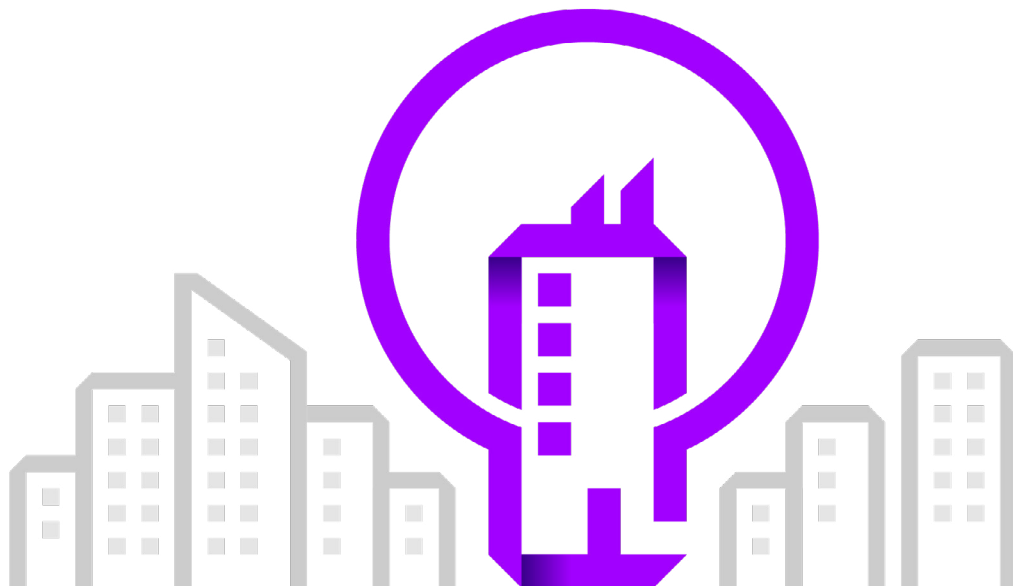




BUILDING THE FUTURE- READY BANK

Banking Technology Vision 2018



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REVOLUTIONS MAKE FOR GOOD COPY.

The journalists standing at the Berlin Wall when it came down witnessed a sudden and truly disruptive change that reset the geopolitical landscape of Europe for a generation.

In business, the rapid reversal of fortunes of Blockbuster, BlackBerry®, Myspace® and Kodak will live on for generations as business school case studies that demonstrate how market leaders can be overthrown by innovative insurgents.

In retail banking, we're witnessing one of those revolutionary moments in China. With over 1.5 billion active users,¹ Alipay™ and WeChat are reshaping the payments landscape with a deluge of innovations that are making both cash and traditional card payments anachronistic in some cities. While mobile payments languish in the low single digit percentage in the US, more than half of WeChat's users scan a quick response, or QR, code regularly to pay at a retail location,² and Alipay's "pay with a smile" is using facial recognition to let consumers buy fast food.³ With Ant Financial (Alipay's parent) having the most blockchain patents and live blockchain production systems of any financial institution in the world⁴ (and they are also building a payments system that can handle 100 billion transactions a day), the accelerating pace of change in China shows no sign of abating and we are truly witnessing a great leap forward. India may also be in the early days of this type of payments revolution, with mobile payment volumes up 22 times in a 12-month period⁵ and with the combination of demonetization and standardized mobile payments infrastructure driving rapid adoption.

In contrast, the pace of change in more developed retail and commercial banking markets appears to be more evolutionary than revolutionary. The would-be rebels see the EU's second Payment Services Directive (PSD2), the UK's Open Banking initiative, and mandated data sharing in Australia as game changers and pre-cursors to radical change; and over time, they may well be. Yet, current evidence suggests that, in most of these markets, incumbent banks have managed to avoid the waves of digital disruption that have washed over other industry sectors. In Europe, there is no shortage of new entrants, with 20 percent of the players in the retail and commercial banking space being created since 2005,⁶ and they are playing in every space—from payments, to consumer and SME lending, to robo-advice. However, to this point, they have only captured about 6.6 percent of the industry revenue and an even smaller portion of the profit pool.⁷

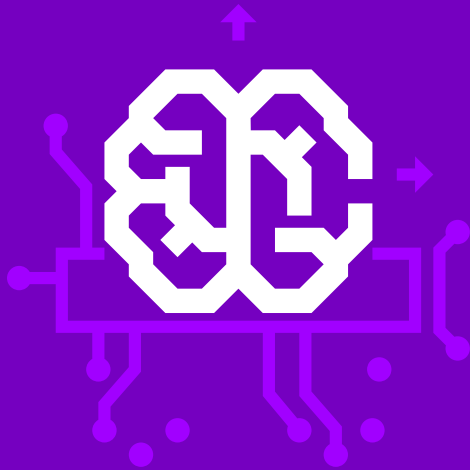
In the US, for all the fintech innovation we have seen, the story since the financial crisis in consumer deposits has been further consolidation rather than increased competition. In 2007, the top three banks in the US held 20 percent of deposits while in 2017 that number rose to 32 percent.⁸ As digital account openings become more common, market share has moved not to new entrants, but instead to incumbents who can afford to invest billions of dollars in a great digital customer experience. In 2017, new checking account openings in the US were dominated by the established players, with 45 percent being opened at the three national banks.⁹ Those who are losing share are the smaller institutions who have been reliant on their branches as the fly paper for deposits. In US credit, there has been more change. Over one-third of small and medium-sized enterprises (SMEs) that borrow now use non-traditional lenders¹⁰ and mortgage originations are dominated by specialists not banks. Again, the profile of change is very market specific; for example,

SME credit and mortgages are bastions for incumbent banks in mature markets like Canada.

