

THE UNLOCKING AI PLAYBOOK

THE UNLOCKING AI PLAYBOOK: CREDIT RISK AND PAYMENTS EDITION

The Unlocking AI Playbook: Credit Risk And Payments edition, a PYMNTS and Brighterion collaboration, seeks to assess the current use and potential of AI and other computational systems in the banking sector, with a special focus on risk and payment operations. The report is based on a survey of 150 U.S. bank managers and executives representing institutions with assets ranging from \$1 billion to more than \$100 billion.

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TABLE OF CONTENTS

Introduction	01
AI use cases coming into focus	05
The emerging applications of smart agent-based AI	11
Deep Dive: AI in various bank types	17
Conclusion	23
Methodology	24

The Unlocking AI Playbook: Credit Risk And Payments edition was done in collaboration with Brighterion, and PYMNTS is grateful for the company's support and insight. [PYMNTS.com](https://www.pymnts.com) retains full editorial control over the following findings, methodology and data analysis.

■ INTRODUCTION

Managing risk has always been a central priority for banks, institutions that regularly underwrite loans and assess when existing ones are in danger of slipping into default. Current economic conditions only heighten the importance of this task.

Yet risk assessment and management have long been complicated by the volume of variables in play at any given time and by the limits of human-generated models, which tend to reflect their architects' biases or blind spots. It is because of these complications that risk assessment has emerged as one of the more promising applications of artificial intelligence (AI) in the banking sector. AI can process and gain insights from massive volumes of data in real time, and it has the potential to flag risk factors long before they appear on conventional models' radar.

PYMNTS has been examining AI systems' business uses and potential for growth as part of the Unlocking AI Playbook series, a

PYMNTS and Brighterion collaboration. In the latest installment of this series, the Credit Risk and Payments edition, we turn our attention to two areas in which financial institutions (FIs) see potential in deploying AI: credit risk and payment services. The study is based on a survey of 150 U.S. bank managers and executives representing institutions possessing assets ranging from \$1 billion to more than \$100 billion.

Our research has revealed two overarching trends. One is that the use of AI remains limited but has grown, as 9.3 percent of respondents report using it, up from 5.5 percent in a study PYMNTS conducted in 2018.¹ The other trend is that FIs are focusing their applications of AI. Our research shows that 92.9 percent of banks that employ AI do so in payment services, and 71.4 percent use the technology to manage credit risk. The latter case represents a dramatic increase from the 2018 study, when just 27.3 percent reported using AI in this area.

Another important development emerges in our latest research: Bank managers are increasingly using AI for core credit risk management and payments operations. We find that 60 percent of FIs that use AI in managing credit risk apply it to the credit decisioning process itself. Banks are leveraging AI to make better decisions on whether to approve or reject borrowers. Other applications appear to be just starting to take root, including pricing credit risk and flagging at-risk borrowers before default. Only a handful of FIs currently practice these two AI use cases, but they could represent future targets for growth.

The ways that banks use AI depend significantly on their natures and sizes. This report focuses specifically on how commercial banks, community banks and credit unions are using AI and analyzes their interest in applying the technology in specific areas. These and other insights follow below.

AI and smart agents

Our study uses precise definitions for AI that target a specific form that is powered by "smart agents."

- **AI:** an unsupervised computational system that is able to work with and learn from large volumes of data in real time.
- **Smart agent-based AI:** A form of AI that uses smart agents, which are capable of offering a virtual representation of each entity within a system and providing personalized account-level responses after observing various actions. An organization using smart agent-based AI to manage payments services, for example, could assess factors associated with each active cardholder, merchant or terminal to learn from every transaction in real time. Smart agent-based AI is self-learning and adaptive, continuously updating its individual profiles as each entity performs an action.

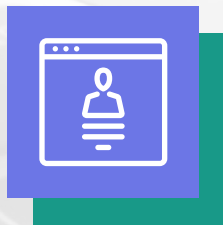
¹ AI Innovation Playbook: AI and Fraud Edition. PYMNTS.com. 2019. <https://www.pymnts.com/study/ai-gap-study-june-2019/>. Accessed April 2020.

Key Findings:

FIs are increasingly utilizing AI to manage payment services and underwrite credit risk, applying the technology to critical functions within these areas.

An overwhelming majority of the banks that currently use AI apply the system in payment services: 92.9 percent. The second-most common application is credit underwriting, as 71.4 percent of AI-using respondents deploy it in this area. This statistic represents a dramatic shift from 2018, when just 27.3 percent reported using AI in credit underwriting.

