BNY MELLON

Artificial Intelligence in Banking:

The Future Is Now

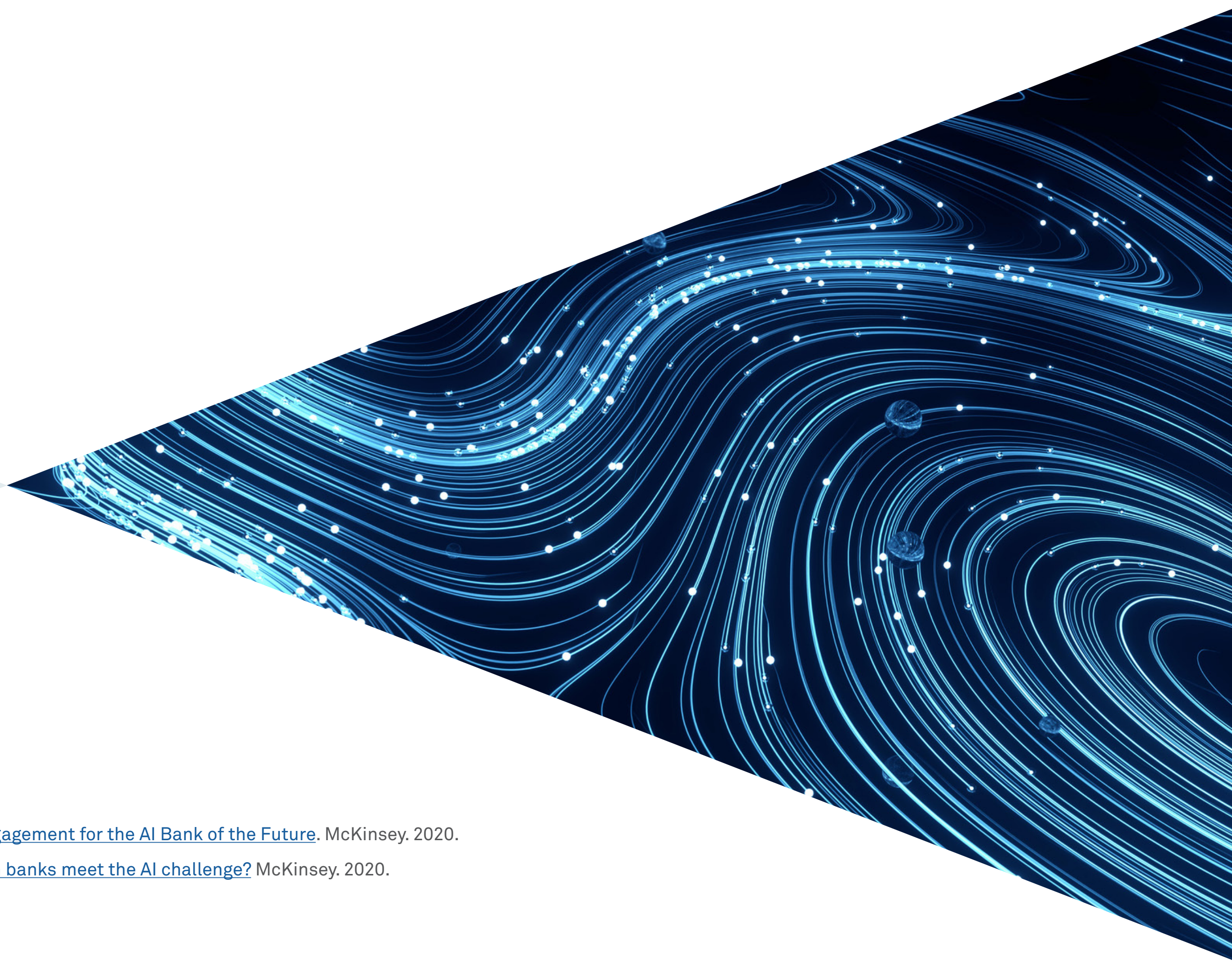
In collaboration with

Microsoft

Importance of AI in Banking + *Financial Services*

Delivering a positive client experience is the key to unlocking success across the global financial sector. To put it simply, banks perform well when their customers do. In fact, a recent McKinsey study found higher degrees of customer satisfaction drive higher assets under custody.[1]

As financial institutions continue to embrace the next generation of technology, they are looking to real-time and tailored services, transparency and speed of information as well as a high level of security. Artificial intelligence (AI) has applications across the spectrum of these functions and enables banks to deliver optimal experiences for their clients. In successfully unlocking these capabilities, McKinsey estimates that AI technologies could potentially deliver up to $1 trillion of additional value for banks each year.[2]



[1] Reimagining Customer Engagement for the AI Bank of the Future. McKinsey. 2020.

[2] 2AI-bank of the future: Can banks meet the AI challenge? McKinsey. 2020.

