



Tomorrow's AI-Enabled Banking

How can Cognitive Technology
breathe new life into relationships
between Retail Banks and their
customers?

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Executive Summary

Retail banking is facing the deepest level of disruption in decades.

Shifting customer needs and a generation of millennials resistant to traditional banking methods are challenging established models. After years of incremental change banks need to plan for a fundamental rethink of operations in order to thrive in a rapidly digitized and data-driven world. Customers expect access to information and resources at all times.

Although consumer relationships in the retail banking space have never been particularly strong, a recent millennial survey revealed that all four of today's leading banks are amongst the ten least loved brands by millennial consumers.¹ To a certain extent, this may be connected to the financial crisis that began in 2007. Today's generation is dealing with a dearth of jobs and increasing student loans and personal debt, which has increased skepticism and has diminished trust between younger customers and retail banks. As a result, today's hyper-connected consumer associates personal finance with crowdfunding, virtual currencies and online payment apps — rather than paper checks, bank branches and ATMs.

Due to an increasing number of FinTech entrants and emerging startups, competition across all industries is fierce. Against this backdrop, customer loyalty and retention is paramount to success, making it critical for retail banks to reform their business models quickly.

The cost of winning customer loyalty is equally critical. McKinsey & Company indicates that the primary driver of industry return on equity (ROE) growth has been operational effectiveness (+1.69%, 2013-2014 change)², implying that those banks unable to adapt their cost structure in the face of decreasing margins are at risk of not creating economic value. The largest banks have announced aggressive cost cutting measures that promise to shave 20% of operations but they do so in such a hotly contested market that any sacrifice in quality of customer experience that their program causes will be heavily penalized by customers who have a fast growing wealth of alternatives. A further pressure on operational costs is the ability to absorb the demands of mounting compliance regulations. Together these competitive pressures represent a significant threat to the status quo. Studies have already revealed that within the five major retail banking businesses (consumer finance, mortgages, SME lending, retail

¹ Viacom Media Networks, March 2014, "The Millennial Disruption Index"

² McKinsey & Company, September 2015, "The Fight for the Customer: McKinsey Global Banking Annual Review 2015"

Banks that harness cognitive technology will gain the advantage of faster digitization and provide customers with cross-channel, targeted, on-time products and services.

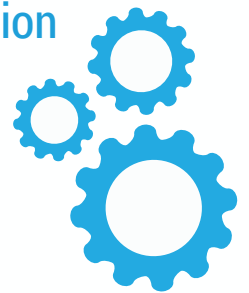
payments and wealth management), up to 40% of revenues, in addition to 20-60% of profits, will be at risk by 2025 – with consumer finance the most vulnerable line of business.³

After years of promise, artificial intelligence (AI) and cognitive computing have reached maturity and are now ready to implement. The McKinsey Global Institute estimates that the economic impact of the automation of knowledge work will reach USD 6.7 trillion annually by 2025.⁴ AI will provide a catalyst for operational change that has the potential to unleash unprecedented growth for legacy industries, like banking.

AI will make it possible to automate vast proportions of knowledge work, managing data at record speeds and capacities while harnessing the same information for invaluable insights. New cognitive-based solutions will also enable a more pro-active and personal customer experience at low cost. This is driven by AI's ability to build knowledge at high speed, understand natural language, and run operational processes in a fully compliant fashion.

Impact of the automation
of knowledge work

**\$6.7 trillion
by 2025**



With new capabilities that can optimize value rapidly, banks can both compete and team with FinTech entrants and other disruptors such as robo-advisors that have quickly gained mass appeal amongst customers of all demographics, regional markets and socioeconomic groups.

Banks that harness cognitive technology will gain the advantage of faster digitization and provide customers with cross-channel, targeted, on-time products and services. This report will examine current and future applications for cognitive technology in the retail banking sector and provide tangible insights into how executives can plan for this transformation.

³ McKinsey & Company, September 2015, "The Fight for the Customer: McKinsey Global Banking Annual Review 2015"

⁴ McKinsey & Company MGI, May 2013, "Disruptive Technologies: Advances that will transform life, business, and the global economy"



Winning Customer Loyalty in the Age of Agile Startups

AI will only be impactful if customers are willing to engage with it and that means understanding how this technology can best be leveraged to meet changing customer preferences.