The speed at which a specific retail and commercial banking market changes is clearly not just about the speed of technological change, but also the complex interplay of many other factors including the regulatory environment, industry economics, level of customer satisfaction with existing providers, and the structure of competition in the sector. That being said, technology is a critical driver of change in the banking industry and a key factor that all players (new and old) need to understand if they are going to successfully navigate the choppy waters of either revolutionary or evolutionary change.

In this paper, we place a banking lens over the five emerging tech trends highlighted in the cross-industry Accenture Technology Vision 2018. Each of these IT trends could potentially generate the next wave of industry disruption that banks can ill afford to ignore, even in markets that currently look stable and profitable. Only by understanding these trends can banks ensure that they are truly future ready.

Of the nearly 800 bank business and IT executives from across 25 countries interviewed in the global Accenture Technology Vision 2018 survey, 86 percent agree that technology is increasing the level of integration between financial services and the rest of their customers' lives. To prevent being marginalized and pushed to the ends of the value chain, banks are going to need to go beyond current products and services and create compelling living services that are highly personalized and relevant. Whether that change is coming fast—as it is in some of the emerging markets—or somewhat slower in the more developed economies, there is no disguising the fact that technological change is going to rewrite the rules of the banking industry over the next decade.



Trend 1

CITIZEN AI

The Newest Member of the Bank Workforce

AI may be the next big thing for many industry sectors, but banks are veteran users of this technology.

The first neural networks for automated credit decisioning were built over 20 years ago, and banks already make extensive use of AI to automate repetitive, rule-based manual tasks, such as AML transaction monitoring and credit card fraud detection. Yet today, AI is evolving to offer a far more comprehensive set of cognitive capabilities that can sense, comprehend, act, and learn. These capabilities allow AI-powered machines to interact far more naturally with both customers and other employees in ways that not only easily pass a Turing test,¹¹ but also display humor, emotional sensitivity, and other very human traits. According to our survey, 79 percent of bankers believe that within the next two years, AI will work next to humans in their organizations as a co-worker, collaborator, and trusted advisor. They also expect that the majority of bank-customer interactions will be conducted via AI in the next few years, making machines the “face” of the organization.

One of the more visible signs of this trend is the emergence of collaborative robots, or cobots, that work alongside humans to help them do their jobs better and give customers a better banking experience. In 2016, Bank of America debuted Erica, an intelligent virtual assistant that uses predictive analytics and cognitive messaging to offer financial guidance to the bank’s 45 million-plus customers.¹² We have also seen widespread growth in the use of robo-advisors in companies across the financial services ecosystem, including Betterment, UBS, Credit Suisse Group, Merrill Edge, JPMorgan Chase, Wealthfront, and Charles Schwab. Some of these bots directly interact with customers, while others support the advisers, but in both cases their purpose is to help navigate the world of retail investing to meet specific goals.

As AI becomes a more visible co-worker that can make autonomous decisions, legitimate concerns are being raised about the processes through which an AI makes those decisions and whether those decisions are being made within the right regulatory and ethical context. For example, Capital One® is researching ways to use AI for a variety of functions, including deciding who is granted a credit card, while maintaining a high bar of explainability.¹³ Bank of America and its Chief Operations and Technology Officer, Cathy Bessant, are helping lead the way to “responsible automated intelligence,” as she calls it, focusing on ensuring that algorithmic or automated models are also unbiased.¹⁴ Ultimately as banks maximize the power of AI, banking regulations, such as the European Union’s soon-to-take-effect General Data Protection Regulation (GDPR), will raise the accountability bar on consumer data handling whether conducted by humans, machines or both.

As AI develops decision making capabilities, it can’t be a black box. Instead, it needs to be subject to the same constraints and transparency rules as any other employee. Bankers overwhelmingly recognize the importance of this transparency. Ninety percent agree that it is important for employees and customers to understand the general principles used to make AI-based decisions, and 29 percent expect to be fully transparent regarding customer-facing AI-based decisions within the next two years. That being said, fully three out of four agree that banks are not well prepared to face the societal and liability issues that come with having AIs that are making customer-facing decisions on a daily basis.