Banks primarily use AI within payment services to deal with security-related functions, including system security (69.2 percent), authentication (61.5 percent) and preventing data breaches (53.8 percent). The most common use of AI within managing credit risk is in credit decisioning, which was cited by 60 percent of AI users — more than twice the share citing any other related activity.



FIs believe smart agent-based AI has the greatest potential in customer life cycle management, enhancing payment services and underwriting credit risk.

The largest shares of banks believe these three business areas are the most promising for smart agent-based AI, which can represent every entity within a system and generate personalized responses from their activities. We found that 43.7 percent of bank managers that are least “somewhat” interested in smart agent-based AI believe payments teams would be “very” or “extremely” interested in using the system. This is followed by new product/customer life cycle management (38.8 percent of those that have the same level of interest believe the business unit would be highly interested in the system) and underwriting credit risk (33 percent). These findings represent a marked shift from 2018, when FIs were most inclined to view internal fraud as the department in which smart agent-based AI had the greatest promise.



Banks increasingly view smart agent-based AI as a system that can bring new capabilities to payment and credit services, not just a way to reduce manual review.

FIs' three most-expected benefits from smart agent-based AI are improved customer satisfaction, reducing payments fraud (cited by 67 percent in both cases) and improving credit/portfolio risk (cited by 62.1 percent). These factors far outweigh reducing manual review and decreasing fraud personnel, which ranked high as benefits in our previous research. This suggests that banks now view smart agent-based AI as not just a means of automating labor-intensive processes but as a way to optimize key operations.



Commercial banks are the FIs most likely to use AI, and they are especially intrigued by the potential of smart agent-based AI to improve credit risk.

Our research shows that 19.6 percent of commercial banks currently use AI, compared to just 2 percent of community banks and 6.1 percent of credit unions. Commercial banks are also more likely to be highly interested in smart agent-based AI than other types of banks, with one-third of them “very” or “extremely” interested in implementing the system. Banks also have differing views as to where they would be most interested in applying smart agent-based AI. We found that 40.5 percent of commercial banks would be highly interested in using the systems in underwriting credit risk, compared to 30.6 percent of community banks and 26.7 percent of credit unions. Community banks see smart agent-based AI's greatest potential in product and customer life cycle management, as 44.4 percent of them are highly interested in using the system in such a way.

AI USE CASES COMING INTO FOCUS

Technology has long been a cornerstone of modern banking, yet the core payment processing systems at many banks still run on programming languages that date back three decades or longer. This reflects a main challenge to integrating new computational systems like AI with payment processing and other activities. Every bank uses at least one preexisting computational system, and most use two or three to manage critical business functions. Our research indicates that many have grown comfortable with legacy approaches to the extent that one is used across nearly every business unit within an institution.

Business rules management system (BRMS) use has grown since 2018, when our last study found that 82 percent of FIs reported using it. Just 9.3 percent of banks report using AI, in comparison. The trendlines tell a different story, however, as the use of AI has grown by more than 70 percent since 2018.

Another notable trend is that banks appear to be applying AI with greater specificity than in the past, suggesting that strong use cases have emerged. Our research shows that 92.9 percent of AI-using FIs are applying it to

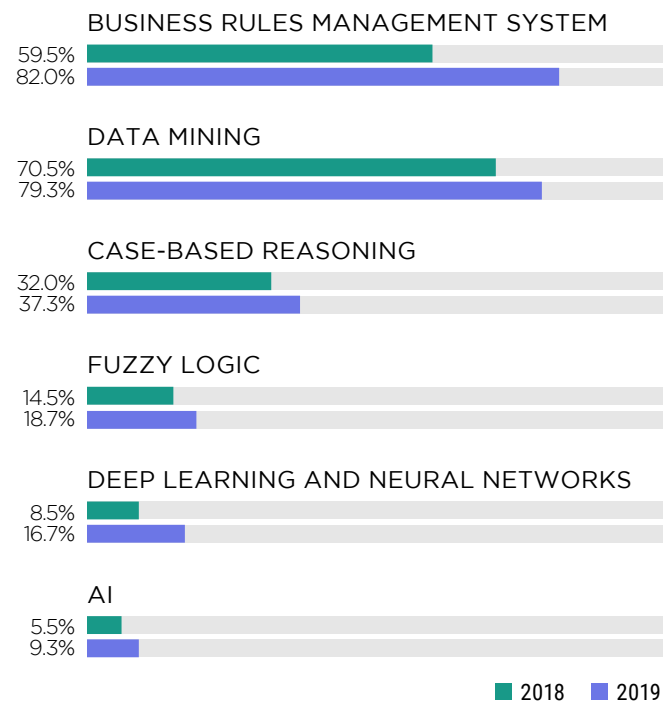
payment services, and 71.4 percent are doing so in credit underwriting. The latter finding is a marked shift from our 2018 study, in which just 27.3 percent of FIs reported using AI in credit underwriting.

