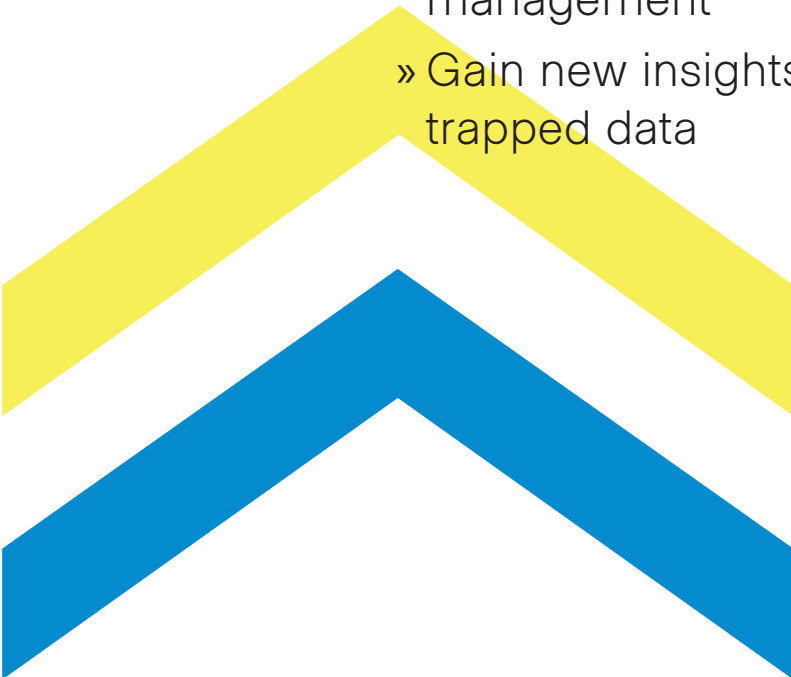


A Banker's
Official Guide To
**Artificial
Intelligence**

deluxe®

BENEFITS OF AI:

- » Transform your customer experience with faster, more relevant information
- » Inject efficiency into systems and processes
- » Improve fraud detection and risk management
- » Gain new insights from previously trapped data





A Banker's Official Guide To Artificial Intelligence

State Of AI In Banking: As AI Gap Widens, Mid-Sized Banks Must Act Now—Or Risk Falling Behind

Less than 20 percent of mid-sized FIs have plans for AI

Ask a banker about technology and innovation and more than likely, you'll hear a reference to artificial intelligence (AI). Whether it's the promise of algorithms, the complexity of big data or the dreaded rise of the machines, the buzz about AI makes the finance industry sound like Silicon Valley.

Unlike Silicon Valley, however, the challenge at most banks is turning that talk into action. The biggest risk—especially for mid-sized banks and credit unions—comes from standing still.

No one's arguing that smaller banks should compete dollar-for-dollar with their mega-sized counterparts. Rather, the gap sparks concern because of how AI works. The longer FIs wait, the harder it becomes to catch up. FIs that start early gain a head start of months—even years—to gather data and “train” their self-learning, intelligent applications. The longer AI operates, the smarter and more useful it becomes.

This guide is designed to bridge the gap, giving FIs the knowledge, resources and confidence to move forward. The potential rewards are substantial.

By 2030,

analysts estimate AI in the financial services industry could yield:

- » Up to \$1 trillion in productivity gains
- » Lower overall employment costs
- » A 34 percent increase in revenue
- » A 14 percent net gain in jobs⁴

At large banks

- » Over 70 percent have implemented AI for front- or back-office functions¹
- » The seven largest U.S. banks each have AI strategies, teams and projects in place²

At mid-sized banks

- » Just 2 percent have deployed chatbots, machine learning or other AI technologies³
- » Only 13 percent plan to invest in or implement these tools in 2019³
- » For nearly half, AI is “not even on the radar”³



The good news for FIs

is that making progress with AI does not require a Herculean effort. This guide contains recommendations for every step along the way.

