journey is an increasingly important strategic aspect of the digital banking transformation. In fact, removing friction from the customer journey has been named the number one priority for this year in the 2018 Retail Banking Trends and Predictions by The Financial Brand and Kony. The majority of respondents in the study, namely 61%, placed this trend in the top three, compared to 54% last year. The trend around the use and application of data also increased in importance from last year, with 57% of those surveyed placing this in the top 3 for 2018, compared to 53% in predictions for 2017. Other notable shifts of importance included a greater belief that open banking APIs would be important, less emphasis on regulatory changes and a greater belief that advanced technology would have an impact in 2018.
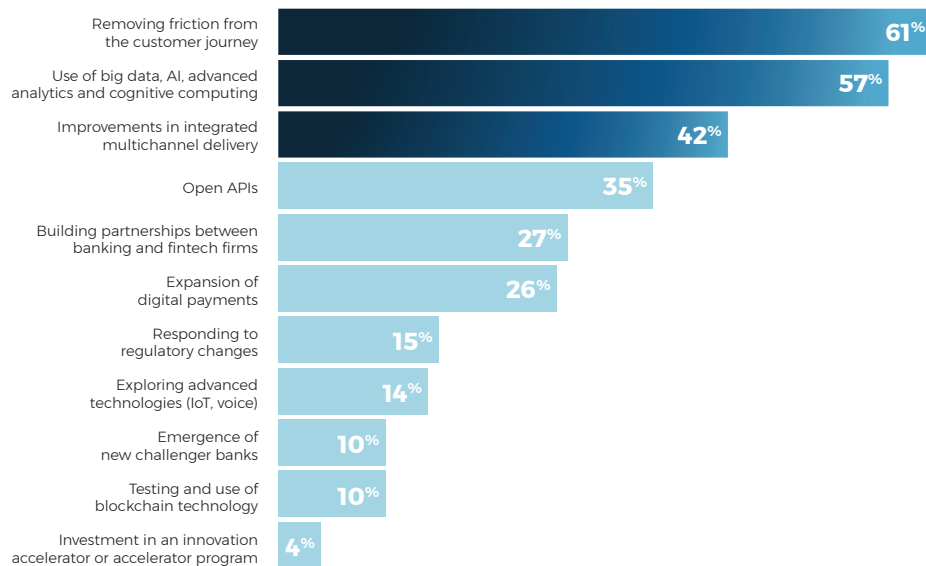
"2018 will see a radical change in how traditional financial institutions approach digital transformation. The Chief Digital Officer concept will be replaced as companies seek to embed digital transformation for both customer value proposition and business model transformation into the roles and expectations for every job in the organization and every initiative undertaken. Digital management, much like risk management in recent years, will become everyone[1]s job. This will launch a wave of transformation, especially in traditional banking."

Mary Beth Sullivan,
Managing Partner ofCapital Performance Group

Self-service banking

Differentiation is harder in today's economy of commoditization. For most people, it doesn't really matter which bank they choose to do business with since they all do the basic job of keeping their money safe. With most banking products becoming commodities, banks have to work harder to differentiate themselves through rates, fees, advice and, most importantly, customer experience.

Self-service is an intrinsic aspect of the age of the customer, where the relationship with the bank and the experience they provide is the key to sustaining growth. People are familiar with the concept of self-service or in the case of retail technology self-checkout and they've come to expect it. In a recent survey, self-checkout rated highest out of a variety of retail technology on a "consumer consciousness scale" with 71% of shoppers declaring that they were familiar with the concept. Self-service kiosks are another element of self-banking, providing at least part of the convenience that digital consumers are seeking in local branches. In 2017, Source Technologies launched the Personal Teller Machine, as the only solution in the market that includes

3 most important trends for retail banking industry in 2018
FIs and Suppliers (n=404)

Trend	%
Removing friction from the customer journey	61%
Use of big data, AI, advanced analytics and cognitive computing	57%
Improvements in integrated multichannel delivery	42%
Open APIs	35%
Building partnerships between banking and fintech firms	27%
Expansion of digital payments	26%
Responding to regulatory changes	15%
Exploring advanced technologies (IoT, voice)	14%
Emergence of new challenger banks	10%
Testing and use of blockchain technology	10%
Investment in an innovation accelerator or accelerator program	4%

Source: DBR Research © December 2017 Digital Banking Report

self-service check issuance and on-demand printing capability. The self-service kiosk offers 9 different routine transactions: cash withdrawal in any denomination, deposit cash, and checks, get cash back, account transfers, access and print statements, check account balances, stop payment, issue official checks and bill payment.

Robotic process automation (RPA)

Robotic Process Automation or RPA combines the use of software with artificial intelligence and cognitive computing to mimic the activities of humans conducting highly repetitive tasks. RPA answers the need for strategic flexibility, operational adaptability, and process efficiency. Because it replicates human activity, it can be thought of as a set of software "robots," forming a virtual workforce available 24 hours per day, with full audit and 100% accuracy. This "virtual workforce" emphasizes business rather than IT control, and provides for rapid adoption through existing compliance and risk management frameworks. Last year, Deloitte predicted that RPA will have achieved near-universal adoption within the next five years. Their Global Robotics Survey 2017 showed that, among those that had already implemented RPA, 78% expected to significantly increase investment in RPA over the next three years. They also predicted that insurer spending on cognitive technologies such as RPA is expected to rise 44% globally on a compound annual growth basis over five years, reaching $1.02 billion by 2020.