Six computational systems employed by FIs:

- **Business rules management system (BRMS):**
Solutions that enable companies to easily define, deploy, monitor and maintain new market opportunities, policies, procedures, regulations and workflows.
- **Data mining:**
Statistical methods that identify trends and other relationships from large data sets.
- **Case-based reasoning:**
Algorithmic approaches that use input from past outcomes to solve new problems.
- **Fuzzy logic:**
Systems that categorize information based on middle-ground values rather than binary patterns like black-white or true-false.
- **Deep learning and neural networks:**
Technology that is loosely inspired by the brain's structure, relies on algorithmic sets and uses a neural network as its underlying architecture.
- **AI:**
Systems that use intelligent agents to personalize, self-learn and adapt to new information in real time.

FIGURE 1:
Changes in FIs' computational system usage

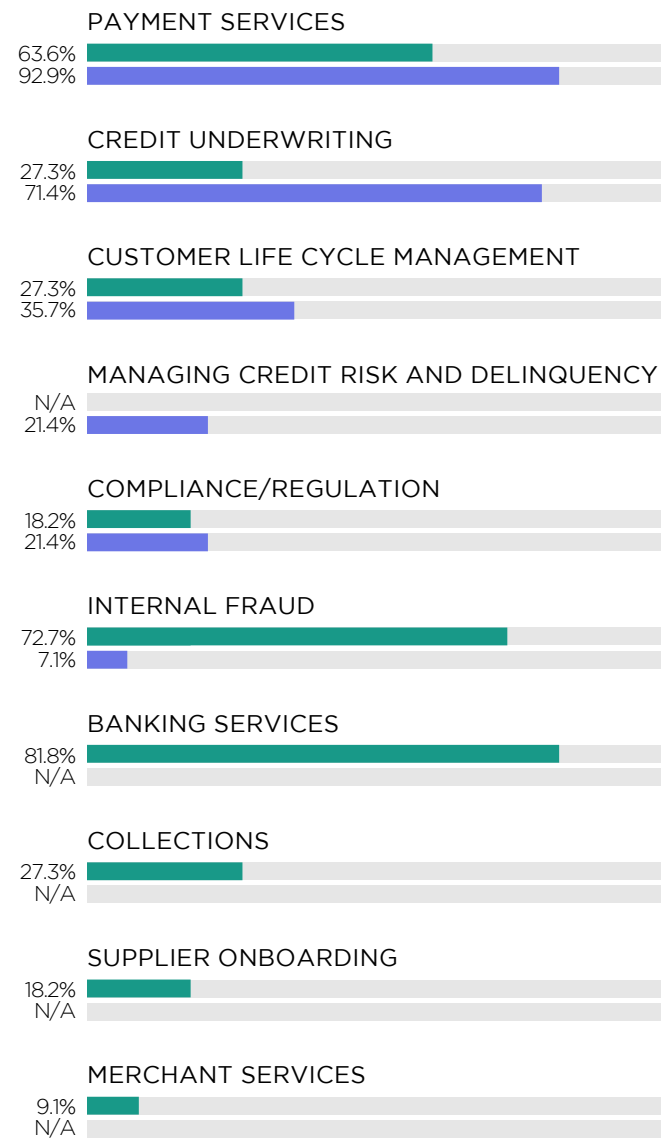
1A: Share of banks using select technologies, 2018 versus 2019



Source: PYMNTS.com

Our research further indicates that FIs are applying AI to some of the most sensitive and important functions within these two business units. FIs are predominantly applying AI to security-related payment services functions: system security (cited by 69.2 percent of AI users), verification (61.5 percent), authentication

1B: Share of AI users citing select areas of use, 2018 versus 2019



"N/A" indicates that the option was not available in the given study period.