Begin by:

- » **p5** Identifying your use-cases
- » **p12** Readyng your organization
- » **p13** Finding the right partners





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Use-Cases: Top Use-Cases For Artificial Intelligence In Banking

Analysts estimate a \$1 trillion AI opportunity for the industry

\$1 trillion. That's the magic number for AI in banking. Numerous analysts predict that in the next 10 to 15 years, an influx of AI-powered applications will create \$1 trillion in savings for the industry.⁵

That figure comprises front and back office opportunities—everything from more efficient data processing to automated customer service to shifts in staffing levels. No matter how you slice it, this adds up to a monumental opportunity.

AI investments fall into four categories

As the following use-cases demonstrate, there's no shortage of AI opportunities in banking. How your bank ultimately harnesses AI will depend on your strategy and resources (in-house data scientists or technology partners).

Top Use-Cases For AI In Banking

Risk management and compliance

- » Fraud detection
- » KYC and AML compliance
- » Credit and underwriting

Operational efficiency

- » Contract reviews
- » Reporting
- » Straight-through processing
- » Workflow automation

Customer experience

- » Account self-service
- » Chatbots
- » Virtual assistants
- » Biometrics and facial recognition

Revenue growth

- » Personalized offers
- » Upsell/cross-sell recommendations
- » Robo-advisors
- » Alerts for at-risk customers
- » Integrated receivables

Sizing up the \$1 trillion AI opportunity for banking

Companies that effectively utilize AI can realize:

» 22%
Reduction in operating expenses

» 34%
Increase in revenue

» 14%
Net gain in jobs⁵





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Use-Cases: Top Use-Cases For Artificial Intelligence In Banking

1. Risk management and compliance

This is the most mature category for FIs, garnering the bulk of early bank investments. Credit card processors, for example, have relied for years on sophisticated AI algorithms to scan millions of transactions and detect potentially fraudulent purchases.

Newer AI initiatives focus on smarter, faster detection of fraud and stronger decision-making.

Banks like HSBC are testing applications that automate Know Your Customer (KYC) and Anti-Money Laundering (AML) compliance. These tools can review and extract data from a variety of sources during onboarding or examine millions of transactions and quickly flag suspicious activity.




Analysts estimate FIs could save \$217 billion through risk, compliance and authentication projects.⁶

AI is also fueling credit and underwriting decisions. The FinTech company Upstart claims the first AI-driven lending platform. It uses non-traditional criteria, such as a borrower's education and job history, in its consumer credit decisions.

2. Customer experience

Numerous FIs are also piloting AI projects that strengthen engagement with retail and commercial customers. Recent improvements in natural language processing (NLP) and image recognition unleash a number of possibilities, from chatbots and virtual assistants for customer service to facial and biometric recognition that replaces password-based authentication.

Most projects in this category aim to reduce "friction points" when the customer interacts with the bank. With most, the goal is not to replace bankers or threaten human-to-human relationships. Instead, AI delivers greater customer insights to support stronger conversations. Automation also eliminates routine and redundant tasks so staff can refocus their efforts on more valuable activities.



With most, the goal is not to replace bankers or threaten human-to-human relationships.

For example, when an AI-powered interface helps customers reset their access codes or passwords automatically, it frees customer service staff for more complex interactions.

Many banks have already launched conversational interfaces; most are embedded in the bank's mobile app. Wells Fargo channels their chatbot through Facebook Messenger. Bank of America's Erica assistant recently passed one million users. Ally Bank, one of the early movers in this space, takes assistance a step further: Ally AssistSM works within their app, and the new Ally SkillSM lets users manage their accounts with voice commands through the Amazon Alexa virtual assistant.

Sophisticated AI interfaces can go well beyond apps and retail environments. In 2017, the Alberta Treasury Board debuted Pepper, a humanoid robot designed to interface with customers at the branch. Last year, J.P. Morgan launched a virtual assistant pilot to support its corporate treasury customers.






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AI In-Depth: AI For Customer Experience

Chatbots and virtual assistants are powering a revolution in customer experience. These conversational interfaces leverage AI to understand, learn and interact like a human. They hold great promise for FIs.