Identifying & Understanding the Rewards of AI

While the use of AI in the financial services industry is still in its early stages, the technology in combination with traditional data sources and has the potential to provide invaluable insights to inform and accelerate human decision-making and enterprise-wide growth.

Harnessing the power of AI, banks and financial institutions can:

CREATE AND LEVERAGE BETTER INTEGRATED DATASETS

Large global financial institutions have traditionally struggled to access and integrate data siloed across various teams and systems. As organizations migrate their data from "on-premise" locations into the cloud, technology managers are seeking data management platforms that can:

- Leverage machine learning to provide greater flexibility and agility across data types as volumes grow
- Deliver quicker ways to onboard new data to create actionable fit-for-purpose data models
- Provide data quality management capabilities to easily access information

AI has the ability to solve these challenges. For example, BNY Mellon's Data Vault, a data management platform exemplifying these principles, leverages machine learning (ML) across disparate datasets to identify trends and patterns in the data to unearth insights. The analysis provided can help client service teams better inform their clients about strategies that may enable better financial decisions. It can also be applied to internal processes, helping managers to operate more efficiently.

IMPROVE THE CUSTOMER EXPERIENCE

Financial institutions are eager to use AI's enhanced ability to provide more tailored customer experiences, transparency into transactions and 24/7 client support across the globe. Conversational agents and chatbots provide the opportunity to supplement support teams in order to enhance client service. These support services create a pathway to build stronger relationships, bolstering reputational outcomes, increasing referrals for new business and driving client retention.

INCREASE OPERATIONAL EFFICACY

Certain AI technologies such as robotic process automation (RPA) and low-code platforms allow teams to automate manual and repetitive tasks. This capability can reduce risk intrinsic in manual processes, creating greater efficiency and opportunities for employees to take on more sophisticated tasks.

ENHANCE RISK MANAGEMENT

AI-powered systems can use machine learning across various datasets to identify risk signals such as insolvency or fraud. Similarly, natural language processing (NLP) can perform sentiment analysis to help a bank identify customers who show signals of dissatisfaction that correlate to a risk of client churn. Accurately anticipating these risks can help client teams make better decisions when issuing loans or knowing with whom they should prioritize engagement.

IMPROVE DATA SECURITY

ABI Research estimates that the financial sector will spend $96 billion on AI and cybersecurity analytics by the end of 2021.[3] As data and cybersecurity become increasingly important, AI-based systems can provide signals that are an effective mechanism against malefactors. The programs analyze customer behavior, location and financial habits to trigger a security mechanism that will detect any unusual activity. The use of AI security systems could present additional ways to help keep client data even safer.

BOLSTER REGULATORY COMPLIANCE

AI provides the potential for financial institutions to navigate complex and changing regulatory guidelines with greater sophistication and efficiency by analyzing data and automating manual compliance processes. These capabilities present tremendous opportunities, as 51% of financial institutions currently report manually managing key regulatory protocols including "Know Your Customer" (KYC) and "Anti-Money Laundering" (AML).[4] Leveraging AI can help drive efficiencies around these processes, enabling banks and other financial institutions to perform faster and more in-depth screening of enterprises and conduct financial crime discovery and analytics to optimize workflows.

[3] Use of Artificial Intelligence in Banking World Today. Finextra. July 29, 2021

[4] Tranforming Anti-Monday Laundering and KYC Controls with AI: Part I. Infosys Consulting. January 15, 2020.

Applications of AI in Banking + *Financial Services Today*

As financial institutions continue to implement AI, the industry is seeing increasing opportunities to reshape and optimize business models to deliver sustainable returns. We spoke with Yu Yu, Director of Data Science at BNY Mellon, who leads AI/ML innovation, to understand these trends.

"BNY Mellon is actively adopting AI, such as machine learning and natural language processing across the bank," said Yu. "We see no shortage of opportunities of applying AI. Our challenge is finding applications which will provide the most impact and ensuring they are scalable across a very large and complex organization."

While there are hundreds of examples, we'll focus on a few common examples across institutions:

PREDICTING & FORECASTING BALANCES & PROCESSES FOR OPERATIONAL EFFICIENCIES

AI can forecast and predict potential outcomes in order to better manage money and processes. For example, it can make accurate forecasts for end-of-day balances instead of using historical benchmarks. These predictions, delivered 24 hours in advance, can provide teams lead time to take any market action to either deploy excess cash or add to reserves.

Similarly, AI can help predict settlement fails. BNY Mellon has developed patented machine-learning technology that is designed to predict when Treasury market trades will fail to settle so teams can respond accordingly to perform corrective actions. This helps to avoid disruptions and strengthen resiliency. Financial institutions can also use these capabilities to accurately anticipate the direction and magnitude of lending rate movements for securities to increase lending utilization, ultimately driving revenue for clients.