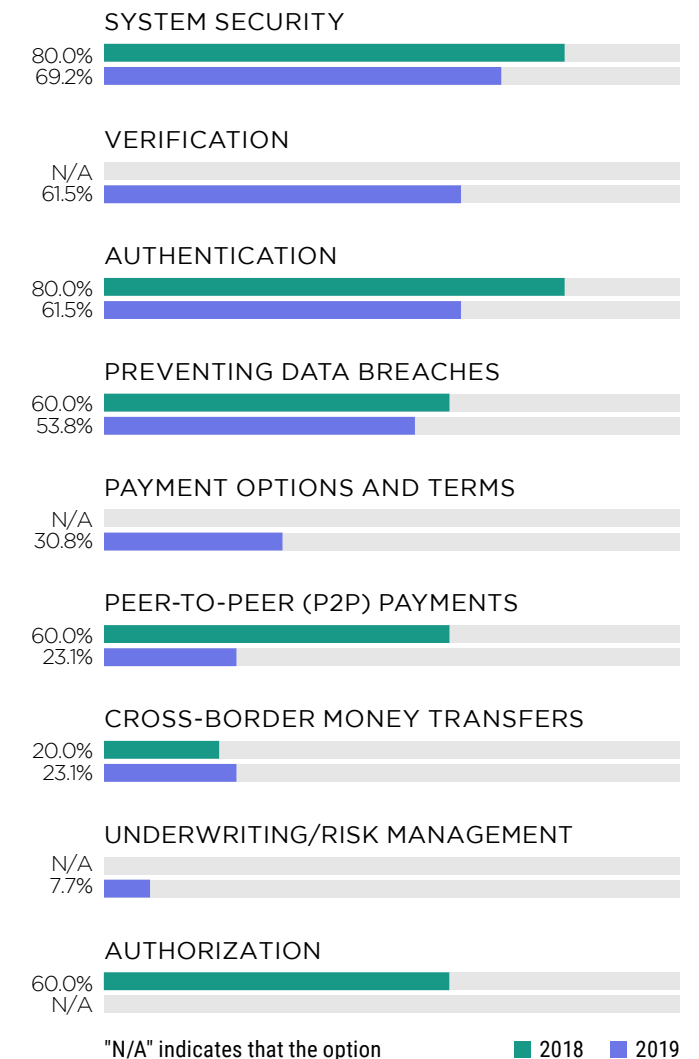
Source: PYMNTS.com

(61.5 percent) and preventing data breaches (53.8 percent). Only 23.1 percent reported using AI for P2P payments, indicating that the minority of AI-adopting banks are using it optimally, since the technology has been shown to be adept at discovering early indicators of suspicious activity in ways that supervised rules-based systems cannot match.

One application of AI regarding credit risk management rises above all others: 60 percent of AI users reported deploying the system for credit decisioning. AI is making inroads into credit/loan underwriting as a way to supplement conventional scoring models – or supplant them altogether.² In this way, AI is being used to expand the pool of potential borrowers – and to bring greater scrutiny to potentially risky ones who might only look good on paper. An array of FinTechs are offering services in this area. Our findings suggest that the trend is extending to banks themselves, as a majority of banking AI users are deploying the system for credit decisioning.

FIGURE 2:
Use of AI for functions within payment services

Share of AI-using banks that utilize the system for select payment services functions, 2018 versus 2019



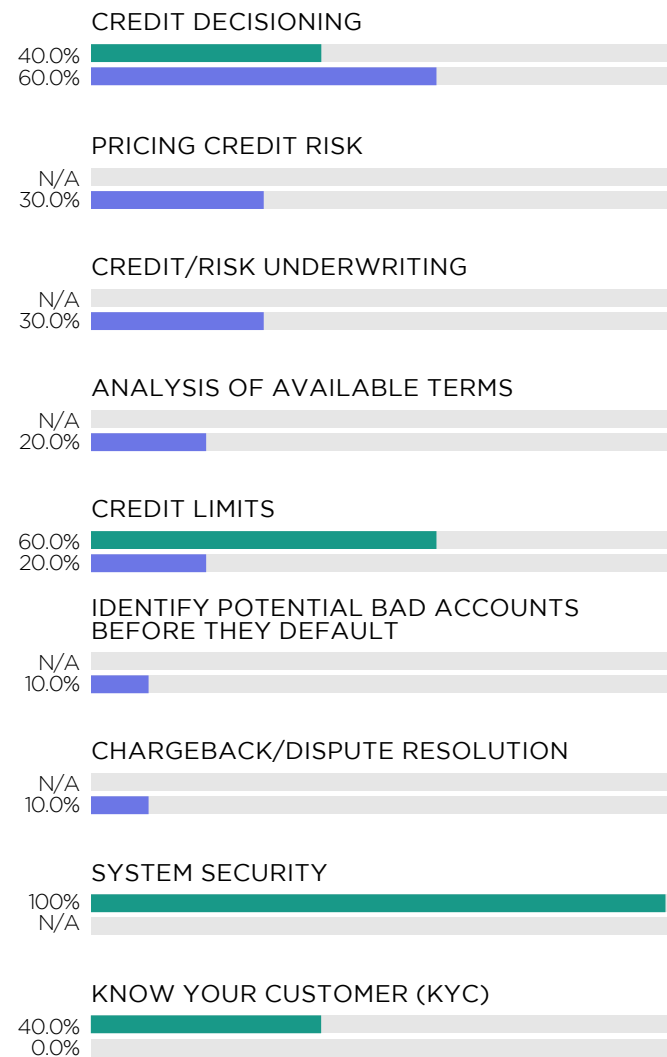
"N/A" indicates that the option was not available in the given study period.