By reworking their IT architecture, banks are using automation to enable smaller operational units to run value-adding tasks, including complex processes, such as deal origination, and activities that require human intervention, such as financial reviews. Some financial services institutions are already generating value from automation. One such example is JPMorgan, who is using bots to respond to internal IT requests, including resetting employee passwords. The bots are expected to handle 1.7 million IT access requests at the bank this year, doing the work of 40 full-time employees.

Aside from "standard robotics," more recent RPA solutions also incorporate "intelligent robotics" — the use of machine learning and artificial intelligence approaches to allow automated processes to self-adjust and improve, and to tackle subjective decisions as well as following simple rules. This offers improved, data-driven decision-making at speed, and increases the scope of manual work that can be automated.

A.I. and Chatbots

John McCarthy, widely recognized as one of the godfathers of Artificial Intelligence (AI), defined it as "the science and engineering of making intelligent machines." Machine learning is a subset of AI. In other words, all machine learning counts as AI, but not all AI counts as machine learning. One aspect that separates machine learning is its ability to modify itself when exposed to more data; i.e. machine learning is dynamic and does not require human intervention to make certain changes. The relationship between the two concepts is important as we discuss the role of AI in banking.

Gartner predicts that AI technologies will be the most disruptive class of technologies over the next 10 years due to radical computational power, near-endless amounts of data, and unprecedented advances in deep neural networks; these will enable financial organizations to harness data in order to adapt to new situations and solve problems that no one has ever encountered previously.

For now, AI applications are limited and somewhat underwhelming but that is to be expected given the nature of the industry and the many aspects that govern it. JPMorgan Chase is one of the banks that already invested in the technology through its Contract Intelligence (COiN) platform designed to analyze legal documents and extract important data points and clauses. Because manual reviews of 12,000 annual commercial credit agreements normally require approximately 360,000 hours, they

implemented a machine learning technology that showed that the same amount of agreements could be reviewed in seconds. COiN is described to have widespread potential and the company is exploring additional ways to implement this powerful tool.

Another use case for AI in banking is the implementation of machine learning algorithms to secure existing banking infrastructure to ensure compliance and prevent fraud. Traditional algorithms could only catch a fraudulent transaction when it violated some of the pre-set rules. Machine learning algorithms, on the other hand, can go a deeper and identify suspicious activities based on the transaction history and behavior of individual customers. For instance, if a large transaction is initiated from a bank account with a history of performing minimal checks, machines can immediately withhold it until it is verified by a human. The analysis is performed in real time and is improved over time, as the algorithm can "learn" from past actions.

Risk management is another process that benefits from AI technologies, in the form of predictive analytics. To assess the creditworthiness of a prospect, traditional systems relied on historical data like transaction history, credit history and income growth over years to understand the risk associated with every loan extended. This resulted in inconsistent estimates as historical data is not always an accurate standard to predict future behavior. With machine learning, the bank has a real-time analysis based on recent transactions data, market conditions, and even latest news to identify potential risks in offering credit. Using predictive analytics, a machine learning algorithm can analyze petabytes of data to understand micro-activities and assess the behavior of parties to identify a possible fraud.

Investment strategies have also benefited from machine learning algorithms in the past few years. As the algorithms scour millions of data points, including granular trading information

on companies around the world, they deliver money-making strategies autonomously by spotting patterns humans can't see and self-correcting to adapt to changes in the market. Bloomberg reports that investment banks are using AI to find the speediest way to execute trades, to make bets on market momentum, and to scan press releases and financial reports for keywords that could signal that a stock will rise or fall. Head of group innovation at Barclays Michael Harte believes that the most obvious use for AI in banking is in large algorithmic trading. Investment research is also a candidate for AI technology, with Swiss bank UBS developing "virtual agents" that can perform investment research to near-human levels. Annika Schroeder, AI lead at UBS Group Innovation says that the bank is trying to build virtual agents that can imitate the quality of an investment analyst. It can screen through market data and can perform a company valuation with all of the inputs that a human analyst would use, producing text in a fairly decent quality and almost human mimicking language. The tool is not live yet but its creators are optimistic about its potential.

Chatbots

The most popular application of Artificial Intelligence in banking, chatbots, are conversational, personal and predictive. By enabling customers to interact with the bank through natural language conversations, chatbots provide an intuitive channel for customer inquiries, facilitating user-friendly interactions and delivering a better customer experience.

While in tech circles they are not by any means a new thing, they are still an element of futuristic banking for most customers. In 2016, one of the largest U.S. banks, Bank of America announced Erica, a voice- and text-enabled chatbot for their customers. But while Erica was covered by all major publications as the up and coming intelligent digital assistant designed to help customers make smarter banking decisions, the chatbot has only been rolled-out this month to 300 of the bank's employees. In 2017, Capital One also launched an invite-only pilot for their banking chatbot called Eno, Wells Fargo & Company announced a pilot to test an AI-driven customer chat experience for Facebook Messenger.