For the bankers who responded to the survey, the upside of AI is highest in three areas:

- 1 Building customer trust and confidence** (71 percent)
- 2 Cost and operations optimization** (63 percent)
- 3 Improving compliance with regulations** (62 percent)

Interestingly, despite the success of AI-powered platforms like Alexa®, an Amazon® product, in capturing the hearts and minds of consumers, “competitive differentiation” only made the top three aims for AI in a small number of markets, including Australia (77 percent), Brazil (70 percent), and Japan (100 percent).

Just like with any other employee, banks need to understand at a granular level how AI will fit into the workforce and the role it will play. The challenge is that, while there may be areas where machines will displace humans completely (typically administrative roles), there are many other areas where the relationship will be symbiotic, with humans helping machines and machines, in turn, augmenting the capabilities of humans.

To get the best from the technology, banks will need to decompose traditional job descriptions to discrete tasks to understand where AI can be most helpful. We also need to think about how humans need to work with AI machines to ensure they are well trained, can make ethical decisions, and will evolve in ways that are consistent with the bank’s brand promise and codes of conduct. It goes without saying that this is not a one-off exercise; given the rapid advances in the AI field, it is an ongoing and continuous process of ensuring and optimizing the balance of man and machine in all areas of the bank.

Trend 1 **Citizen AI**

Actions to take now to be future-ready.

Don't expect huge workforce displacement from AI. Instead, plan for a phased impact of AI on humans: enhancement, then extension, followed by automation. But as humans are displaced, also expect new roles to be created that train, explain, and maintain the AI-powered machines.

Identify where in your organization AI can have the most positive impact, either for driving business growth or increasing operational efficiency, and focus early efforts in these areas. Recognize that many of these opportunities will require symbiotic human-machine interactions, not binary human versus machine choices.

Establish a business-wide operating model for AI that assures ethical governance from the outset and which also ensures a baseline of AI skills across the organization, rather than having them compartmentalized and fragmented.

In the context of AI, build collaborative working relationships with regulators to provide assurance that good customer outcomes are at the core of your AI strategy.



Trend 2

EXTENDED REALITY

The End of Distance

The video phones of 1980s science fiction are grainy, low-bandwidth disappointments compared to the way real technologies, like Skype® and FaceTime®, are now able to bring families together.

We are now entering a period in which extended reality (XR) technologies, including virtual reality (VR), augmented reality (AR), and mixed reality (MR), are removing distance between people, information, and experiences. With these technologies, brands can create competitive differentiation simply by overlaying the real world with digital enhancements to extend human reality. Gartner predicts that by 2019, 20 percent of large-enterprise businesses will have adopted XR technologies.¹⁵

An XR-based solution places people directly and virtually into whatever setting an enterprise may want or need to offer. The technology immerses the user through visuals, audio, and potentially olfactory and haptic (touch) cues. Users can dive into a new situation and fully experience it, regardless of location and whether the situation is actually dangerous, expensive, or impossible.

XR isn't just another video medium. It is qualitatively different and potentially far more engaging than any other digital medium that banks use today. In their book, *Infinite Reality: The Hidden Blueprint of Our Virtual Lives*, Jim Blascovich and Jeremy Bailenson suggest that XR experiences are perceived and remembered differently from, say, books or videos. And, XR memories are far more like "real" physical memories than those created by any previous remote communications technology.¹⁶ Research work comparing the use of a 2D video and

a 3D immersive system in teaching tai chi (conducted by the University of Washington, University of California at Berkeley, and Stanford University) concluded that immersive virtual reality is far more effective at teaching new techniques.¹⁷

There are many use-cases emerging for this technology in banking. A real-time, 3D virtual learning on investment scenarios, for example, could use immersive animation, simulations, role-plays, and online instruction to train wealth and asset managers to better advise their clients. Virtual recruiting would allow banks to access, woo, and engage some of the best talent globally regardless of where they live. An augmented reality app run at a branch could deeply immerse consumers in a home buying experience that ends with the completion of a digital mortgage.

In most scenarios, XR makes for deeper, more meaningful customer engagements, and higher workforce performance. Of bankers responding to our Technology Vision 2018 survey, 82 percent believe it will be important to leverage XR solutions to close the gap of physical distance when engaging with employees or customers. Thirty-five percent identify removing distance barriers as a driver in their adoption of XR solutions, and 80 percent consider it important to be a pioneer in XR solutions. On the other hand, bankers are less likely than their peers in other industries to prepare for XR solutions by building talent in the space (38 percent versus 46 percent for all executives).

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Leading banks are already in pioneer mode. FNB's eBucks Partner locator on the FNB app uses augmented reality to help customers find nearby eBucks retail partners.¹⁸ BNP Paribas also recently rolled out a virtual reality-based app for its retail banking customers in France that allows the user to virtually access account activity and transaction records, and it can walk the user through the various steps of a real estate purchase in virtual reality mode.¹⁹

45%
of digital-savvy consumers would like their bank to introduce new ways of communicating like wearables or virtual reality.²⁰

For banks, creating value from XR will be about drawing on the ever-increasing amounts of available data—from internal and external sources—to better know and delight customers, and create unique sales opportunities. For example, the Republic of Korea's Hana Bank offers instant mortgages delivered to customers through augmented-reality applications on mobile phones. Using big data, the app can get information on an apartment, a house, a block of flats or a neighborhood, and couple that with data about the customer. Pointing the phone's camera at a property gives the customer not only its price, but also a real-time offer on a mortgage. The pricing of the sale and the risk assessment have already been done, and the customer can also apply for a mortgage digitally, meeting physically only to sign the mortgage papers. With advances in digital Know Your Customer (KYC) processes, even this physical contact will soon be a thing of the past.