Source: PYMNTS.com

²Bharadwaj, R. How artificial intelligence is helping banks. Fintech News. 2019. <https://www.fintechnews.org/artificial-intelligence-for-risk-monitoring-in-banking/>. Accessed April 2020.

**Figure 3:
Use of AI for managing credit risk**

Share of AI-using banks that utilize the system for select credit risk management functions, 2018 versus 2019



"N/A" indicates that the option was not available in the given study period.

■ 2018 ■ 2019

Source: PYMNTS.com

Banks are also using AI to guide their credit product offering decisions and manage existing portfolios, albeit to a lesser extent than in decisioning. Our research shows that 30 percent of AI users employ the technology for pricing credit risk, such as interest rates offered, and the same share, 30 percent, use it in credit or risk underwriting. We also find that 10 percent use it for a novel purpose: identifying potentially at-risk accounts before they default.



■ THE EMERGING APPLICATIONS OF SMART AGENT-BASED AI

Gauging AI interest and use is complicated by the fact that the term itself is amorphous and technical. Survey respondents may have only vague ideas of what they are being asked about — and, if so, would be unlikely to express strong interest in adopting such systems.

Our research has sought to measure interest in a very specific and well-defined form of AI: smart agents, which harness AI's power to learn from vast amounts of data and create virtual profiles for multiple entities within a system. An FI could deploy smart agents for each credit card it has issued, for example, allowing it to base decisions on cardholders' specific circumstances rather than aggregate demographic data. Responses to indicators of default risk could be made in real time, as could indicators of improved financial resources.

Our research shows that 26 percent of FIs would be "very" or "extremely" interested in

implementing smart agent-based AI — close to three times the share that currently employ AI. FIs also appear to have clearer ideas than they did in the past about how they would deploy smart agent-based AI, starting with the business units they would address.

Our research shows that 43.7 percent of FIs that are at least "somewhat" interested in using smart agent-based AI would be "very" or "extremely" interested in using it for their payments business units. This is followed by their new product or customer life cycle management units (38.8 percent) and credit risk underwriting units (33 percent). The concentration of interest in these three units represents a marked shift from 2018, when the largest share of FIs (50.5 percent) were most interested in using smart agent-based AI to address internal fraud.

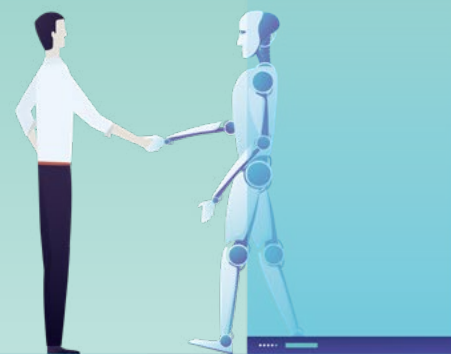
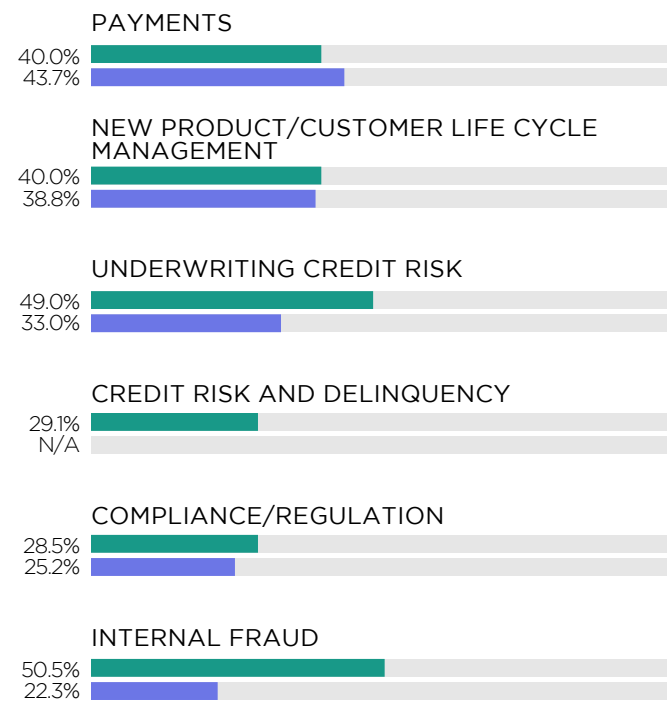


