How Digital 2.0 Is Driving Banking’s Next Wave of Change

By holistically harnessing the rich capabilities of AI, blockchain, IoT, RPA and open banking, financial institutions can build a more resilient, customer-focused bank of the future that incorporates the virtues of nonbanking rivals.
EXECUTIVE SUMMARY

In the last few years, a wave of digital technologies changed the banking landscape as we know it. Social and mobile altered the way banks engage with customers. Analytics enabled hyper-personalized offerings by making sense of large datasets. Cloud technologies shifted the computing paradigm from a Cap-Ex-oriented model to a more flexible Op-Ex model, enabling delivery of multiple business processes as services from third-party platforms.

Now, a second wave of disruption, or Digital 2.0, is set to drive even more profound change. This time, the influential technologies include robotic process automation (RPA), artificial intelligence (AI), Internet of Things (IOT) instrumentation, blockchain distributed ledger and shared infrastructure, and open banking platforms controlled by application programming interfaces (API). These are the forces that will power the banking industry and reshape how financial institutions evolve and operate for the foreseeable future.

While these Digital 2.0 components come of age, financial institutions (FIs) remain in a value-discovery phase, conducting multiple trials and experiments, some of which are generating value across the financial services value chain. Global assets under management by AI-driven robo-advisory, for example, will total USD$8 trillion by 2020,1 according to some estimates, and in 2016, blockchain start-ups reaped USD$500 million in investments.2

As these technologies become commercialized, and demand increases for digitally-enabled services, we expect the banking industry to see unprecedented disruption, particularly as nontraditional banks and fintechs rush into all segments of the banking space. The resulting “bank of the future” will be characterized by the following traits and roles:

- **Orchestrator of personalized customer journeys.** FIs will need to create expansive solutions and a rich, curated customer experience across touchpoints.

- **Smart aggregator of capabilities across the banking ecosystem.** FIs will need to channel capabilities available in the evolving banking ecosystem rather than building offerings from the ground up.

- **Provider of platform-based products/services.** FIs will use platforms to serve entire business lines, hastening the development process and facilitating improved operational agility and speed of deployment and integration.
• **Lean operator supported by front-office to back-office digitization.** FIs will need to optimize expenditures in conventional business operations, while freeing budget and human resources to innovate by building smart products and services.

• **Intelligent processor of data to expand the business footprint.** FIs will create micro-segmented customer groups by combining big data with “thick data” (ethnographic/human behavioral data) to reveal customer intent and needs.

• **Agile service unit consuming on-demand offerings.** FIs will be pressured to decouple their dependency on “on-premise” systems and shift to software-as-a-service offerings on the cloud that boost agility, improve flexibility, reduce total cost of ownership (TCO) and accelerate provisioning.

Digital 2.0 has the potential to help FIs lead from the front. While each component of Digital 2.0 might create disruption on its own, the bank of the future will be realized by fusing multiple ideas; for example, the customer acquisition process could be transformed through a natural/human-like interface enabled by AI, combined with real-time KYC via blockchain and RPA for account provisioning. However, several practical challenges should be acknowledged:

• AI and RPA pose unique governance, trust and reputational challenges.

• The IoT has major implications for security and privacy, such as the potential for exposing sensitive personal information, device spamming, device hacking, etc.

• Blockchain promises to upend traditional banking models of trusted intermediaries but introduces scalability and performance issues, and requires greater collaboration with heretofore rivals to create economies of scale. Moreover, the introduction of a decentralized network threatens to undermine stable revenue models and will require a large investment in system integration services to connect legacy systems with shared infrastructure and distributed ledger ecosystems.

This whitepaper examines key considerations for banks as they explore value in the emerging Digital 2.0 world. It proposes alternative approaches for developing use cases that combine various Digital 2.0 concepts to maximize value creation. In addition, it presents our take on the Digital 2.0 operating model and the critical imperatives banks must transcend by focusing on smart collaboration, holistically connecting digital technologies, and embracing platform thinking.
THE NEXT WAVE OF DIGITAL TRANSFORMATION

The second half of the 20th century saw a wave of banking sector transformation, including a major conversion to electronic operations and the introduction of ATMs. Together, these led to an efficiency- and automation-driven model that made banking more transactional and technology-centric. Banks focused on faster and more convenient transactional services for their end consumers via ATMs, e-cards and telephonic services.

Social, mobile, analytics and cloud technologies (the SMAC stack) fueled a second wave of change that is just now taking shape. The role of technology has rapidly changed from a monolithic enabler of efficiency to an engine for personalized and ubiquitous provisioning of banking services for digitally connected customers.