More than half of companies have already invested in some form of AI.⁷ Thanks to advances in natural language processing (NLP) and machine learning platforms, analysts predict that by 2020, you'll be more likely to have a conversation with a chatbot than with your spouse.⁸



Chatbots and virtual assistants poised to disrupt customer experience for FIs

Today: faster, more personalized service

Today's applications can reduce wait times, resolve repetitive inquiries and "converse" in a variety of languages. A well-designed interface can respond to inquiries instantly—around the clock—and provide the same experience across communication channels. Unlike humans, chatbots and virtual assistants easily remember customer preferences. They readily leverage sales and transaction history to recommend new services.

Already, chatbots and virtual assistants can address simple banking requests, such as:

- » What is the current balance of account XYZ?
- » Transfer \$300 from checking to Vendor B right now
- » Find a copy of my April 2019 statement
- » Where is the nearest ATM?
- » What is my credit card limit?

Tomorrow: A bold, voice-driven future

Tomorrow's technology shows even more potential, particularly for financial guidance and cross-sell opportunities. These next-generation tools will analyze large amounts of data, provide real-time insights and initiate action on their own—everything from recommending products to suggesting efficiencies.

Instead of pop-up notifications or banner ads on the customer portal, a chatbot might greet a customer by name and by voice, then initiate a conversation based on that individual's or company's transaction history.

For example: "Joe Treasury, I see you sent five international wires last week. Did you know other electronic payment options are available at lower cost?" The interface could complete simple upsells on its own or transfer warm leads to a banker for further discussion.

Organizations that implement AI for customer service or sales report:

Greater Customer Satisfaction

» 70%
less call/email inquiries

» 33%
savings compared to a call with a live agent

» 30%
higher sales conversion rates with prospects⁷





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AI in-depth: AI for customer experience

Large banks take charge; mid-sized FIs more cautious

US Bank, Wells Fargo, JP Morgan and other market leaders already have conversational applications in the market. While most target retail banking, the race is on to support commercial banking customers.

Last year, JP Morgan launched a pilot for a virtual assistant for treasury users. Instead of navigating its commercial banking portal with mouse and keyboard, B2B customers can direct certain cash management tasks like, balance inquiries, by voice.

Detractors worry about the technology's readiness, as well as its impact on banking jobs like tellers, customer service agents and loan processors. Chatbots and virtual assistants will automate many manual, redundant activities. However, AI also creates jobs, especially higher paying positions for programmers and data scientists.

In the end, it's customers who will decide the future of conversational interfaces, based on their willingness to interact with chatbots and virtual assistants. Done right, there's ample opportunity for AI to increase customer convenience—and free staff for stronger, more valuable engagements.

Among mid-sized and community FIs:

» 41%
have discussed chatbots

» 2%
have implemented a solution

» 30%
plan to invest in the technology in 2019⁹



Use-Cases: Top Use-Cases For Artificial Intelligence In Banking

3. Operational efficiency

Streamlining processes and automating workflows is a natural fit for AI. Banks now leverage robotic process automation (RPA) for everything from contract reviews to reporting. Next-generation applications take RPA to the next level—called intelligent automation (IA)—where these bots begin to train and improve themselves.

Efficiency programs take advantage of AI's core strength: handling unstructured data. Unstructured data typically holds great value but resides in a PDF, email or format that's difficult for a traditional system to access. For example, NACHA estimates that more than 60 percent of ACH payments arrive separately from remittance information. These "stranded" receivables force staff to track down email remittances and then manually enter data. It's busywork that delays posting, lengthens DSO and negatively impacts cash flow.

Analysts predict up to \$200 billion in savings for FIs through back office efficiencies.⁶

Sophisticated RPA capabilities automatically match incoming electronic and paper payments to open invoice remittance details from accounts receivables processing systems. Applying AI frees staff from tedious data entry and reduces errors. It surfaces new insights that were previously "trapped" in data. Analysts predict up to \$200 billion in savings for FIs through back office efficiencies.⁶

4. Revenue growth

Generating new revenue is one of the most exciting AI opportunities. With greater customer insights

It starts by using data to make customer relationships more personal.

and automation, banks can deepen customer relationships, provide more support to bankers and sales teams, execute stronger marketing efforts and even launch new products.