FIGURE 4:
Business unit interest in smart agent-based AI

Share of respondents who believe select units would be "very" or "extremely" interested in smart agent-based AI



"N/A" indicates that the option was not available in the given study period. Source: PYMNTS.com

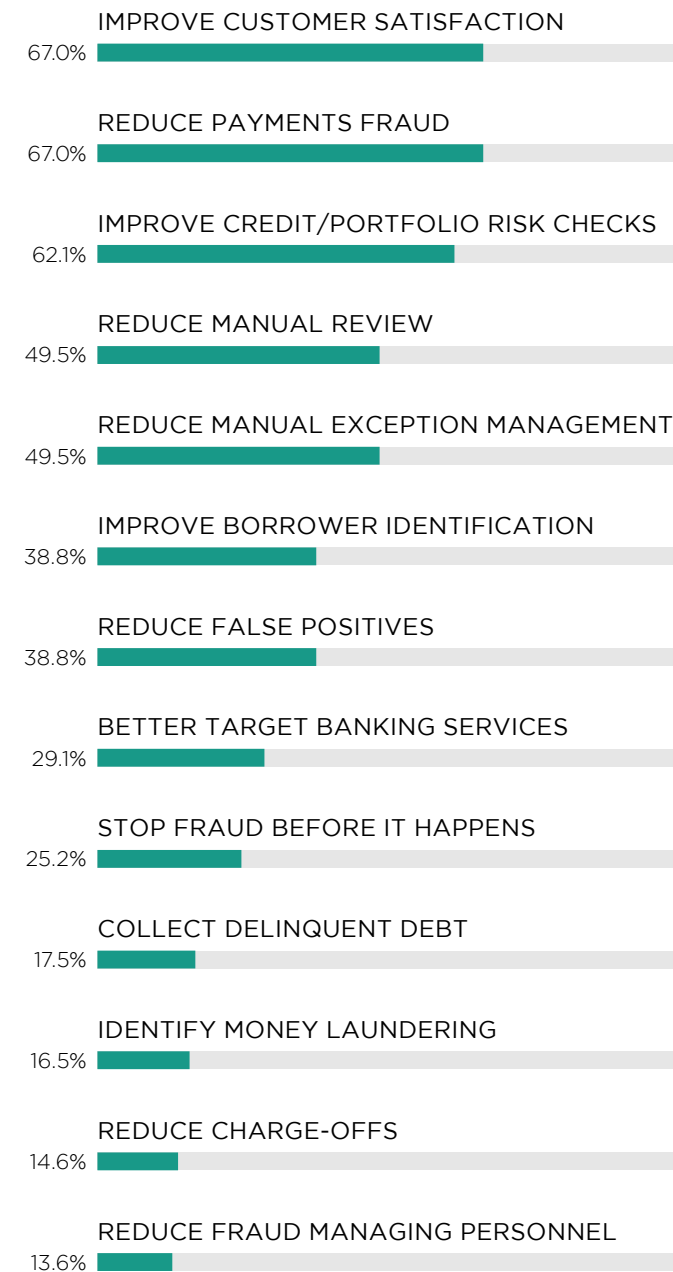
Where bank managers believe smart agent-based AI would have the greatest impact is closely tied to how they expect such systems to benefit their organizations. Smart agent-based AI's top two most-cited benefits are improved customer satisfaction and reduced payments

fraud, which were both cited by 67 percent of FIs at least "somewhat" interested in smart agents. Next most cited was improved credit and portfolio risk assessment, which 62.1 percent of interested banks consider a likely benefit.