According to a report released by Juniper, chatbots will be responsible for over $8 billion per annum of cost savings by 2022. Another report by Gartner, states that consumers will manage 85% of the total business associations with banks through Fintech chatbots by 2020.

> 'Artificial intelligence isn't poised to take over banking. A Financial Times survey of 30 major banks signals modest efforts to apply machine learning and limited progress so far (paywall).'
>
> via The Financial Times

4. Insurance

The digitalization of insurance

Following in the steps of fintech innovation, the insurance industry is also finding new ways to create hyper-relevant services and access new markets with the help of technology. Developing new models of interacting with customers and partners, today's digital insurers are providing customer experiences that adapt to individual needs and context. They use data and smart business platforms to rapidly launch value propositions adapted to the changing roles of customers and business ecosystems. Automation is a key driver in minimizing complexity, time-to market, cost and risk in these new business models.

Digitalization goes beyond the conversion of paper and hard-copy information into digital formats. Instead, it includes the deployment of capabilities which support digital processes including social media, big data and analytics, Internet of Things and robotization. This calls for the rethinking of business models to support improved decision making, enhanced customer relationships and expanded automation through reduced human touch points across the value chain. Insurers have to navigate complex business models, particularly in the area of underwriting and claims, where multiple variations of similar processes, modified to support unique lines of business, co-exist across the value chain. As is the case with many established industries, organizational silos are an obstacle in the way of digitalization, along with a lack of vision, C-suite support, and talent to implement and manage a digitized process environment.

Telematics

Telematics encompasses telecommunications, vehicular technologies, road transportation, road safety, electrical engineering, and computer science. The field has evolved over time to the point that it can now merge with other technologies such as big data and the cloud. One example that showcases the potential of telematics is the partnership between TomTom Telematics and BP to offer businesses an innovative fuel and driver management solution. BP FleetMove combines fuel transaction information from BP fuel cards with driver behavior data from the TomTom Telematics Service Platform, bringing together insights into driver, fuel and vehicle data. This allows for easier identification of areas for improvement.

In the case of auto insurance, today's technologies make it possible for driving information to be accessed online or on apps allowing customers to monitor their driving patterns and make needed adjustments to improve their chances for better policies. Many insurance companies are already offering mileage-based and driving behavior-related discounts. In fact, insurance telematics policies are continuing to grow across Europe and the US.

Octo is a telematics company that provides tailored solutions for the insurance and automotive industries by collecting contextual vehicle, location and crash data, as well as driver behavior information to support Usage-based insurance (UBI) policies. The information that insurers receive from their telematics devices changes the way coverage is priced with policies drawing on data to cost premiums more accurately. The

same technology is used to detect insurance fraud, by giving insurers a complete understanding of a crash. If the devices detect a G-force above a certain level, they can automatically trigger a call to check if the driver and any passengers are unharmed, or alert emergency services if needed.

AI and Cognitive technologies

Cognitive technologies are a product of artificial intelligence, that use advanced analytics and big data. Deloitte defines them as those technologies that can perform and/or augment tasks, help better inform decisions, and accomplish objectives that have traditionally required human intelligence, such as planning, reasoning from partial or uncertain information, and learning.

Along with other fintech companies, insurers are increasingly interested in them because some have improved dramatically in recent years, with impressive gains in computer vision, natural language processing, speech recognition, and robotics, among other areas. Because cognitive technologies extend the power of
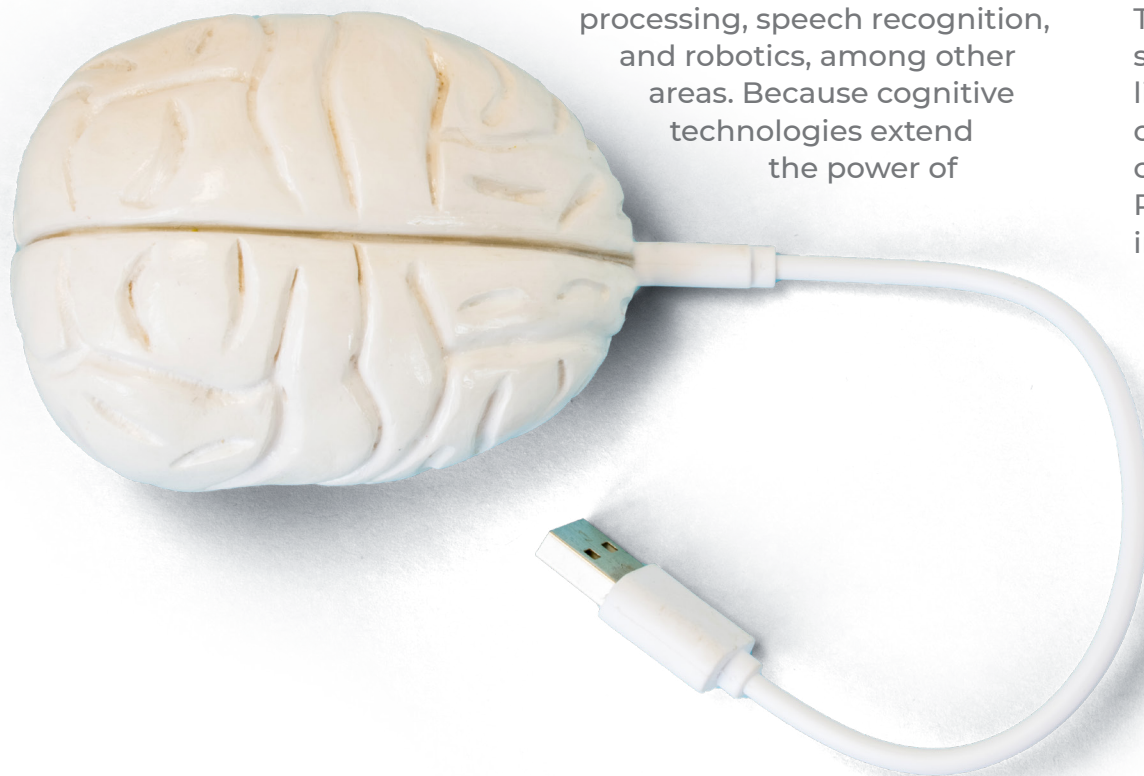
information technology to tasks traditionally performed by humans, they have the potential to enable organizations to break prevailing tradeoffs between speed, cost, and quality.