Banks that aim to win in the digital economy will need to master the application of extended reality technologies in creating new, winning business models. It requires a strong application programming interfaces (API) strategy to deliver relevant data in real-time to the various service layers that connect ecosystem players. And, design thinking would need to include experiences for both authenticated (or “logged-in”) customers and unauthenticated users. Without such integration, a bank will find it hard to compete.

Live-immersive banking reimagines the bank branch

A new Live-immersive banking for real estate application, developed through a partnership between SAP Co-innovation Lab and a global bank, could bring fresh innovation to the bank branch.²¹ Writer Susan Galer took the app for a test-drive, citing the experience as a “mesmerizing example of AR that could turn banks into real estate brokers and customers into people who can’t wait to visit their local branch.”²²

In a high-end, 3D, computer-generated environment at their local bank branch, future home buyers could be immersed in an extended reality experience for home buying. A customer would wear a head-mounted device and use gestures to easily search for specific properties by size and location, soaring above aerial views of the entire neighborhood, and lifting the roof from each building to “walk through” the homes. The experience would include a complete virtual tour of floor plans for property (data provided by builders and architectural firms in partnership with the bank) that’s under construction or located in another country. The bank could qualify the potential buyer then and there and assist with the home purchase. After purchase, the bank could also provide insurance, relocation, and home furnishing services—extending the bank into all aspects of the home buying process.

Trend 2 **Extended Reality**

Actions to take now to be future-ready.

Even if you don't see a compelling use case at the moment, experiment with XR to establish a minimum level of internal expertise. Fund this as innovation and do not expect an immediate return. Look to deploy XR solutions initially in the safe environment of your physical channels. Potentially focus on the home-buying experience as a moment of truth that leads easily to a value-added ecosystem of associated purchases.

When consumer access to XR in your market is mature, develop XR apps that bridge the physical and digital worlds, and extend the bank more deeply into your customers' lives.



Trend 3

DATA VERACITY

Build the Future on Truth

We are all familiar with the double-edged sword of big data and analytics. On one hand, there are personalized customer experiences that use data to surprise and delight. On the other hand, there is fake news, data hacks, and the fear of identity theft.

This duality came through loud and clear in our survey. More than 84 percent of bankers responding to our Technology Vision survey agree that their organizations are increasingly using data to drive critical and automated decision-making. But, 77 percent also agree that most organizations are not prepared to confront the impending waves of corrupted insights, bad decisions, and potential compliance failures that could occur as falsified data starts to infiltrate their information systems.

Banks have always held a hefty amount of highly confidential internal data on customers, partners, services, suppliers, and products. Now, they are increasingly adding data from external “unstructured” sources, such as newly accessible government and third-party databases, and many more interaction channels, including social media.

If banks don’t ensure that data is accurate, valid, consistent, and has referential integrity, then they will be vulnerable to drawing business insights and making decisions that are of questionable value at best and corrupted or illegal at worst. Thirty-four percent of bankers in our survey report that their organization has been the target of adversarial AI at least once, and 78 percent believe automated systems create new risks, such as fake data, external data manipulation, and inherent bias.

The regulatory environment is clearly an important directing factor when it comes to bank data. The Basel Committee on Banking Supervision’s standard number 239 (BCBS239), for example, has driven a far greater understanding of risk data

With big data comes big responsibility

Given their pivotal place at the center of almost all commercial activity, banks have wide access to all sorts of customer data. As the Internet of Things, Open Banking APIs, and AI increase the flow of that data, banks will need to deal with both the upside and the downside risk of having a privileged place in the economy. Customers understand that their data has value and are beginning to demand reciprocity. Accenture’s consumer research indicates that nearly 80 percent of digital-savvy customers are happy to share personal data with their bank, but 66 percent demand faster, easier-to-access services in return.

Ultimately, most banks strive to be a trusted adviser to their customers, but such an intimate relationship requires a high level of trust. Some of that trust can be generated through regulations, like GDPR, but in the end banks will need to go well beyond what is required by law. It means continuing to strengthen cybersecurity capabilities, deploying tactics that focus inside the perimeter to make it as difficult as possible for hackers. It means using data and digital technologies, such as block chain and digital objects, to enhance transactional banking. The goal for banks: demonstrate that not only are they protecting customer data, but they are also using it to act in the customer’s best interest at all times.

aggregation and reporting. PSD2 and Open Banking have forced banks in Europe at least to think hard about the value of data, and GDPR is fundamentally shifting all organizations' attitudes to the importance of managing all aspects of personal data covering privacy, accuracy, and, most important of all, the need to obtain consent to its use in processing.