Additional notable findings include the factors that rank lower in importance than the aforementioned benefits. Just 13.6 percent of interested FIs consider reduced fraud personnel a benefit, and even reduced manual review – a commonly cited benefit of AI – ranks lower than the aforementioned benefits, as 49.5 percent of interested FIs cite it. This suggests that bank managers view smart agent-based AI as more than an automation tool allowing them to reduce headcount. It seems they are more inclined to believe that smart agent-based AI could bring new capabilities to their operations, particularly in the areas of payments fraud, customer satisfaction and credit/portfolio risk.

FIGURE 5:
Expected benefits of smart agent-based AI

Share of banks citing select benefits if they adopted such AI



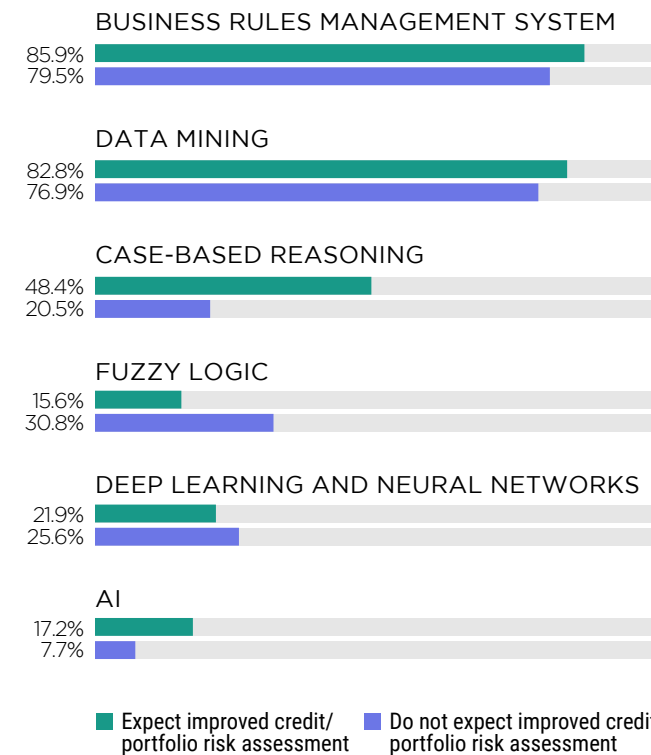
Source: PYMNTS.com





FIGURE 6:
Credit-risk orientation and computational system use

Share of FIs at least "somewhat" interested in smart agent-based AI that use select systems, by whether respondents believe smart agent-based AI would improve credit/portfolio risk assessment



Source: PYMNTS.com

It bears noting that a significant portion of interested FIs expect improved customer satisfaction to be a benefit of smart agent-based AI. This is of course an important consideration for any business, and AI does indeed

have important applications in this area, such as customer chatbots and virtual account assistants. That being said, our data indicates that banks that view improved credit/portfolio risk assessment as a benefit are also considerably more likely to actually employ AI.

FIs that expect smart agent-based AI to improve how they assess credit/portfolio risk are more than twice as likely to be actual users of the system than those that expect other benefits, like improved customer satisfaction. We find that 17.2 percent of the former group currently use AI, while 7.7 percent of the latter group do so. This difference is further reflected in the tendency of credit-risk minded FIs to employ advanced computational systems — including data mining — to a greater degree across the board.

It seems safe to conclude that these differing perspectives on the benefits of smart agent-based AI are informed by banks' real-world experience with AI — or lack thereof.

■ DEEP DIVE: AI IN VARIOUS BANK TYPES

Our research has uncovered a strong correlation between bank assets and AI use: large banks, those possessing assets over \$100 billion, make up the lion's share of AI users and also tend to display the strongest interest in implementing smart agent-based AI. The following Deep Dive will examine how these trends relate to bank type: credit union, community bank or commercial bank, as each constitutes approximately one-third of the survey sample.

It may come as no surprise that the nature of an FI has a strong impact on its AI interest and use. Each type tends to serve a specific clientele and can face different competitive pressures. Key differences between the institutions include that credit unions are nonprofits and technically owned by their customers, that community banks are typically state-chartered and that commercial banks tend to be larger, are more likely to offer investment services and sometimes operate nationally or regionally.