The advent of the internet has created the most educated generation of financial services customers in history. These "millennial" customers have access to constant comparison information and visibility of alternative financial solutions which have seized considerable market share from more traditional financial institutions. Winning the trust and loyalty of millennials, however, is becoming more and more difficult, as increased competition has made it harder for retail banks to differentiate based on pricing or offerings alone. Indeed, customers around the world have reported an increased likelihood to change service providers, with 52.7% of millennial customers likely to switch their banks by 2016.⁵

The most disruptive competitors for retail banks are not direct industry players, but a growing set of competitors that lie outside traditional banking models. A constant stream of FinTech start ups and solutions are shaking up the market, while simultaneously driving larger rifts between retail banks and their consumers. Analyzing

successful FinTech initiatives shows that the principal factors customers want are: (1) cross-platform, (2) straight-through response 24x7, (3) easy to use and (4) low cost. FinTech companies offer the same cross-platform experience for financial services as consumers expect from their favorite apps and online services. Accessible anywhere at any time is the starting point. Customers can open a bank account in minutes with Bank Simple or get immediate confirmation of a loan through Lending Club. Both these services offer the same simple straight-through process that consumers have come to expect through other services such as Facebook Messenger. The price point of FinTech offerings is typically lower than that of traditional banks too. While each individual start-up might not appear to pose a major threat to banks, when they are acquired by large global players and assimilated into a broader services their influence can change overnight. Take for example Future Advisor, a robo-advisor that suddenly achieved global reach and resources when it became part of BlackRock.

⁵ Capgemini, April 2015, "World Retail Banking Report 2015"

Another source of competitive threat is coming from large global enterprises, such as online retailers, that fully integrate important banking processes within their own broader business experience. They minimize the banking activity to an administrative necessity and because these companies fall outside of bank regulations, they are able to operate at much lower costs than traditional banks, and so offer lower prices for customers.

Large global B2B and B2C platforms like Alibaba and Amazon offer lending products as part of a buying experience. These organizations are able to underwrite these loans themselves and are looking for banking balances to finance these loans. Even retail giants, such as Walmart, are now offering checking account products.

Established technology giants (such as Apple, Amazon and Facebook), as well as FinTech startups, offer new services that will likely increase the size of the payments market especially as cash usage declines and cross-selling opportunities arise from better use of data.

Where do banks still have an advantage? Regulations, as already noted above, may not even out the playing

field as new players prove so adept at circumnavigating them. The second source of advantage one might consider is capital. Banks have the capital necessary for lending at scale but again FinTech players are catching up with the banks. They can benefit from investments by pension and hedge funds, for example, that are looking for capital gains yielding more than the low interest rates currently available.

The third area of advantage for the established banks is trust, traditionally a prime characteristic for banks. Unfortunately, this advantage is slipping away as consumer confidence grows stronger for non-bank financial services providers. A recent global study found that 83.4% of bank executives believe their customers are comfortable with conducting their banking through internet and technology companies, but only 64.8% of executives believe their customers are comfortable banking at traditional banks.⁶ In 2014, an astounding 73% of millennials stated they would rather handle their financial services needs with Google, Amazon, Apple, PayPal or Square than with their own nationwide bank.⁷

⁶ Capgemini, April 2015, "World Retail Banking Report 2015"

⁷ Viacom Media Networks, March 2014, "The Millennial Disruption Index"



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Tomorrow's AI enabled banking

Artificial Intelligence technologies will not have an isolated impact on banking operations.

Technology is changing the fundamental processes carried out in every part of the structure and how they link together (see diagram opposite). In tandem, the roles of bank staff will evolve from executing operations directly to managing the AI systems that execute work.

In order to take a closer look at the impact on processes, we can segment a bank's operations into its five core functions. These are (1) front-office including branches, call centers, mobile channels; (2) back-office functions such as data entry and processing; (3) the financial backbone functions such as Asset Liability Management [ALM]; (4) the analytics functions that focus on risk and opportunity management; (5) and the policy setting functions such as those managing regulations, specific products and so on.