Even with such oversight, 28 percent of bankers said that they do not validate or examine the data they receive from ecosystem or strategic partners most of the time, and five percent said they do not validate at all or rarely do. This somewhat cavalier attitude to data does not bode well for some banks in the digital economy.

Banks will need to address this new vulnerability by strengthening their capabilities in three key aspects of data management:

- 1 Provenance**, or verifying the history of data from its origin throughout its life cycle;
- 2 Context**, or considering the circumstances around its use; and
- 3 Integrity**, or securing and maintaining data.

The skills and tools needed to build this confidence are within reach. Many banks now have a Chief Data Officer, but far fewer of them have a true "data intelligence" function that draws on the combination of existing data science and cybersecurity capabilities. The first step is to ensure that the right data is being used throughout decision support systems and processes. What's more, banks must be vigilant in uncovering and addressing ways in which stakeholders might manipulate data for their own benefit—for example, well publicized incidents of fake accounts being created by sales people or transaction posting sequences being manipulated to maximize the chance of the customer going into overdraft to generate additional fees for a bank.

Eighty-one percent of bankers we surveyed agree that organizations are basing their most critical systems and strategies on data, yet many have not invested in the capabilities to verify the veracity of that data. By making these investments, banks will generate more value from their data, through building a deeper level of trust with their customers and being able to nimbly and accurately respond to regulatory requests.

A new "data intelligence" function will make this possible. Its job will be to grade the truth within data, by establishing, implementing, and enforcing standards for data provenance, context, and integrity. This could start by ramping up existing efforts: embedding and enforcing data integrity and security throughout the organization, while adapting existing investments in cybersecurity and data science to address data veracity issues. Grading data will also require developing an understanding of the "behavior" around it. Whether it's a person creating a data trail by shopping online or a sensor network reporting temperature readings for an industrial system, there's an associated behavior around all data origination. Companies must build the capability to track this behavior as data is recorded, used, and maintained. With this understanding, the organization can provide cybersecurity and risk management systems with a baseline of expected behavior around data. For example, in phones that are hacked or stolen, the criminal will rarely use lifestyle or fitness apps; therefore, recent use of those apps may be a good indicator that the phone is still in the possession of the rightful owner.

The presence of bad data in a system isn't always the result of malicious intent, but may be a sign that a process isn't working the way it was intended. Uncovering processes that inadvertently invite deceit is a key step to improving the truth in data across a system. Incentivizing truth will allow companies to reduce noise in data, so that real threats stand out. Ultimately, it will help ensure the data can be trusted to drive critical decisions in the future.

Trend 3 **Data veracity**

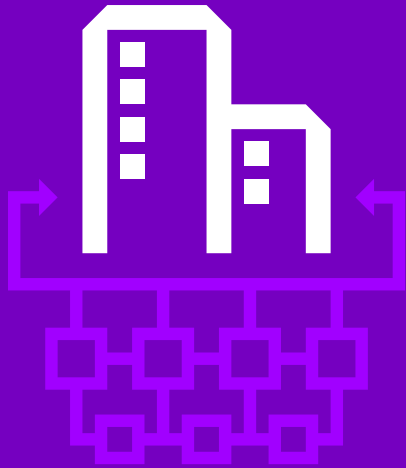
Actions to take now to be future-ready.

If the impact of data-related regulation has not yet driven an enhanced respect for the importance of managing data throughout its lifecycle, then now is the time to take this seriously.

Start collecting information on the cost of data quality lapses. Consider completeness, accuracy, validity, and consistency amongst other potential issues that can lead to re-work, customer dissatisfaction, or even regulatory fines.

Data is both the raw material and finished good of the digital business, so as a digital bank, you must manage data in the same way a manufacturer or retailer manages its supply chain and inventory. This will likely require new skills and tools.

Treat this increased investment in data management as a value-generating initiative rather than purely an overhead or a burden. For example, AI trained on higher quality data will result in more valuable insights and improved decision-making.



Trend 4

FRICITIONLESS BUSINESS

Built to Partner at Scale

Banks are being forced to become more promiscuous in their partnerships to thrive in the digital economy. Our survey shows that 44 percent of banks work with more than twice the number of partners than they did two years ago (compared to 36 percent in other industries).

ING, for example, says it has a diverse group of some 100 fintech partnerships—a strategy it uses to get the best ideas from around the world, change its culture, and accelerate the pace of innovation.²³ In Australia, 80 percent of bankers say that the number of partners their organization works with has at least doubled since 2016, compared to less than 40 percent cross-industry. This demonstrates a degree of maturity not seen elsewhere in managing ecosystems of fintechs.

Yet, banks are inhibited in their ability to partner by complex, usually inflexible operating and technology platforms that are often the polar opposite of “plug and play.” Legacy banking systems were not built to support high metabolism, technology-based partnerships. Instead, they were built in silos intended to operate only within the walls of the business and with the assumption that change would be slow and steady. Now, as banks expand their networks, participate in diverse ecosystems, and shift partners within them, outdated systems that cannot keep pace are becoming a material barrier to growth and future readiness. Banks that persist in relying on legacy systems are simply denying the future.