RPA, a technology that we discussed in the banking section, is also used in insurance to automate manual back-office and customer-facing processes, making them faster, significantly more cost-effective, and improving consistency and regulatory compliance. For example, Zurich, the European multi-line general insurance and life insurance provider, was one of the first insurers to want to implement RPA as a key element of their goal to enhance service and achieve their commitments to more than $1b of cost improvements by 2018. Together with consultancy firm EY, they started with a pilot proof of concept in Zurich UK life and pensions in December 2014, to deliver multiple projects and create a federated robotics center of excellence for the insurance company.

The initial pilot was designed to demonstrate the technology solution and create a business case for implementation within life operations. In just six weeks, they managed to halve the cost of some existing processes, provide a significantly enhanced customer service and accelerate the delivery of change using RPA. Within a further six weeks, they continued to identify and implement new opportunities, releasing 25% capacity within the operational team. The success of this initial project spread rapidly across the business, with deployments across their general and life insurance businesses, and further projects planned. Bancolombia, the largest bank in Colombia, also used RPA for its new "Invesbot" product launched last year, designed to help clients better manage their investment portfolios. Invesbot provides real-time intelligence about portfolio performance to its users and can offer advice about whether current market conditions suggest any changes should be made.

AI technologies are increasingly used in insurance to increase the speed and efficiency of the claim management process. For example, the startup Lemonade was designed with the issue of improving claims in mind. The company created a claims bot using artificial intelligence technology. His name is Jim. The algorithms powering AI Jim 'understand' the nature of claims, their severity, and whether the user is in a state of emergency. AI Jim also tries to assess the likelihood of a claim being fraudulent and even nudges people to be more honest by incorporating years of behavioral economics research into every little detail in the conversation and the UI. Jim's AI tracks loads of user-generated data-points to help identify suspicious activity and predict what customers need before they even know it.

Self-directed robo-advisors are another application of AI in insurance. These are convenient 24/7 advisors that provide ready access to information that can empower consumer decisions on top issues about financial planning and investment management. Robo-advisors allow customers to set up a customized, diverse portfolio and can give them access to wealth management services previously reserved for the ultra-wealthy, in just a few minutes. According to consulting firm A.T. Kearney, assets under management by robo-advisors will grow by 68% annually to a whopping $2.2 trillion in the next five years. Betterment LLC is one of the prominent robo-advisor companies on the market. With over $10 billion in assets under management (AUM), it is the biggest robo-advisor.

5. Payments

Digital payments

Global digital payments volumes are predicted to increase by an average 10.9 percent through to 2020, reaching nearly 726 billion transactions, according to the World Payments Report 2017 by Capgemini. This growth is fueled by emerging markets, changes in consumer expectations and advanced technologies such as connected homes, contactless bank cards, wearable devices and augmented reality.

Contactless payments are becoming more commonplace, with this form of payment becoming the norm in many European countries. Industry specialists are pointing out that emerging technologies such as the Internet of Things (IoT) and blockchain are beginning to disrupt the payments ecosystem at the same time as new competitors and new markets stimulate growth. However, it's important to mention that this new digital payment ecosystem comes with risks, most notably cybersecurity and privacy.

Alternate payment channels
Contactless

Contactless payment is a secure method for consumers to purchase products or services via debit, credit or smartcards, by using RFID technology or near-field communication (NFC). To make a contactless payment, a person simply needs to tap their card near a point-of-sale terminal – leading to the nickname "tap-and-go". Since contactless payments do not require a signature or a PIN, transactions sizes on cards are limited. The allowable amount for a contactless transaction varies by country and by bank. Examples of non-credit or debit card contactless payments include transit cards, Apple Pay, Android Pay and Google Wallet.