The analytics function is often talked about as a new banking function. In truth, however, it is one of the oldest functions. Credit risk management, fraud detection, market projections are all traditional, analytics driven banking roles. In practice, however, this area is moving fast from being seen as an art to a science. AI makes it possible to use advanced analysis techniques, such as machine learning and apply it to huge amounts of data in a way that was not previously possible. For instance, solutions like Watson or Sentient Technologies can analyze huge amounts of structured and unstructured data to deliver recommendations to advisors or traders. These solutions will enable banks to make important decisions in real-time. For example, they will support instant credit decisions or cross-sell suggestions. Smaller start-ups like Narrative Science enable banks to turn complex analytics into simple stories people can understand and act on. In addition, machine learning tools like R are boosting the effectiveness of marketing related analytics by enabling strategies on 'next product to buy', churn prevention and micro-pricing.

In the front-office, cognitive agents will automate an increasing amount of customer contact. Powered with in-

telligence provided by other systems, these agents will provide a far richer and efficient experience. With customer patience becoming ever shorter, always available service will become a necessity in order to maintain customer loyalty. In the US alone research shows that more than half of consumers will hang up after waiting on hold for 6-15 minutes while 25% will cut out of the call within the first 5 minutes of waiting.⁸

Moreover, cognitive agents will make it easier for customers to access their bank as they are "always-on" and will never deviate from best practice compliance regulations or have a "bad day." Cognitive agents integrated in mobile apps and websites, are beating the convenience of the current generation of apps and websites. Kasisto and IPsoft's Amelia play in this field. For example, a customer who has just lost his debit card can immediately start a chat with the cognitive agent to explain succinctly what has happened and have the issue resolved without delay. By contrast, existing apps would oblige the customer to search and select the right menu option and follow a much slower and rigid process. Because the cognitive agent can answer questions in the same way as a human, the process is much more efficient for the customer.

In the back office, robotic process automation (RPA) is already being used to populate data entry and increasing processing speeds for all elements containing structured data. Together with other technologies and policies, this will lead to a radical slimming down of back-office organizations within the next five years. Complexity reduction is being driven by new regulations at the same time as cost reduction is being enabled by increasingly capable automation tools. Business Process Management platforms like Pega can automate processes up to micro-session level whereas banking platforms like BaNCS, by TCS are becoming full straight through processing (STP) platforms as well. The business cases for automation are becoming better, even for legacy products.

The AI-Enabled Bank

Front Office

Cognitive agents
as a channel

*Full service cognitive
customer agents*

Agent-assisted channels
(branches, call center)

*Cognitive-augmented
customer teams*

Self service channels
(web, mobile, ATM)

*Cognitive-enhanced
self service*

Analytics Support

Marketing

Operational Risk

Credit Risk

Market Risk

*Cognitive
enabled
advisory
bots*

Back Office

2nd line

Data entry

Processing

*Cognitive
agents*

*Process
automation
bots*

Policies

Expert desk

Regulations

Products

Processes

*Cognitive
agents*

*Expert
systems*

Enterprise Support Roles

Financial Backbone

Supply Chain

IT

Facilities Mgmt

HR

Hybrid digital/human workforces

The financial backbone is typically highly automated already. New platforms like SAP Hana make many of the financial processes close to real-time and are close to eliminating the last remaining manual steps in the processes. Automated algorithms will more and more be used in ALM.

More traditional policy setting functions are also about to change. The impact of AI will be felt at the very start of the process affecting how policies are being set. Internal policies will soon be managed entirely through analytics. For instance, no factual changes noted in the systems will mean no policy changes can be made. As systems evolve further, however, they will be trained to suggest policy changes dynamically. Implementation of policies will sim-

ilarly move away from a multi-step process in which emails are sent to IT in order to be translated into technology language and replaced with smooth automated processes managed directly by the policy maker. From an IT operations perspective, the roles that will remain valuable in these back-office functions will be those that manage the AI and automation engines powering the processes. In parallel, some policies will be managed entirely by expert third parties that have created intelligent platforms to deal with highly specialized and complex processes, such as regulations. Fenergo, for instance, offers expert systems that will keep all your policies and processes compliant across borders.



Implications for the banking industry

So what is the result of tying all these developments together? It will be the emergence of a fully automated bank. Clients will be interacting in natural language with the bank's cognitive agents that are on stand-by 24/7 via their mobile. Real-time intelligence systems and automated back-offices will enable the cognitive agent to take educated decisions (e.g., on credit) and execute processes in a compliant way. The bank's financial backbone will be managed in a pro-active fashion as the underlying machines in the bank will exchange data and will accurately predict upcoming events. In case of a policy change or a new role, the rules embedded within the technologies will be quickly updated and all processes subsequently executed following the new standards.