We now see the emergence of another disruption, known as Digital 2.0, which will leave an altered banking landscape in its wake. Digital 2.0 (see Figure 1) has emerged from numerous human experience studies, new-age business constructs (such as decentralized currencies and alternative platforms) and technology research (such as virtual personal assistants). When fully assembled, the technologies of this era will drive a much deeper level of personalization through smarter use of data, and could disintermediate or significantly undercut the industry’s structure, forever changing the essential nature of banking and the customer journey.

We envision widespread adoption and commercialization of products and services based on Digital 2.0 thinking within the next few years, and are already seeing sustained experimentation and value discovery undertakings around Digital 2.0 constituent parts, such as blockchain, AI and IoT.

The Evolution of Banking

The pace of financial services innovation has accelerated from leisurely to turbo-charged.

Figure 1
LIMITLESS POTENTIAL, WORK IN PROGRESS

Multiple trials of Digital 2.0 technology initiatives are taking place across the banking and financial services industry (see Figure 2). While leaders have shown keen interest in Digital 2.0 research and small-scale incubation, several organizations have dedicated funding to develop business use cases powered by Digital 2.0 thinking and technology; some are experimenting with them in real-life customer situations.

Value Discovery in Digital 2.0

- A North American bank has partnered with a cloud-based accounting provider to provide end-to-end reconciliation and cashflow services.
- A regional U.S. bank has partnered with a leading fintech to offer core banking services.
- A large U.S. bank uses AI chatbots to improve customer self-service and provide value-added customer services.
- A leading credit card network is using machine learning for real-time fraud analysis.
- A major credit card network is using geolocation (mobile data) and other sensors (biometric) in credit/debit card transactions to enhance transaction security.
- A leading global bank uses beacons for enhanced branch services.
- A large European bank is using RPA for data extraction.
- A large U.S. financial services provider is automating customer notifications (e.g., collections) through RPA.
- A leading global bank uses blockchain for secure document transfer.

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QUICK TAKE

Optimizing Customer Service with Natural Language Processing

We worked with a leading financial services company that wanted to optimize its call center operations to improve customer satisfaction and reduce operational expenses.

The first step involved improving speech transcription capabilities. We further used natural language processing technology to classify call types, structure data and develop sentiment measures. Predictive analytics allowed the bank to anticipate future customer behavior based on the call center interaction and develop strategies to improve customer outcomes.

Our approach met the organization’s goals of rapidly streamlining call center operations and helped improve customer satisfaction scores by up to 20%. Predictive analytics also reduced call center volumes, resulting in operational cost savings.
ENVISIONING THE BANK OF THE FUTURE

As illustrated in Figure 3, the bank of the future will be buffeted by significant disruption across the banking value chain. These forces of change will dramatically impact the financial ecosystem. The emergence of fintechs and related technology companies will accelerate the commoditization of many transactional services, while AI-driven analytics will drive the emergence of highly targeted and personalized products and experiences.

Structural changes such as open-banking regulations will force FIs to compete for customers with new entrants and nontraditional banks. Cost pressure will be a major driver for change within the middle and back office, and agility and responsiveness will enable the adoption of service-based architectures.

We expect big data to converge with thick data (i.e., behavioral inputs) to enable banks to derive deeper insights. There will also be a significant shift in customer expectations, influenced by experiences in other consumer-facing, Internet-empowered businesses, and as ever-increasing numbers of millennials join the bankable population.

The bank of the future will essentially operate in the following ways:

**Orchestrator of Personalized Customer Journeys**

As customer expectations of the banking relationship evolve, and physical world data is merged with digital data, banks will need to extend customer relationships into areas outside the traditional banking domain, such as health, security and purchasing decisions. They will also be able to anticipate customer

**Constructs of the Bank of the Future**

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*FANG stands for Facebook, Amazon, Netflix, Google.*
needs, whether it is medical insurance or inventory credit, in order to meet or exceed customer relationship expectations. For example, banks can use IoT data and devices, as well as AI interfaces on mobile applications, to extend their footprint in mortgage lending to outside the branch premises and provide value-added services to consumers (see Figure 4).

Customer Journey Orchestration: Home Purchase

Bob asks his bank’s AI personal assistant to help him determine whether his financial standing is sufficient for purchasing a home. Using information on Bob’s income, expenses and savings, as well as his smart car data for his work location and house pricing trends, the AI assistant determines that a purchase is feasible. The smart assistant begins compiling real estate listings, with Bob’s input, along with useful data points, like Bob’s expected commute time, the distance to his favorite ball park, and a forecast of his post-purchase finances.

Using advice from the smart assistant on recent sale prices, Bob makes an offer. The AI assistant ensures that all the loan documents are in order and puts Bob in touch with a lawyer. The seller accepts the offer, and the AI assistant sets up a funds transfer.