The global contactless Payment market was valued at US$7.391 billion in 2017 and is projected to reach US$30.380 billion by
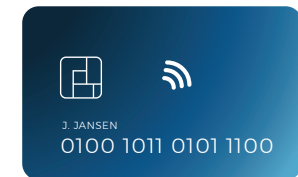
2023. In the UK, for example, two-thirds of consumers have made a contactless payment since it was introduced to the region 10 years ago, making it the global leader in contactless adoption, according to Visa's annual Digital Payments study, reported on by PYMNTS. The study, which surveyed 2,000 UK consumers, also found that more than one-third of UK card payments in June 2017 were contactless, making the UK a leading market for this payment adoption.
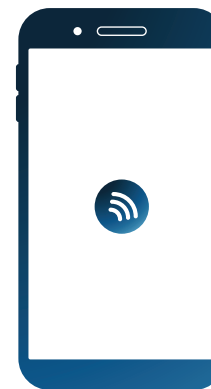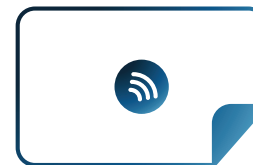

mobile phones   smart watches   debit cards

stickers   keychain

Wearables

Wearable technology is the next phase in payment technology and is currently on a course toward revolutionizing the industry. Contactless spend on Mastercard and Maestro grew by 145%

in the last year, and the huge success of contactless has seen consumers willing to explore new ways to pay. Earlier this year, our client ABN Amro has launched a live trial of a range of wearable devices - including a ring, watch, bracelet or keyring - for making contactless payments, since as many as 50% of all payments in the Netherlands are already contactless.

> "The rise of contactless payment doesn't stop at bank cards and mobile phones. (…) More and more products have payment through Near Field Communication (NFC) enabled, so, naturally, we're eager to test this method with our clients."
>
> Yvonne Duits, ABN Amro product owner payments

As manufacturers and technology companies make changes to their systems, that means that banks and retailers need to keep up with that technology. Many retailers still have outdated systems that do not even accept mobile and contactless payments. In order to accept wearable technology payments, they will have to update their POS systems.

Tractica estimates that wearable payments will amount to about $500 billion by 2020, from $3 billion in 2015. The majority of that growth will most likely come from smartwatches as they are the biggest driver in the growth of wearable payments, but there is still a lot of room to grow. As companies continue to answer the why question and as stores continue to improve their POS systems, the outlook for wearable technology payments looks promising.

Augmented reality (AR)
Augmented Reality (AR) is a technology by which 3D graphics are placed over top of images in the real world. It is a blending of the virtual world and the real world. It should not be confounded with Virtual Reality (VR), which is a more immersive experience, one in which a user is placed in a 360° virtual world. In terms of technology, VR requires a virtual world that can trick the brain

into thinking it is real. E-commerce is the main driving force behind the fast evolution of AR technologies. Fashion brands such as Sephora, Paul Frank, and Max Factor have popularized AR by allowing consumers to virtually try on clothes and cosmetics in the home, mimicking the experience of shopping in a store.

Financial companies are also picking up on the trend, following in the footsteps of retailers.
Last year, Mastercard unveiled an augmented reality shopping experience that incorporates Masterpass and Identity Check Mobile with iris authentication for safe and seamless payments. Developed with Qualcomm Technologies, it delivers photorealistic augmented reality and provides consumers customized, security-focused shopping experiences. Worldpay. A payment processing company, also partnered up with Gatwick Airport to create an augmented reality wayfinding system that the airport can use to guide travelers through the airport and that retailers can potentially use to target individuals with promotional offers. The Worldpay prototype showed how shoppers operating within a virtual environment can use a Host Card Emulation (HCE) system to visualize the payment process, with EMV (Europay, MasterCard, and Visa) technology enabling payments from credit and debit cards. Shoppers making a payment of £30 or under would buy in the same way as contactless payment, by tapping a virtual card on a virtual card machine. When a purchase is worth more than £30, shoppers would use an AirPIN, whereby they would see a range of numbers while within the virtual world and collect the four numbers that make up their PIN number, one by one, using a virtual controller.

Open APIs
An Application Programming Interface or API refers to a set of communication methods between various components of a software application or between different software applications themselves. Organizations can have hundreds of internal APIs, but these APIs often lack standardization, adequate documentation

or openness to the public. Open APIs are both public and standardized, making it easier for third-party integrations and customized feature development. Data from Open APIs can be used to improve the usability of online platforms, whether they're banking platforms, payment platforms or insurance platforms.