It starts by using data to make customer relationships more personal. Banks and credit card issuers, for example, are using AI to enhance their loyalty programs. Offers are based on each cardholder's behaviors, spending habits and even travel locations rather than generic points or rewards. In marketing, AI enables customer segmentation with far greater precision. Outcomes may be upsell/cross-sell recommendations or even financial guidance from "robo-advisors."

FIs can also harness AI to provide early warning when high-value customers are at risk, helping to stem attrition. These tools monitor numerous variables, from decreased usage of the bank portal to fluctuating transaction levels, and then alert the banker to take action.

Leveraging AI-powered products to enhance other in-demand solutions are the final opportunity for growth. For example, next-generation Integrated Receivables (IR) solutions now feature sophisticated algorithms and machine learning technologies to match customer invoices with electronic remittances. This technology solves a common issue for businesses that receive high volumes of ACH receivables.

When AI pairs with IR, banks can offer a compelling product that adds value to their relationships with corporate customers, demonstrates the bank's commitment to innovation and introduces an entirely new revenue stream.





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Ai In-Depth: Ai For Revenue Growth

Machine learning enhancements to solutions such as integrated receivables (IR) are already in the market. Their popularity clearly demonstrates the power of AI for product expansion.

It also shows the corporate market's growing comfort with AI as banks and businesses readily adopt the technology:

- Forty percent of businesses expect to implement an IR solution by 2021¹⁰
- Seventy percent of banks view integrated receivables as a high priority.¹⁰

AI capabilities power payment reassociation

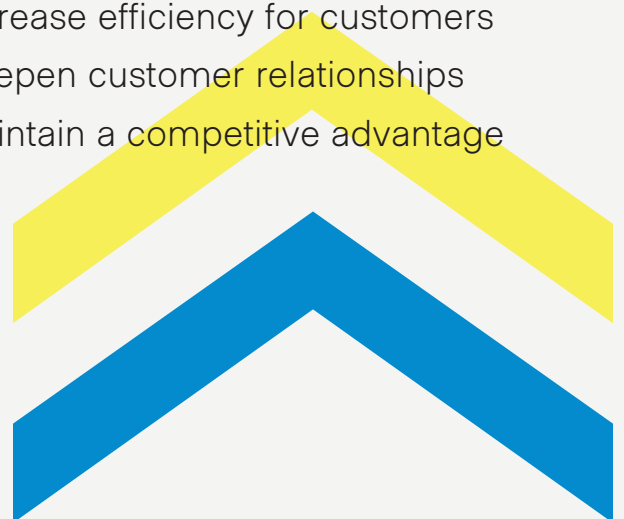
IR solves a common challenge for treasury customers: electronic receivables that lack corresponding remittance data. These payments create headaches for staff, delay posting and impede straight-through processing.

Sophisticated machine learning capabilities can make quick work of this challenge and deliver incredible value to corporate customers and their banks. AI has the structure, computing power and self-learning functionality necessary to analyze vast amounts of unstructured data then reassociate the payment with its remittance—all without human intervention.

Ready, set, match!
Artificial intelligence is changing the game for electronic receivables

Banks that harness AI's product development potential can:

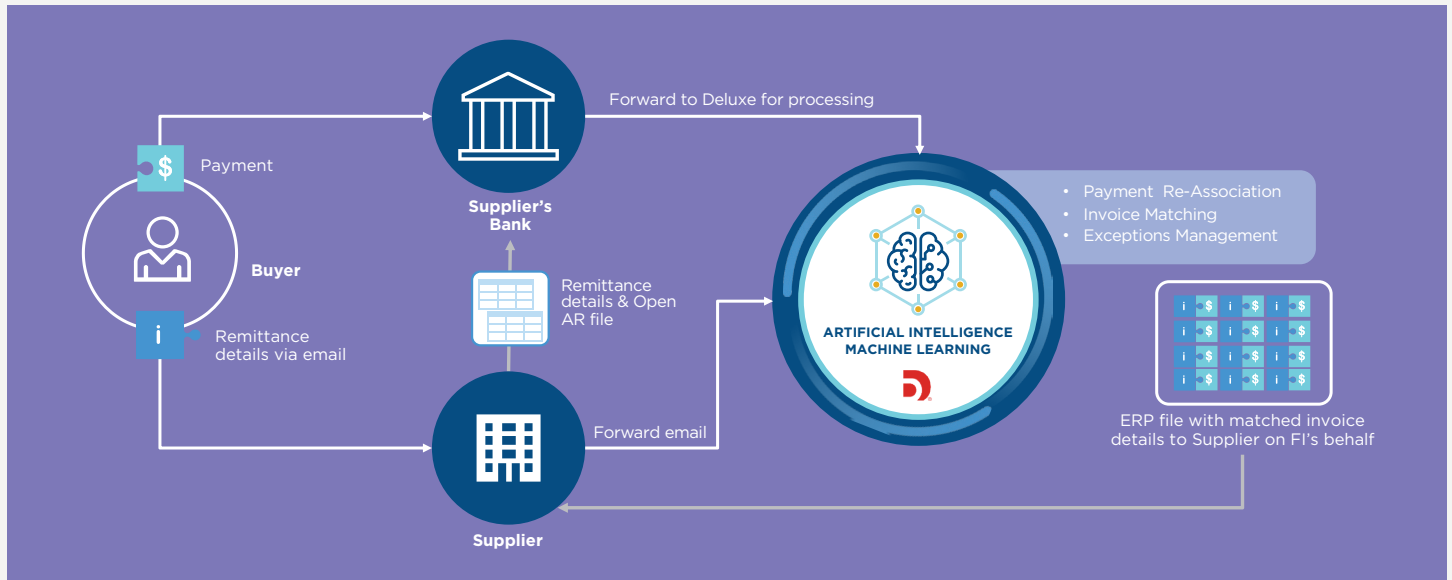
- » Add new revenue streams
- » Increase efficiency for customers
- » Deepen customer relationships
- » Maintain a competitive advantage





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AI In-Depth: AI For Revenue Growth



How it works

The AI layer of an IR solution follows a simple process:

- 1. Extract:** Machine learning algorithms scan and “read” thousands of remittance documents—like emails—and extract pertinent details, such as vendor name, payment amount, invoice number and date.
- 2. Match:** The AI solution compares this data with the treasury customer’s open file of invoices to create a three-way match: payment, remittance and open invoice.
- 3. Confirm:** The customer makes a one-time confirmation that each match is correct; after that, the IR tool’s self-learning capabilities automatically reassociate all future payments for each vendor account.

95%
IR solutions can increase straight-through processing rates by up to 95 percent.





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Strategies For Success: Four Strategies To Make Your Bank's First AI Project A Success

Early adopters emphasize quick wins and cross-functional collaboration

1. Make AI cross-functional. Where an AI project resides in the organization can make or break its effectiveness. Early adopters in various industries recommend creating an AI Center of Excellence (CoE).

The CoE exists outside of traditional IT and operates similarly to a shared services model. Staff establish the vision for AI, embed within various departments to understand roles and processes, collaborate with internal and external resources, and share success stories across the organization. J.P. Morgan Chase and Deutsche Bank are two FIs leveraging this approach.¹¹

2. Always start with business needs. Data drives AI projects, but it also can hold them back. A common pitfall occurs when the organization attempts to harmonize every aspect of its data before moving forward. It's time to forget "perfect."

Instead, make business and end-user needs the focus of AI projects. With this priority, banks address data architecture and quality issues incrementally while simultaneously making progress on AI. Both the data and the AI tool improve over time.

3. Plan for quick wins. Budget cycles at most banks span a few months to a year. Full-blown AI development cycles, on the other hand, can extend across multiple years as the technology learns first with human supervision, and then gradually on its own.

Scope your bank's first AI project to deliver quick wins that are well within a single budget period. That means prioritizing use-cases that deliver value rapidly and then launching pilots. Pilots typically

develop a minimum viable product that has just enough functionality to demonstrate AI's full potential. This enables you to get buy-in from senior leaders and secure funding for larger initiatives.