Two technologies will play key roles in overcoming these challenges: microservices and blockchain.

MICROSERVICES

Microservices can be thought of as an approach to technical architecture. As opposed to a monolithic design, where applications are built with a single codebase,

the microservices approach breaks down applications into simple components that perform recognized business functions. Each function is treated within the organization as a single service, equipped with its own team of engineers responsible for maintaining their own code and, importantly, API endpoints—URLs that point to the available functionality. What makes this approach different from previous service-orientated architectures is the proviso that each microservice manages its own data, access to which may only be gained through the API endpoints. This single rule eliminates much of the complexity found in traditional architectures. Larger “applications” (such as a mobile banking app) are created by coordinating API calls to each of the independent services—a boon to partnerships as the API calls can include services outside the organization. Strictly internally, the benefits remain vast in that applications become lightweight, dynamically scalable, and more resilient as it is easier to pinpoint issues at a granular level (Figure 1).

This approach means that a microservices-based architecture has the application modularity, scalability, and reliability to support technology partnerships at scale—doing so quickly and easily with seamless integration of services, and without hindering partners or customers.

Seventy-three percent of bankers in our survey say they plan to increase use of microservices in the next year, and 82 percent agree that microservices are critical for scaling and integrating ecosystem partnerships. ING improved its software time to market from

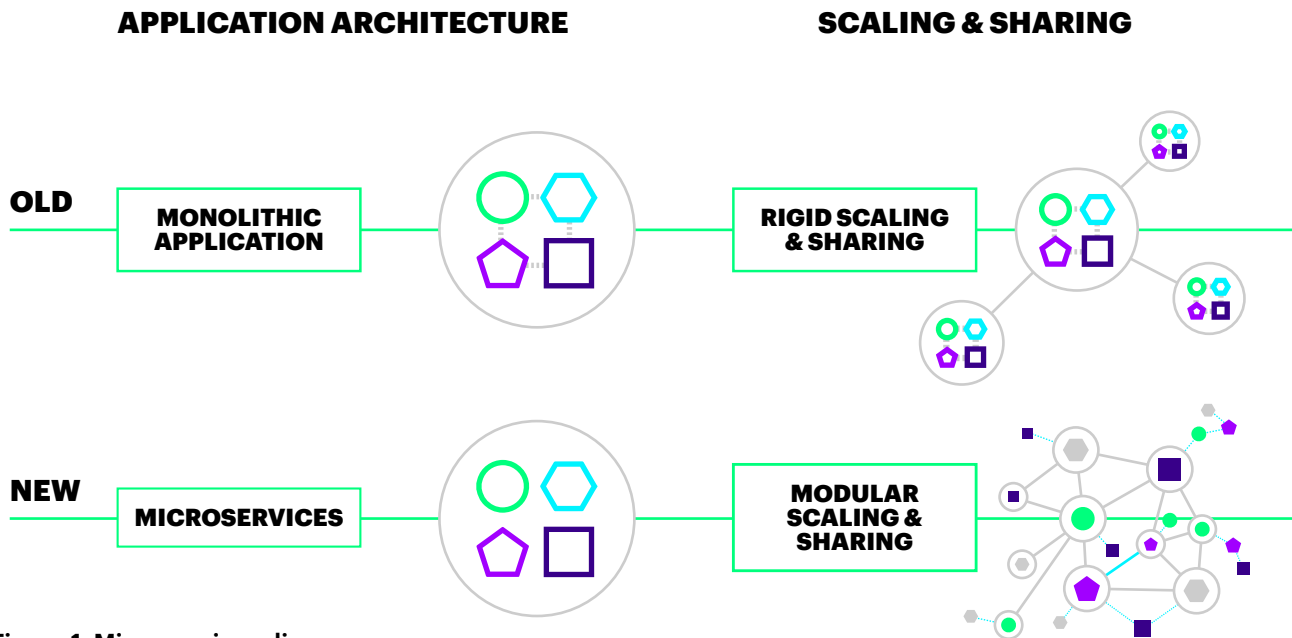


Figure 1. Microservices diagram.

13 weeks to less than one week with DevOps and continuous delivery practices, including microservices, APIs, CA Release Automation, and container-based solutions, to build a flexible, resilient, highly available, and continuous delivery pipeline with little-to-no downtime.²⁴ Some banks are thinking beyond cloud and microservices to product-based organizational structures modelled on those of internet giants—think Spotify with their now-famous squads, chapters, tribes, and guilds.²⁵

While most banks are not in an immediate position to convert their core systems to microservice-based alternatives, banking software vendors are beginning to recognize the benefits and convert their solutions to microservices. A notable example is iGTB which has re-architected its Contextual Banking Experience suite to comprise microservices and make extensive use of cloud-native PaaS technologies.²⁶

BLOCKCHAIN

Blockchain is one of the most talked-about topics in the financial services industry today. It is a distributed ledger technology (DLT) that stores groups of transactions (the “blocks”), and then links and sequences the list of transactions using cryptography. The real innovation with blockchain, though, is that no single organization owns the blockchain—it is distributed across a peer-to-peer network, with redundancies in the blocks and consensus mechanisms to ensure that no one can manipulate the transactions. Blockchains can either be public, like Bitcoin or Ethereum, or, as in many enterprise use cases, they may be developed privately or by consortia. With blockchain, every transaction is trackable, and relationships are established with the network of peers rather than one to one. DLTs provide a path to access irrefutable information in real time from any point in the network.