PSD2, or the revised Payment Service Directive, is a key Directive issued by the European Commission, designed to regulate payment services and payment service providers throughout the European Union (EU) and European Economic Area (EEA). Its wider purpose is to promote pan-European competition and participation in the payments industry also from non-banks and to provide for a level playing field by harmonizing consumer protection and the rights and obligations for payment providers and users. The technological core of PSD2 is believed to be open APIs, which can provide the means for banks to connect their payments and data services to third-parties. PSD2 will enable bank customers, both consumers and businesses, to use third-party providers to manage their finances. As Open Banking begins to develop and evolve, this directive enables fintech companies to build applications on top of data from banks. With the customers' permission, online merchants can then get direct access to customer bank details. In this case, open API is a possible optimal solution for banks to provide their systems' data to third-party developers. This would enable consumers to individually control their payment transactions without banks interfering in the process. That means more security and a higher level of fraud prevention.
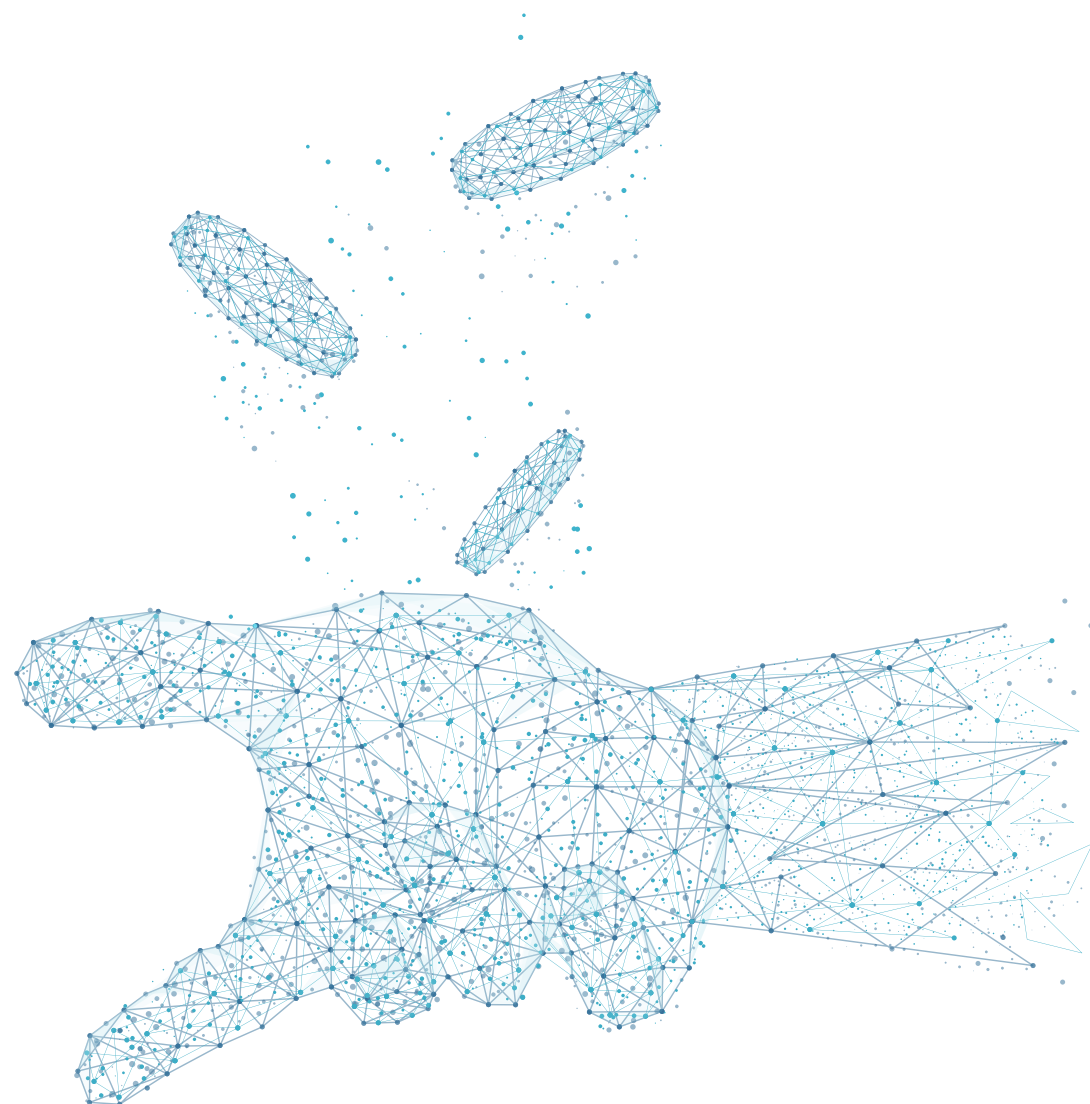
AI (Artificial Intelligence)

Risk decisions in payments are never 100% clear, hence the potential to perfect them using machine learning algorithms. These algorithms can be training using historic risk data from previous payments, to learn and improve risk predictions for future payments. Online payment platform Stripe launched Radar, a set of machine learning-powered tools to help businesses block fraud. Stripe Radar learns from the hundreds of thousands of businesses processing transactions on the Stripe network every second and automatically identifies fraudulent activities based on patterns learned from the payment platform's users. It also allows Stripe's customers to submit their own suspected fraudulent activity for review.

Natural language processing is another subset of AI. Natural voice processing services such as Amazon Alexa or Google Assistant have become very popular in the past few years, finding their way into home appliances such as Amazon Echo, the Sonos speaker system and even cars. Consumers can use Alexa to buy from Amazon, if they have an Amazon Prime membership and if they're based in the US. Google has also launched a similar program called Shopping Actions, that will allow users to purchase items through Google Assistant and shopping ads in search results, also restricted to US consumers for the time being.

Facial recognition and biometric identification are AI-supported technologies that are increasingly used for digital payments. Bank of Scotland, First Direct, Halifax and Tesco Bank are among the first UK banks to integrate this new technology into their mobile banking apps, which are compatible with the iPhone X's facial recognition software. Their iPhone-using customers can log into their phone and authenticate payments using facial scanning, rather than traditional usernames and passwords.