The AI assistant helps Bob choose a loan, parses the loan contract and sets Bob up with an inspector and valuation agent. The AI assistant also checks on the property title on a blockchain title database and sets up a smart contract. Soon after, Bob is the owner of a new home.

As Figure 4 reveals, the bank of the future orchestrates the customer journey using AI algorithms, IoT data and open banking tools to provide advice to the customer throughout the home buying journey.
Smart Aggregator of Capabilities Across the Banking Ecosystem

As barriers to entry fall, and innovative new capabilities proliferate, the bank of the future must provide holistic offerings to serve large customer bases with multiple niche requirements. A key value differentiator will be the effectiveness of the bank’s aggregation capabilities across the ecosystem. For example, banks will be able to broaden their small and medium-size enterprise (SME) customer base and financing options by incorporating capabilities provided by fintechs and other industry-focused funds (see Figure 5).

How Niche Finance Capabilities Broaden SME Service Options

Jane runs a small fabrication business that makes specialized widgets for the defense industry. She requests a bank loan so she can expand capacity in order to be eligible for a new government program. The bank distributes the request on its lending platform that connects fintechs and other banks via secure APIs. A fintech specializing in lending to government contractors agrees to fund the loan, and the bank sets up a smart contract via its platform to automatically manage the loan terms.

Figure 5

As Figure 5 shows, the bank of the future will be able to aggregate capabilities from specialists using open APIs and service loans through smart contracts to automate administration.
A Provider of Platform-Based Offerings and a Lean Operator Supported by Front- to Back-Office Digitization

For several reasons, the bank of the future will be platform-based: the rapid pace of innovation, the need for agility in delivering banking services, and soaring demand for integrated services, including customers, service providers and individual developer communities. Platforms will be used to serve entire business lines, hastening the development process and facilitating improved operational agility and speed of deployment and integration.

Cost pressures will also lead to leaner operations in middle- and back-office functions. Banks will optimize expenditures on routine operations through process automation and digitization to free up budget and resources to focus on innovation and service quality.

For example, banks will be able to transform customer on-boarding through a fully digitized platform that processes new accounts using blockchain, AI and RPA to provide real-time setup for new accounts (see Figure 6).

Real-time Account Opening Using a Digital Platform

A potential customer visits the bank’s website or downloads an app to open a bank account. A virtual assistant guides her through the application process, following a simple, step-by-step approach that only requires a photo of the customer’s ID and her e-signature. With the help of image processing, an AI tool extracts the information from her ID and presents it for verification. After the customer verifies the information, a KYC request goes out on a shared KYC blockchain database. In the meantime, RPA services provision the account and send print orders for her cards and checks, completing the onboarding process.

Figure 6

As Figure 6 explains, the bank of the future will provide a real-time, fully digitized retail banking platform that handles customer acquisition using a real-time process that is delivered via an AI tool, RPA-enabled back- and middle-office functions and blockchain KYC.
An Intelligent Processor of Data to Expand the Business Footprint

Banks will be able to create micro-segmented customer groups, using the combination of big data and relevant thick data (i.e., ethnographic/human behavioral insights) to understand customer intent and needs. Doing so will result in enhanced conversion rates, personalized solution design, real-time decision enablement, and proactive fraud control.

For example, banks will be able to use location and other IoT-generated data to authenticate payments. Combined with ML-based transaction behavior tracking, they will be able to simultaneously reduce fraud and denials for legitimate transactions (see Figure 7).

Intelligent Transaction Authorization

A customer makes a card payment that is flagged as unusual by a real-time fraud detection system (based on her previous transactions). The system checks the location of the customer’s other connected devices, such as her car, mobile phone and wearables, to ensure she is actually at or near the PoS from which the transaction was initiated. A connected camera verifies the customer using facial recognition, and the transaction is approved.

As Figure 7 illustrates, banks of the future will use data gathered from IoT devices for intelligent decision making using machine learning and related AI algorithms.

An Agile Service Unit Consuming On-Demand Offerings

Due to the heightened pressure to decouple on-premise systems dependency, banks are seeking ways to run more agile IT operations that improve flexibility, reduce TCO and accelerate provisioning, while delivering almost everything as a service.

An example of this is the transformation of KYC/AML to a utility model that is co-owned by multiple banks. Using a shared database on a secure technology like blockchain, banks can create a model of a “customer-as-a-service,” where customer information can be verified for KYC/AML without compromising the privacy or identity of the customer (see Figure 8, next page).
As Figure 8 depicts, the bank of the future will be able to create an as-a-service model for KYC by sharing relevant information on a shared blockchain database powered by open banking components that provide the protocols and standards of communication for data sharing between authorized nodes.