In the sections above, we introduced four criteria for winning the hearts and minds of the customer, (1) cross-platform, (2) straight-through response 24x7, (3) easy to use and (4) low cost. As described, AI can play a crucial factor in each of these areas and make it possible for them to transform customer experience and perception. In summary, AI will strengthen banks' competitiveness.

1. AI will help banks unlock the value of the wealth of data they have in-house. Banks have an unprecedented historical perspective at both the macro and micro level that can be leveraged to generate value.

2. Banks can close the gap with the new online providers by offering real-time decisions. Most importantly, however, given their established customer base and exper-

tise they can offer fast access to financial services over a broader and more complex variety of products than a typical start-up could. The convenience factor will allow them to retain a large proportion of clients.

3. Automation will help banks to integrate specialist third party services from niche start-ups in a very flexible way. New tools will facilitate integration and cognitive agents will make it faster to train and activate a customer facing agent to sell these services to all clients.

4. By applying AI to most common processes, banks have the potential to reduce their cost base significantly – taking out an additional 30% to 50% to the current programs of aggressive cost cutting that have already been announced. Many of the reactive service elements can be automated at a fraction of the cost, removing a large part of the volume of incoming requests, doing data entry and manual risk controls.

The prerequisite to affecting this transformation is customer acceptance. Customer experience needs to be superior to today's norms. The decline in face-to-face interactions with tellers and bankers has resulted in weakening levels of brand affinity for banks. The only way for banks to realize the described impact is to put their customers at the heart of their plans and construct an AI revolution which delivers a superior service. Orienting AI simply to create efficiencies for their own financial benefit will lead them to miss key steps and put the overall change at risk.



This hybrid workforce that combines skilled employees and AI “cognitive agents” equates to a more agile workforce that rapidly address tasks and problems across all digital channels in real-time.

Seizing the competitive advantage

AI technologies have matured and are ready to implement now. They offer the biggest opportunity in decades to establish new operational models. Insights from analytics engines will identify gaps in current personal finance offerings, uncovering opportunities and advantages that can be seamlessly provided to customers ahead of non-bank competitors. Cognitive agents can capitalize on these insights and provide personalized, informative services at scale making it possible to provide innovative high-quality services at low-cost. This hybrid workforce that combines skilled employees and AI ‘cognitive agents’ equates to a more agile workforce that rapidly address tasks and problems across all digital channels in real-time.

While most large retail banks are currently evaluating how to restructure their workforce, few have taken a hard look at fundamentally adapting their operating model to cognitive. This is primarily due to management in the retail banking sector relying on traditional employee structures or systems to drive change. These following three recommendations for embracing AI within banks will help them accelerate change:

- **Make it a board priority.** Although true for all significant organizational changes, this is particularly the case for cognitive transformation, as it will lead to a huge power shift in the bank. In future, it will be the teams who design the systems and underlying rules that drive the bank. Traditional banking leaders working in operations and risk will manage exceptions and probably be steered by the AI machines.

- **Start building a cognitive center of excellence (CoE) now.** The organization defining the new ecosystems and underlying rules is crucial for the economic performance of the bank of the future. High quality resources in this space are rare. The resources in a bank need therefore to be fully centralized and have attractive career paths. The CoE also needs a robust mandate to ensure all mundane execution work and decisions are automated by intelligent systems, reducing the power and importance of many other managers in the bank.
- **Build the transformation plan around client’s needs above cost reduction opportunities.** Determine in which areas the customer is most helped and will adopt the new AI driven service model. Co-develop the new models with the bank’s clients in an agile fashion. Grow the model step-by-step. Avoid the big mis-steps that some banks have recently made regarding data usage and privacy.

By pairing the existing strengths of traditional retail banking with cognitive technology, banks can seize competitive advantage amongst a growing number of competitive non-bank forces. They have the opportunity to launch first-of-a-kind services at a speed and cost unmatched by today’s set of services. For instance, retail banks will have the capacity to provide free financial advisors to younger customers who may need guidance but would normally be unable to afford personal support with adherence to regulations. The speed and scalability of cognitive technology will release a constant stream of growth opportunities for banks that adopt these approaches into their strategy now.