CHATBOT ADOPTION

Today, many clients still follow traditional processes, such as calling or emailing their bank representative for assistance or inquiries. However, client representatives have limited work hours and/or the client teams that are available may lack the language skills to effectively answer client questions on a global level. Already, institutions across the global financial sector have begun to diversify this technology. At BNY Mellon, we are currently utilizing Selina Bot. Additional organizations embracing similar technology include Bank of America's Erica and Hang Sang Bank's Haro.

Chatbots that use NLP can be easily used to supplement traditional forms of communication so that clients can get real-time information and enhanced support at each level of their customer journey. Chatbots are also well-suited to better manage internal processes and communication. Multiple teams within BNY Mellon have started adopting and enhancing bots with NLP, leveraging advanced entity detection with different platforms, including Microsoft Azure, and incorporating chatbots and AI-driven automation into sales and service on Dynamic 365.

MARKETING & MACHINE LEARNING

In response to clients' requests, BNY Mellon has explored automating the creation of sales and marketing materials. Leveraging a combination of BNY Mellon's Data Vault, and a collaboration with Assette, the solution uses machine learning to quickly review requirements, such as questions within a request for proposal (RFP), and identify related answers and slides based on those requirements. Information is pulled from Data Vault and then inserted into slides to form a customized and tailored PowerPoint presentation. These capabilities ultimately streamline and accelerate the process of responding to client requests and ensures clients are sourcing the most up-to-date data.

DETECTION OF UNUSUAL PATTERNS & ANOMALIES TO STRENGTHEN RISK CONTROL

Machine learning models can utilize intelligent trend detection capabilities to discover unusual patterns and flag anomalous client transactions in near real-time in order to strengthen risk controls. These capabilities can help provide the preemptive remediation needs to mitigate potential risks and circumvent costs associated with corrective action for clients and for the bank. For example, calculated NAV is compared against historical NAV movement ("guardrails") as well as NAV movements of "like funds" ("siblings"). Anomalies are flagged for further investigation and timely resolution. This solution can be expanded for similar controls in bond pricing.

AUTOMATING DOCUMENT PROCESSING

Financial institutions can automate the processing of incoming client instructions received in "unstructured" formats that vary from client to client. BNY Mellon is developing an Azure-based solution to extract and classify key data elements required for downstream processing (such as account number, amount, ABA number, etc.). These AI/ML processes will be designed to help improve processing time, reduce errors and improve client experience.

Evisort: A Case Study in *AI Application in Banking*

The Challenge

Originally, with each new custodial agreement, BNY Mellon tasked a team of lawyers to manually create a new contract based on approved, standardized agreement language and navigate a complex web of internal approvals and escalations. Contracts were sent by email through the approval process, with each lawyer individually reviewing prior changes, making new updates and emailing the updated contract to the next reviewer.

This legacy process repeated itself until the agreement was finalized but came with a potential for gaps in accountability, version control and progress tracking. As a contract was finally executed, multiple review and summary forms then had to be compiled about the details of the agreement. This created additional time to the process contracts to ensure all documentation and compliance was completed. This led to prolonged onboarding periods for the client, resulting in increased costs.

The Solution

BNY Mellon sought to automate the custodial agreement generation process to simplify stages of the review process with AI. We collaborated with Evisort, an AI company backed by Microsoft's M12, that leverages ML and NLP to streamline contract generation, review and management. Evisort customized its artificial intelligence tools to review new custodial agreements based on BNY Mellon's internal rules, guideline and processes.

Evisort then used its AI technology to automatically create customized initial contracts and digitally coordinate with the necessary internal stakeholders for approval of special terms.

Furthermore, Evisort's technology can automatically flag non-standard language and alert the necessary legal team members as well as automate the decision-making process, allowing attorneys to focus on more strategic tasks. For example, for all custody agreements, an attorney needs to fill out a detailed, multi-section worksheet to determine the most appropriate BNY Mellon legal entity to enter into a global custody or depositary agreement with a client. Evisort automates this decision-making process through a simple intake form.

The Benefit

In incorporating Evisort's capabilities, BNY Mellon can now create, tailor, update and track contracts in a fraction of the time. In automating manual tasks, BNY Mellon is able to shorten and help streamline the onboarding process and effectively drive a better client end-experience.

In leveraging AI, BNY Mellon will continue to improve contracting efficiency and established the timely and appropriate escalation of deviations from standard contract language. The datatization of agreements additionally enables the bank to develop an instant "best first draft" that is tailored to each client, decreasing the amount of back and forth necessary in contract negotiations.