Don't be afraid to consult the experts. Reaching out to universities, incubators, technology partners and other resources can accelerate your time to market and speed learning.

4. Build a digital culture. Adopting AI moves your bank into uncharted territory. Banks that succeed will do more than simply establish a CoE or hire a data scientist; instead, leaders will recognize that AI brings new roles, new processes and new ways to collaborate.

The right AI leadership will be critical. Important roles to fill include a "translator" to connect business and technical stakeholders and an "evangelist" to champion AI projects across the bank. On the data side, staff will need to manage data ownership, governance, quality and technology. Some, like Microsoft, are even hiring digital "ethicist" roles to measure the impact of AI on consumers and evaluate potential bias in machine learning.¹¹ These new positions will help shift your culture to a truly digital, insight-driven environment.





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Resources: Choose The Right AI Resources

Technology provider partnerships are ideal for mid-sized and regional banks

When it comes to AI resources, there's no single path to success. Most FIs will leverage a combination of internal talent, external resources and off-the-shelf AI components.

Most large banks started their AI journey with the help of third-party resources. Now, they're maturing the AI function with in-house AI leadership roles—while still relying on technology partners and other outside experts.

For regional and community banks, partnerships may offer the best opportunity.

- » You retain your core focus on customers and financial services.
- » You complement these strengths with best-of-breed partners that bring cutting-edge skills and technology.

Banks and technology partners are learning to co-exist rather than compete, making for smart collaborations. A technology partner can bring an innovation mindset and an agile approach that can speed development and streamline processes.

Working with outside resources also makes it easy to scale. You can rapidly jumpstart a project with a resource push and then reduce the workload as your AI project matures. It eliminates the ebb and flow on your bank's internal staff.

Even tech giants struggle to hire top AI talent

If you hire internally, be open to change. AI relies on data, but it's also experimental and ongoing. AI attracts those with innate curiosity, perseverance

and strong problem-solving and mathematical skills. When hiring, don't fixate on someone who fits the current mold or follow the same playbook used with software developers.

It's also important to understand the experience level you need and the differences in AI job titles. In this booming field, high-end talent with financial services expertise can be costly. (Even tech giants struggle to fill AI roles.) Know your requirements and where you'll be willing to invest in on-the-job training so you can attract the best talent for your budget.

Important resource decisions for your AI project

- » In house or outsourced?
- » Technology partner or consulting firm?
- » Ongoing relationship or project-based?





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Resources: Choose The Right AI Resources

How to select the right external partner

Once you agree on your direction, follow these best practices to choose the right technology partner, consulting firm or AI development agency. No matter how you resource your AI project, good communication and upfront planning will smooth the way.

- » **Create a scorecard.** Identify the most important criteria for your FI's decisions and then rank each resource accordingly. Common elements include industry knowledge, past experience, available functionality and customer service. This helps you focus your decision on more than price—or hype.
- » **Vet their expertise.** Start with a shortlist of potential partners and then conduct phone interviews to screen the best candidates. Do your due diligence with website reviews and references.
- » **Assess cultural fit.** Sometimes a relationship looks good on paper, but then it falls apart in practice. Don't underestimate the importance of shared values between your bank and your AI resource. Trust and good communication are crucial, especially in a high-visibility project. Take time to meet the team and make sure personalities and work styles mesh.
- » **Identify your risks.** Every technology project carries risks; the goal is to understand them and plan accordingly. With outside partners, risk can be skills-based, reputational—even financial or regulatory.

Get clarity around your vendor's capacity—can they execute your project within the desired timeframe? How many customers do they work with simultaneously? With a custom project, be clear on who owns the end product as well as ongoing bug fixes and maintenance. Lastly, in a regulated industry like financial services, agree on the responsibilities for compliance to avoid costly missteps down the road.

Ask these questions to determine your resource needs:

- » Does a turnkey AI solution already exist?
- » What is most essential in a custom solution?
- » What are the top skills needed?
- » Should we staff in-house or use external resources?