Appendix

The impact of IPsoft's cognitive agent Amelia

According to Gartner, more than 40 financial services providers employ Virtual Customer Assistants, which differ significantly from interactive voice response units of the past.⁹

Amelia is a next generation virtual agent. This is why we call her a cognitive agent. So where can you find these cognitive elements and what is their value? We see five distinct elements that elevate Amelia from the rest of the market:

1. Amelia can have conversations in normal human language, really understanding your needs.

There is a big difference between answering a question in natural language and having a conversation in natural language. In a conversation with your neighbor for instance you would expect him to remember the things you told him earlier. To do this you need to do more than scripting and statistical analytics. You need to simulate and build semantic networks. Amelia does this live during her interactions and that makes her flexible enough to have real conversations that are personalized rather than rigidly scripted Q&A.

2. Amelia can manage a full request for you at the most efficient and consistent level possible.

How often do you get stuck in processes like requesting a new account or sending back items you ordered but did not like once they were delivered? In the past you would contact a call center and wait for 10 minutes or more before eventually getting through to a person who could help you. Now, you are forced to go online to submit a form, and in return receive an email or link that describes how you can still solve the problem yourself. Amelia can give bring the best of both worlds together. She offers a fast response, fast resolution and is available 24x7. She works at speeds unattainable by humans and is able to manage thousands of customer queries in parallel. In one pilot project, Amelia was able to manage 65% of the most common user queries in under four minutes instead of the average 18 minutes it took the existing staff. Importantly, for the banking industry, Amelia can execute all of the key customer related processes without ever deviating from the rules.



⁹ Gartner, 8 January 2016, "Where Banks Can Use Smart Machines"

3. Amelia learns extremely quickly and easily.

Amelia does not need extensive programming to learn. She learns from the codified and uncoded best practices in a bank. She can absorb knowledge from key documents as well as learn from previously recorded chat and call conversations. Just like existing agents, she connects to other systems in order to source information or to enter data. In one banking pilot, Amelia was able to learn the 150 most common questions asked by mortgage brokers. As you can imagine, these had a moderate level of complexity and many contained situational factors. For example, 'I have a self-employed person who wants to buy a house, how should I assess income?' Amelia learned how to answer approximately 90% of the questions correctly in less than 7 weeks. Amelia ensures reliable, high-quality responses as she follows deterministic principles. Amelia only answers when she is 100% sure she knows the answer. All others she escalates to a human colleague who has more expertise.

4. Amelia recognizes the emotions of her customers and can adapt accordingly.

Amelia measures the emotional state of her clients and responds sympathetically. In this way banks can be sure to offer a human-quality experience while making it clear that customers are dealing with a digital agent. Based on the customer's emotions, Amelia will adapt her language, facial expression, gestures and, if required, the process she is following. Not only can this contribute to a better customer experience but also improve cross-selling opportunities by taking into consideration when it is better to propose new services to customers.



Amelia offers a fast response, fast resolution and is available 24x7.

She works at speeds unattainable by humans and is able to manage thousands of customer queries in parallel.

	Sales	Support
Transactions	<ul style="list-style-type: none">• Credit Card Application• Debit Card issuance	<ul style="list-style-type: none">• Lost card / forgotten PIN code• Entry / booking reversal
Accounts	<ul style="list-style-type: none">• New customer onboarding (KYC)• Additional account opening (current, savings)	<ul style="list-style-type: none">• Change of limits/mandates• Change of customer address• Client update (KYC monitoring)
Lending	<ul style="list-style-type: none">• New secured loan origination• New unsecured loan origination	<ul style="list-style-type: none">• Change of repayment schedule• Change of fixed interest rate• Questions on payment conditions
Mortgages	<ul style="list-style-type: none">• New mortgage in principle• New mortgage origination	<ul style="list-style-type: none">• Change of repayment schedule• Additional principal repayments• Change of fixed interest rate
Investments	<ul style="list-style-type: none">• New brokerage account opening	<ul style="list-style-type: none">• Buy/sell transactions in portfolio• Value transfer from other broker

Fig 1: Amelia's applications to banking

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