The nature of the aforementioned components (IoT, AI, blockchain and RPA with their open APIs) lend themselves to integration with each other in order to create complete solutions that impact the entire value chain.

AI, for example, is a natural partner for RPA. While RPA can be trained to perform repetitive tasks, AI in conjunction with RPA can provide a learning system that can deduce the rules without programming, and reduce the complexity of setting up process automation. Computer vision and NLP can also be used to make sense of handwritten documents and notes that sometimes create insurmountable problems with automation alone.

We recommend that financial institutions consider the synergies of Digital 2.0 when developing future use cases and addressing more complete solutions, as revealed by Figure 9, next page.
### Assessing Digital 2.0’s Key Components

<table>
<thead>
<tr>
<th>IoT</th>
<th>AI</th>
<th>Blockchain</th>
<th>RPA</th>
<th>Open Banking</th>
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| • IoT as a data source for AI, such as continuous monitoring & analysis of inventory data for trade finance.  
  • AI as device manager (e.g., AI managing ATMs as clusters). | • IoT as a trigger for RPA for procure-to-pay sub-processes such as replenishment orders for consumables. | • Secure, verify & share IoT data through private blockchain.  
  • Usage-based payments models (e.g., new leasing models) through blockchain and IoT.  
  • IoT-based “oracles” (outside data sources) to provide consensus for smart contracts based on real-world data (weather, insurance, trade settlement). | • RPA triggered via API instructions from open banking platforms and applications to provide straight-through processing of transactions. | • Open banking platforms with APIs as a means to provide IoT data to third-party developers. For example, smart car IoT data can be shared with insurance providers on a bank’s platform. |
| • IoT as a data source for AI, such as continuous monitoring & analysis of inventory data for trade finance.  
  • AI as device manager (e.g., AI managing ATMs as clusters). | • AI-led trading on blockchain marketplaces (commodities, shares, etc.).  
  • Blockchain as a secure data source for AI analysis and training. | • NLP and image recognition systems for RPA activities, such as data extraction and document validation. | • RPA triggered via API instructions from open banking platforms and applications to provide straight-through processing of transactions. | • Open banking platforms with APIs as a means to provide IoT data to third-party developers. For example, smart car IoT data can be shared with insurance providers on a bank’s platform. |
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Figure 9
CREATING THE BANK OF THE FUTURE

Digital 2.0 is changing the way banks operate, primarily by combining the power of individual components and designs that enhance the end-to-end customer experience. For most organizations, the transformation will typically follow a four-phase approach (see Figure 10):

1. Understand enterprise-level capabilities.
2. Identify a set of concepts that ensure the new approach is centered around cohesion of Digital 2.0 components rather than individual silos.
3. Package these concepts into a smart product.
4. Realize the product vision through a skilled group led by a product owner, supported by specialists and delivery teams.

Adherence to two foundational principles will ensure success: first, blending both outside-in needs and the bank’s internal capabilities to firm up Digital 2.0 concepts and product definitions; and second, forming a centralized incubation group that is razor-focused on rapidly developing concepts, fast prototyping and engaging customers fully in the build-out process. From conceptualization to design, product delivery and feature enhancements, the line of business needs to be actively involved in driving the Digital 2.0 vision.

Four-Phase Productization

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**Figure 10**
A human touch will still be highly relevant to customers, and a well-thought-out framework will be necessary to determine the right balance between human and machine intelligence.
LOOKING AHEAD

Digital 2.0 will impose secular changes on the banking ecosystem. As regulatory actions improve collaboration between financial institutions, we expect to see the development of markets and standardized revenue-sharing mechanisms within partner ecosystems. Lines will blur between various entities within the ecosystem; in fact, we expect the industry narrative will shift from banks vs. fintechs, to banks and fintechs, creating greater value for customers.

Efficiencies in the form of cost savings and more integrated and effective service offerings will increase customer satisfaction in what promises to be a more competitive future. In fact, the larger pie resulting from an improved financial services industry will drive the banking business model of the future.

Given this, digital acceleration will require a tighter focus on governance and a conscious reshaping of the human workforce and related skillsets. A human touch will still be highly relevant to customers, and a well-thought-out framework will be necessary to determine the right balance between human and machine intelligence. While not a new requirement, data security and privacy will continue to be a significant challenge as the quantum and value of data increases across the banking value chain.

We believe that the Digital 2.0 paradigm will be a continuum, revealed through a series of incremental innovations and nurtured through value discovery investments by progressive financial institutions. Success will continue to be driven by a clear leadership vision that steers a sustained commitment to platform thinking, a focus on the value chain and dedication to collaboration-driven innovation within and outside the industry.
FOOTNOTES


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