By their very nature, DLT-based systems currently make the most sense for retail banks when deployed at a market or industry level—for example, where they are used for property title registers, inter-bank clearing and settlement, or a central bank-issued official cryptocurrency. However, as these technologies mature, they may one day provide cost-effective replacements for legacy core banking systems.

Bankers are more likely than executives in most other industries to consider blockchain and smart contracts as critical for their organizations over the next three years, with 70 percent considering it critical or very critical (compared to 60 percent cross-industry). Already, to serve a world where its customers rely on 24/7 access to funds, the Central Bank of India is establishing a consortium of banks that will use blockchain as the vehicle for inter-

70%
of banks report that blockchain and smart contracts will be critical or very critical for their organizations over the next three years.

bank transactions. The initial pilot included firms responsible for 80 percent of financial transactions in the country. By having institutions share a distributed ledger, banks can maintain a more accurate and up-to-date record of transactions,²⁷ meaning faster access to funds for customers and faster processing for banks, which one study surmised may cut \$15 billion to \$20 billion in costs for banks by 2022.²⁸

The move to more of a plug-and-play architecture can be described as “digital decoupling” where banks retain legacy systems for books and records, but greatly reduce their dependency on them for anything other than recordkeeping purposes. The so-called “freeze and wrap” strategy retains existing core product systems, but minimizes development and investment while customer engagement and analytics systems are decoupled and powered by a cloud-based data layer that connects to the legacy systems as needed. The emergence of new cloud-based core banking-as-a-service providers, along with the power of blockchain, will beckon banks down a path where ultimately the legacy systems can be shuttered and decommissioned.

The future of banking—and responding to a customer when and where they need help—will include a framework for microservices and doing business via blockchain, else the relationships on which banks rely for growth will atrophy as service levels deteriorate in comparison to digital natives.

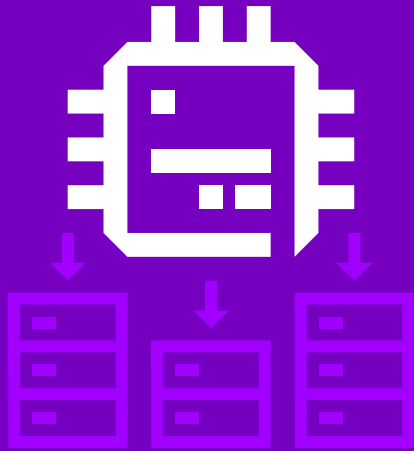
Trend 4 **Frictionless business**

Actions to take now to be future-ready.

Specify microservice architectures for all new in-house developed systems and favor third-party software that conforms to this pattern, as it will provide far more agility and flexibility in the long term than traditional applications.

For monolithic legacy systems, identify “fault lines” along which they can be split—chunk by chunk—into microservices, so that they can be migrated successfully to a cloud infrastructure.

Support industry- and government-backed blockchain initiatives that seek to reduce friction in processes, such as conveyancing or inter-bank settlement.



Trend 5

INTERNET OF THINKING

Put Smart Banking on the Edge of Consumer Interactions.

Imagine avid shopper Jason, who happily agreed to receive relevant merchant retail offers from his bank based on his expressed preferences, including previous transaction history and location. A summary of his preferences has been shared, per his consent, with his mobile network operator. When Jason passes close to a participating store, a promotion is pushed to his registered mobile device by the network operator for instant in-store redemption. Jason visits the store, finds the perfect trench coat, and pays on his way out with a tap of his smartwatch.

For banks, delivering intelligence like this means managing the complexity of unpredictable, external, and physical-world interactions. It means extending their current enterprise infrastructures and drawing on an expanded network of devices and updated methodologies to reach into the dynamic physical environments they want to serve. Sufficient computing power must show up where intelligent environments need it, backed by a renewed focus on hardware, at a time when many banks have grown accustomed to software-driven solutions as their go-to strategies. Businesses must shift event-driven analysis and decision processing closer to points of interaction, and data generation closer to the edge of networks. Without doing so, banks won't be able to produce the sophisticated, intelligent experiences in robotics, immersive reality, artificial intelligence, or the Internet of Things on which their next generation of strategies is built.