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Glossary: How Well Can You Speak AI?

The world of AI can seem like venturing into uncharted territory. Find your footing with these fundamentals.

Q: What's the difference between artificial intelligence and machine learning?

A: The two concepts are related, but AI is broader and describes the entire discipline.

Artificial Intelligence: The field of AI encompasses a number of techniques that enable computers to emulate human behaviors such as interpretation, understanding, reasoning, planning and communication. Machine learning, deep learning, natural language processing and intelligent automation are all subsets of AI.

Machine Learning: Machine learning is another general term. It describes the process of getting a computer to act without specifically being programmed. Instead, the computer learns by experience and without human involvement.

Q: What happens behind the scenes to make AI work?

A: The typical AI toolkit includes these elements.

Algorithms: Algorithms are the recipes behind your organization's AI—its most basic building blocks. They're simple rules and step-by-step instructions—programming commands and math formulas, for example—that instruct the computer on how to solve problems on its own using a specific set of inputs or “ingredients.”

Neural Network: A neural network helps a computer develop human-like functions such as perception, reasoning, visual recognition or language processing. Its setup simulates the sophisticated hierarchies and connections between neurons in the human brain.

A neural network organizes dozens to millions of artificial neurons (called units) into layers, with a different type of processing occurring in each layer. As data and inputs move through the layers, the neural network adds findings and develops greater understanding—just as humans use multiple senses and types of thinking to interpret the world around them.

Deep Learning: Deep learning is the activity that occurs when data and inputs pass through the neural network. “Deep” refers to the numerous layers of processing and the vast amounts of data involved. Unlike traditional computing, which requires specific instructions at all stages, deep learning is autonomous and self-teaching; each time the system performs a task, it finds patterns and improves its performance.

Supervised Learning: Even autonomous machines need some help from time to time. Supervised learning describes the most common approach to “training” an AI application. Using a training set of data, the organization provides the computer with both the question and the answer.

For example, teaching a self-driving car to recognize traffic signals begins with the question: Is this a signal to stop? The answers might include a set of “Yes” images clearly labeled stop sign and red light and a second set identified as “No” images.

Unsupervised Learning: With unsupervised learning, organizations provide the question without the answer. This approach is less common and requires more upfront work to show the computer how to carry out advanced calculations. Computers capable of unsupervised learning represent the full potential of AI.

Q: What are some specific applications of AI?

A: The possibilities with AI are almost endless; these





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Glossary: How Well Can You Speak AI?

are some common applications.

Natural Language Processing: NLP uses AI to train a computer to interpret and respond to human communication in text or speech forms. NLP powers chatbots and virtual assistants like Siri and Alexa.

Image Recognition: Also called computer vision, image recognition enables computers to identify objects, places, people—even handwriting—that exist as images. It powers iPhones that authenticate users by their face and self-driving cars that recognize pedestrians on the roadway.

Chatbot: Also known as a conversational interface, a chatbot leverages NLP to conduct an interactive “chat” with a human user through a website, mobile app or telephone system. Chatbots are most prevalent in customer service.

Virtual Assistant: An AI-powered application that offers help with common tasks. Siri and Alexa are two examples of virtual assistants for consumers.

Robotic Process Automation: Specialized software that is easily programmed to handle routine business processes, such as collecting data, updating spreadsheets or moving information between applications. RPAs quickly and accurately handle repetitive tasks and basic workflows. While not technically a component of AI, RPAs are a common first step before an AI initiative.

Intelligent Automation: Also known as intelligent process automation, IA is a more advanced form of RPAs used to streamline business processes. With IA, not only do machines take over routine and repetitive tasks typically handled by humans, but they also leverage AI to learn and, over time, do them better.





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Conclusion

AI is poised to be the next disruptor for FI products and services. Large, global banks are leading the way and have delivered AI-driven solutions to the market. These products are transforming the way their consumers and corporate clients do business. As the AI discipline matures, it becomes more accessible to the rest of the financial services industry. A well-planned strategy will be critical to every bank's future success.



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