Looking Ahead

Embracing the future of AI, BNY Mellon plans to leverage both NLP and ML to monitor risk exposure in contracts by using AI to identify nonstandard contract language, creating an alert system for ongoing obligations, unsigned contracts and/or upcoming renewal dates, as well as continuous monitoring of compliance as regulations change. In addition, AI will allow the bank to better understand common deviations and educate relationship managers on when those deviations are appropriate and best course of action for proper mitigation.

Challenges of AI Adoption in Banking and Financial Services

While the benefits are clear, banking and financial services also face unique challenges in adopting AI:

TECHNICAL DEBT AND INFRASTRUCTURE

As financial institutions look to incorporate AI within current systems, more mature organizations may struggle the most. While advanced operations signal more robust and well-embedded infrastructure and a depth of resources, it also means a potential “hangover” for legacy systems and technical debt.

When implementing AI into an organization’s processes, there are often new requirements of data, infrastructure and technology to build and scale new models. This is not only more expensive when replacing large legacy systems, but building and running AI applications can often be compute-intensive, resulting in potentially off-putting upfront costs. Moreover, the most advanced AI platforms come with high costs and benefits that have a longer gestation period, which may deter executives in traditional organizations where the time to see benefits might be longer than their average tenure of one to three years.

GOVERNANCE STRUCTURES & MITIGATION OF NEW RISKS & REGULATION

The implementation of new technology can often be at odds with the highly regulated financial services industry as teams work to meet required client and internal workflows. Risk and compliance teams may notably struggle to understand how to manage new potential vulnerabilities or create the appropriate internal regulations of Explainable AI (XAI) to manage them. Use cases of AI should be reviewed to ensure that the use of AI is applied to an ethical framework and deployed responsibly. Without the right governance, AI can be deployed with unintended consequences, such as denial of access to financial products or privacy breaches. This may result in a rejection of new AI technologies or slow down adoption in financial institutions that lack the governance structures to monitor AI effectively.[5]

BUY VS. BUILD

In the past, financial services companies have deployed custom built technology that can be challenging to maintain and, over time, builds up technical debt. Companies can break this pattern and accelerate deployment by leveraging higher level services such as Cognitive Services or Augmented Machine Learning. This frees up resources to focus on building great financial products and offerings for their customers—rather than custom developing every solution.

AI TALENT

A limited talent pool is one of the biggest roadblocks to the speedy deployment and implementation of AI. As an emerging field, a qualified and experienced workforce within the area of AI is limited. To combat this challenge, many firms are already focusing on strategically building internal teams to develop in-house AI capabilities and supplementing any talent shortages by bringing in external resources and/or buying or licensing capabilities from large technology firms. Firms in the financial services sector are more likely than average to say they're building in-house AI capabilities, which requires internal talent with the right skills.

LACK OF STEWARDSHIP & STRATEGY

In a constantly evolving technology space, senior executives may fail to fully embrace AI amid high costs for new infrastructure, monitoring and human capital. In the race for an organization's budget and senior leadership endorsement, AI may also find itself in competition with other necessary rising technologies such as blockchain or traditional operations. If the vision for AI becomes obscured for an organization's leaders, stewardship will faulter and it will become virtually impossible to implement a successful enterprise-wide strategy to effectively utilize these capabilities across a large global organization.[6]

[5] Why Most Organizations' Investments in AI Fall Flat. Harvard Business Review. October 22, 2020.

[6] AI Adoption Advances, but Foundational Barriers Remain. McKinsey. November 13, 2018.

AI in Financial Services in the Future

AI is poised to transform the global financial ecosystem. More than 80% of financial services providers believe that AI is important to the future of their organization and one-third believe the technology will increase company revenue by more than 20%.[7]

“Financial services institutions are leveraging AI to transform business processes, differentiate their customer experience and innovate new products,” said Luke Thomas, Head of Banking at Microsoft. “Microsoft Azure AI Cognitive Services and Azure Machine Learning are empowering financial services institutions to develop artificial intelligence solutions for complex processes—such as predicting securities pricing, automating client service requests and processing financial statements—all on the trusted, secure and compliant Azure platform. AI is, and willl continue to power the transformation and future of the financial services industry.”

As AI technology continues to gain momentum, organizations will do well to not only look to new capabilities, but to prepare current legacy infrastructures with dynamic fintech and technology partners.

This sentiment is underscored by Mark Casady, Founder and General Partner of Vestigo Ventures and a member of the BNY Mellon Accelerator Program’s Venture Capital Advisory Board.

“AI is the present and the future of financial services,” said Casady. “This is due to a combination of talented engineers coming out of great universities well trained in AI along with easily available data from incumbents and a desire to drive down costs among key players in financial services.”

“Incumbents in financial services should have their data warehouses and data lakes ready to be accessed. This is a critical step to getting the power of an AI technology that can harness that data to drive efficiency and a better outcome for customers.”

[7] AI is Enabling Digital Transformation Across the Financial Services Industry. Finextra. July 29, 2021.

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