Mastercard has announced their plan to enable fingerprint and facial recognition validation for payments for their card users, starting April 2019. Mastercard branded cards will have to

provide biometric authentication options alongside traditional PIN and password verification. The technology is expected to be available for contactless transactions made with mobiles in shops, as well as for transactions made online and on mobile devices. According to Mastercard, the introduction of biometric security reduces digital checkout times, improves security and reduces the likelihood of a shopper giving up on a transaction. The company's research conducted alongside Oxford University found that the "vast majority" (93%) of consumers prefer biometric security compared to passwords when validating payments.

6. Blockchain

From One Cryptocurrency To ICOs And Blockchain 3.0

Blockchain or distributed ledger technology, as it's also known, has been on an explosive growth path over the last few years. From 2014 to 2016, $1.4 billion has been invested in blockchain and 2,500 patents have been filled. Blockchain works by creating a data structure that can be shared among a network of computers. In the world of blockchain, each computer is called a node. The system uses cryptography to allow each person to manage the data securely. When users enter data into the blockchain, it is very difficult to change it or remove it. This is due to the fact that when a change occurs, all copies of the blockchain, created by individual users, run algorithms to check and approve the new data. If the data is valid and matches are found, the data will be added to the blockchain.

Bitcoin was the first successful digital currency in the world. Built on what we now call the first generation blockchain technology, its supply was determined unequivocally from the onset. This is why owners of the cryptocurrency could only be able to spend what they had, and that the Bitcoin spent by the individual could not be spent again on another transaction (double spending). In time, Bitcoin revealed some drawbacks to this first generation blockchain. One of the most important ones was the lack of any type of contract between participants to a Bitcoin transaction. As Bitcoin adoption grew, recording transactions on the blockchain were not enough anymore. People started to need much more complex applications to be able to customize their transactions. A first generation coin that was deployed was almost impossible to change afterward. Adding elements and building on it was not feasible, leading to the creation of second and third generation blockchains.

Ethereum is the first second-generation cryptocurrency. This new application of the blockchain technology made it possible for contractual information to be embedded in a transaction, in what we now call smart contracts. A smart contract is a contract that is coded and subsequently uploaded to the blockchain. Whenever a contract is executed, every node in the network runs it, then uploads it to the blockchain. While smart contracts were not a new notion in the crypto space, this was the first successful application of the concept, enabling more elements to be included in transactions.

One major drawback of the speed with which things change in the blockchain sector is governance. If the way we trade value becomes completely decentralized, some would argue we risk becoming a stateless global society. The lack of a governance model also makes it difficult for enterprises to adopt blockchain technology in their activities. Smaller companies, however, have found a way around this, with the creation of Initial Coin Offerings (ICOs). Startups can use an ICO to bypass the highly-regulated capital raising process required by venture capitalists or banks. In an ICO campaign, a percentage of the cryptocurrency is sold to early backers of the project in exchange for legal tender (any official medium of payment recognized by law that can be used to extinguish a public or private debt or meet a financial obligation) or other cryptocurrencies, but usually for Bitcoin.

The applicability of blockchain technology is still being discussed in the industry. But the potential is becoming more and more clear with every initiative. In an effort to speed up blockchain adoption, Amazon just launched an open-source solution that allows users of its cloud computing platform to create and deploy secure blockchain networks. The service is positioned as a quick and easy way for companies and individuals to set up their own

blockchain networks for a variety of purposes. AWS Blockchain Templates users are able to integrate Ethereum and Hyperledger Fabric frameworks into their cloud infrastructures, instead of spending time and energy on the manual setup of a blockchain network.

Blockchain applications in the financial sector
Banking
Santander Bank is one of the first banks to be implementing the distributed-ledger technology for international money transfers. After testing it internally with their staff, the bank made the service available to its retail customers in Spain, UK, Brazil, and Poland, with a wider roll-out planned for 2018. Using Ripple's distributed ledger technology, the service, known as 'Santander One Pay FX', makes it possible for customers to complete international transfers on the same day in many cases or by the next day. The service also shows them the exact amount that will be received in the destination currency before they make the transfer.

> "Blockchain technology offers tremendous opportunities to improve the services we offer our customers, and the launch of Santander One Pay FX is the first of many potential applications".
>
> Ana Botín,
> Executive Chairman of Banco Santander

Insurance
Marsh, an insurance broking and risk management company, recently announced their collaboration with IBM on the first commercial blockchain solution for proof of insurance. Built on the open source Hyperledger Fabric framework and IBM's Blockchain Platform, the service aims to use the distributed ledger technology to make the certificate of insurance process more streamlined and transparent, allowing clients to speed up functions such as hiring contractors and transferring risk while increasing certainty about insurance cover. Proof of insurance is considered to be an essential business requirement in many

industries, so the new blockchain solution is designed to further the creation of a network of networks to provide verification on a much broader scale.

"Marsh sees great opportunity in leveraging blockchain technology to better serve our clients by maximising efficiency and creating new opportunities in the insurance value chain." Sastry Durvasula, Chief digital, data, and analytics officer at Marsh

Payments
Mastercard has been exploring blockchain for quite some time. The company tested and validated its own blockchain for the business-to-business (B2B) space to address challenges of speed, transparency, and costs in cross-border payments. The Mastercard blockchain technology is designed to complement the company's existing capabilities including virtual cards, Mastercard Send and Vocalink to support all types of cross-border, B2B payment flows – account-based, blockchain-based and card-based. Moreover, last year they announced that they are opening their Blockchain API for partner banks and merchants.