Banks that aim to win in the digital economy will need to master how best to apply extended reality technologies in creating new, winning business models. It requires a strong application programming interfaces (API) strategy to deliver relevant data in real-time to the various service layers that connect ecosystem players. And, design thinking would need to include experiences for both authenticated (or "logged-in") customers and unauthenticated users. Without such integration, a bank will find it hard to compete.

Banks are taking note. Our Technology Vision 2018 survey indicates that 88 percent of bankers agree that generating real-time insights from the volumes of data expected in the future will require computing at the edge, where data are generated. Eighty-four percent agree that edge architecture will speed the maturity of many technologies.

We see this happening in the AI-driven digital, voice-enabled personal assistant space. Today's leading digital agents—Siri® (Apple®), Alexa Echo (Amazon), Cortana® (Microsoft®), Google Home (Google)—continue to expand and connect across multiple hard devices, including speakers, smartphones, wearables, and smart home robots. The allure for consumers is a natural language interface that is highly intuitive and user friendly.

The tech giants behind these digital agents are distributing natural language processing to the edge of the network where users issue voice commands to help in everyday living—everything from making simple weather inquiries and sending a text message to checking their calendars and turning off the lights in their home. On the devices themselves, sophisticated processing takes place. For example, a beam-forming microphone array allows Alexa to learn and distinguish up to 10 unique human voices, enabling an agent to personalize experiences upon hearing a recognized voice.²⁹ We are also now seeing integration across digital agents. Amazon and Microsoft, for example, are collaborating to help Alexa and Cortana talk to each other.³⁰

Such integration across multiple devices is likely to ignite digital voice-enabled banking, showing up where consumers interact in their daily lives. Similar to mobile, the use case is compelling. With consumer consent, banks could use an AI-based, digital voice-enabled device to execute simple and semi-complex processes, like balance checking, deposits, payments, and loan processing—instantly and on a 24/7 basis.

Loan origination value extracted at the edge

The Accenture Mortgage Cloud is an example of how banks are extracting value fast and efficiently at the edge of networks. It applies digital data capture techniques combined with AI-powered processing—such as anti-impersonation, document imaging, and classification of financial transactions—to obtain borrower truth at the point of data entry in the digital front office. Doing so improves data quality and reduces data-driven exceptions that would otherwise require manual handling in the back office.

Some banks are already tapping this approach to get to the edge. U.S. Bank allows its customers to conduct simple, everyday banking tasks (account balance, transaction history, payment due dates, and payments) for their checking, savings, or credit card accounts with help from Alexa.³¹ Capital One, American Express®, Garanti Bank, USAA®, Santander, National Australia Bank, and others are doing likewise. Barclays lets mobile banking customers make a payment by asking Siri³² and Starling Bank in the UK is integrating its API with the Google Home device.³³

Banks looking to lead in intelligent responses to customers can take advantage of digital assistant devices as an application platform for their services to be at the edge of consumer interaction.

Trend 5 **Internet of Thinking**

Actions to take now to be future-ready.

Consider collaborating with cellular network operators to deliver location-based services and avoid becoming a bottleneck for processing geofence events.

Explore the potential for distributing more functionality to card schemes and processors in ways that improve fraud detection and enable distributed delivery of value-added location-based services.

CONCLUSION

Each of these technology trends has the potential to generate the next wave of industry disruption in the banking industry either coming from outside the industry or allowing incumbents to differentiate themselves. Even in markets that currently look stable and profitable, bankers must be prepared to deal with the threats and opportunities arising from these trends to ensure that they are truly future-ready.

Accenture has the experience and capabilities to help banks understand and navigate these changes, and we would be delighted to discuss them with you in more detail.

CONTACT US

Alan McIntyre

Senior Managing Director,
Accenture Global Banking
a.mcintyre@accenture.com
@AlanMcIntyre13

Cécile André Leruste

Managing Director,
Accenture Banking, Europe
cecile.andre.laruste@accenture.com
@CAndreLeruste

Fergus Gordon

Managing Director,
Accenture Banking, AAPAC
fergus.gordon@accenture.com

Daniel Laniado

Managing Director,
Accenture Banking, LATAM
daniel.laniado@accenture.com

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AUTHORS

Alan McIntyre

Senior Managing Director,
Accenture Global Banking
a.mcintyre@accenture.com
@AlanMcIntyre13

Schira Lillis

Thought Leadership Principal Director
Accenture Research
schira.lillis@accenture.com
@SchiraLillis

Kelley Conway

Managing Director–Technology Consulting,
Accenture Financial Services
kelley.conway@accenture.com

Peter McElwaine-Johnn

Principal Director, Accenture Strategy
p.mcelwaine-johnn@accenture.com

Peter Sidebottom

Managing Director–Business Strategy,
Accenture Financial Services
peter.sidebottom@accenture.com
@PeterSidesTake

SURVEY POPULATION AND METHODOLOGY

For the fourth year, we conducted a global survey of thousands of business and IT executives to understand their perspectives on the impact of technology on their organizations, and to identify their priority technology investments over the next few years. Nearly 800 banking executives from 25 countries responded to the survey, which was fielded from November 2017 through January 2018.

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