With this proprietary solution, the company is looking to create new benefits for its partners and make the commerce ecosystem easier, faster and safer. In addition to building a new solution, the company has also filed for over 35 patents in blockchain and invested in Digital Currency Group, a collaborator that builds, incubates and seeds Bitcoin and blockchain technology-related companies.

If you're interested to learn more about Blockchain and other applications in the financial sector, make sure you download our most recent white paper available here.

7. Final thoughts

As fintech companies continue to experiment with these new technologies, they need to identify the right digital business models that can interpret and use data to drive innovation and operational efficiency.

The democratization of technology increased access to funds and a rising entrepreneurial culture means that there are now hundreds of startups attacking traditional markets. Startups like Uber, Twitch, Tesla, GitHub, WhatsApp, Airbnb, Matternet, Snapchat or Waze are achieving scale far quicker than analog companies ever did. Whereas the average Fortune 500 company took 20 years to reach a market capitalization of $1 billion, Google managed it in eight years, and the likes of Uber, Snapchat, and Xiaomi in three years or less. Digital technologies like the Internet of Things, AI, machine learning, big data, and blockchain have enabled the emergence of new business models such as peer-to-peer networks, freemium, crowdfunding or crowdsourcing, as a service, marketplaces and personalization. Following these new business models means having to make investment decisions much quicker and change internal processes to identify and evaluate investments, with greater emphasis on decisions informed by data and analytics.

Implementing digital business models is a complex endeavor, especially for established financial companies, who are now having to change their way of thinking entirely. Companies who are still counting revenue as price x volume are lagging. Digital offers a new strategic way of thinking that can enable them to analyze how other frameworks, such as networks, channels, and customer engagement can create value for their business.

Adoption of these new business models is driven by a series of key factors, one of which is delivering value for customers, an increasingly difficult task for many fintech companies. Today's empowered consumers have become real experts in their use of tools and information that they have most of the power in the commercial relationship. They are researching and hunting down what they want and they want it delivered to their doorstep at a rock-bottom price. Most companies are scrambling to understand this behavior and to develop big data and analytics capabilities in order to understand their customers and take back some of that control. But an unstructured approach to this is as dangerous as remaining analytical. Financial consumers see no difference between buying with cash, debit card, credit card, mobile wallet, PayPal, etc. The differentiation is not relevant to them. Instead, they want to be rewarded, irrespective of payment type or channel without having to deal with multiple loyalty schemes. Knowing their bank sees all of their

spendings, consumers are looking for support in receiving rewards across all of their spending activities, whether from the bank's own reward program or that of a third-party retailer. They want to be able to check at any time if money has been received, if payments have gone out, if they have sufficient funds, including drawing down lending, to make a purchase, and if there are better deals and offers available. Banco Falabella and Banco Ripley are two examples of companies who understood this behavior and translated it into a business opportunity. The South American retailers opened their own banks to deal with access to finance but also to improve the reward programs. The result was they became market players in financial industries and recently one retail bank has "leased" their entire operation to a traditional bank for 15 years. It takes a commitment to a digital business model that can deliver value and help companies anticipate a customer's next move instead of reacting to it. This can enable brands to position themselves in customers' paths as they navigated the "decision journey" from consideration to purchase. The way to do that is by shaping the journeys customers take, leading, rather than following them along the path.

Another key driver is the need to streamline operations and speed up digitization, as most fintech companies struggle to move on from legacy systems and information silos. CIOs have their work cut out for themselves. If in the past they were just IT managers, threatened by the decentralization of IT procurement and concerned about their long-term relevance, their role has become a strategic one. CIOs are now expected to become executive leaders within their organizations. As they attempt to navigate this digital transformation, they are faced with a rather large number of options in terms of new technologies that are disrupting workplaces. The disrupting technologies we mentioned in this white paper cannot deliver increased efficiency and profits in a vacuum. When deciding to adopt one or multiple new technologies, companies have to consider the broader context. Their business model will be the starting

point for mapping all interactions between business functions, processes, and structures. These technologies or combinations of them need to be integrated in a digital ecosystem that leverages smart business platforms for both customers and clients alike. In the case of Santander Bank, we saw payments, blockchain and banking come together in a single business initiative designed to increase customer retention and company competitiveness. In another scenario, blockchain technology is used to mitigate and manage threats to the IoT, as ransomware and other cyber attacks become more common. IT security experts believe that blockchain technologies could be considered as means for protecting both data traveling between IoT endpoints and the data silos that underpin IoT implementations. There are countless combinations of these technologies converging to form a digital ecosystem that can enhance the banking, insurance and payments industries.

The starting point in any digital transformation is a structured approach to assessing a company's digital maturity based on an understanding not just of the technologies targeted, but of the 'big picture' of what digital means for that particular business and industry. An approach of this scale goes far beyond the IT department, to include leadership, business development and HR. The key role of leadership, and HR is not only to ensure its implementation but to create the right culture of innovation and digital outlook, to support the chosen business model.

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