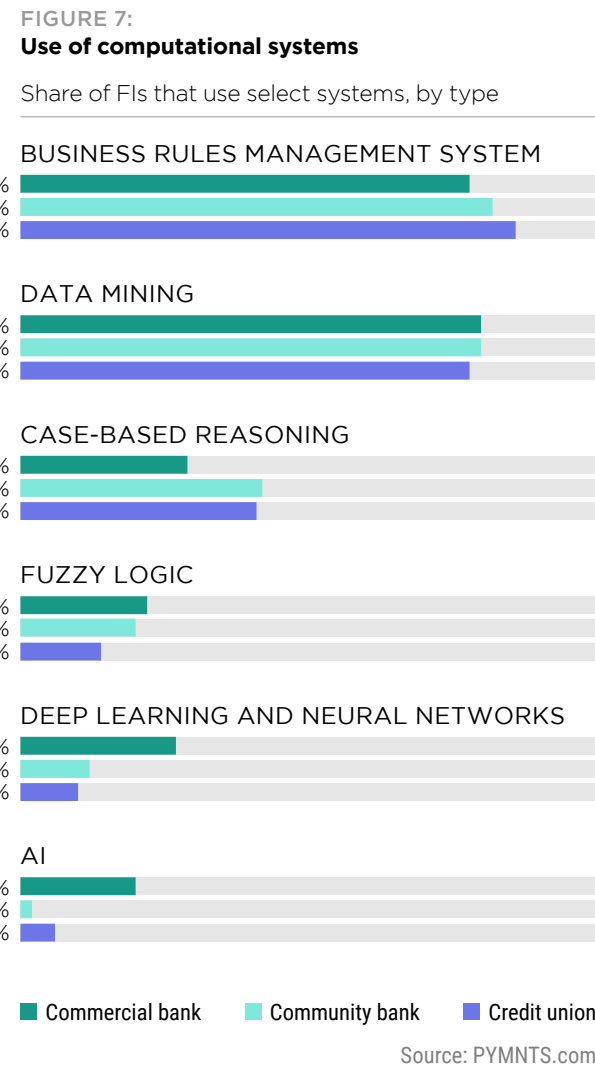
19.6%

OF COMMERCIAL
BANKS USE AI.

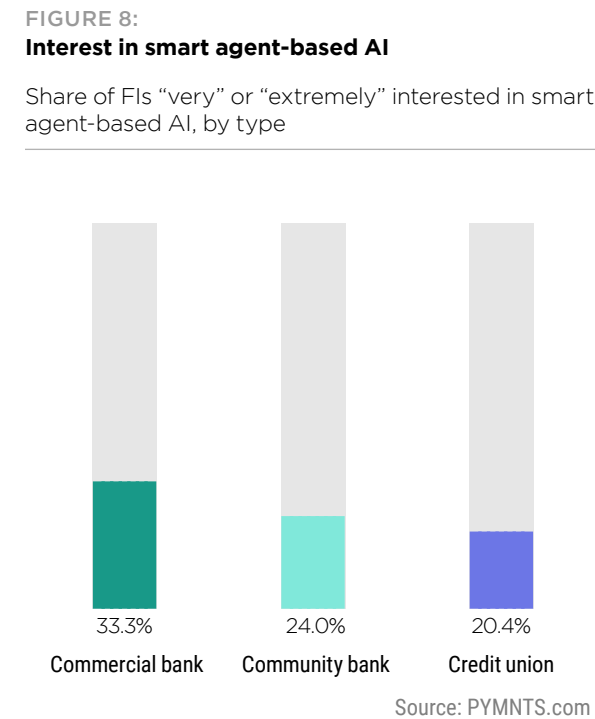
Our research reveals notable distinctions among bank types and their use of computational systems. Community banks and credit unions are more likely to use legacy systems such as BRMS while commercial banks are far more likely than other bank types to use AI. We find that 85.7 percent of credit unions use BRMS, exceeding the usage rate of the other types, but that 19.6 percent of commercial banks report using AI, compared to just 6.1 percent of credit unions and only 2 percent of community banks.

A theme reemerges in our research’s finding that banks that currently use AI are more likely to be interested in adopting smart agent-based AI in the future. One-third of commercial banks are “very” or “extremely” interested in implementing smart agent systems, while 24 percent of community banks and 20.4 percent of credit unions express the same level of interest. One likely explanation for the elevated interest of commercial banks is that they are more likely to work with greater volumes of customers and contend with complex regulations — circumstances that generate smart agent use cases.

FI type also seems to relate to how executives would be most inclined to employ smart agent-based AI. Commercial bank and credit union decision-makers who are at least “somewhat” interested in smart agent-based AI are most likely to believe that it has the greatest potential in payments, as 45.9 percent and 46.7 percent of them have this view, respectively. Community banks would be more interested in applying the system to new product or customer life cycle management, as 44.4 percent reported interest in doing so. This would seem to correspond to community banks’ reputations for prioritizing customer service.

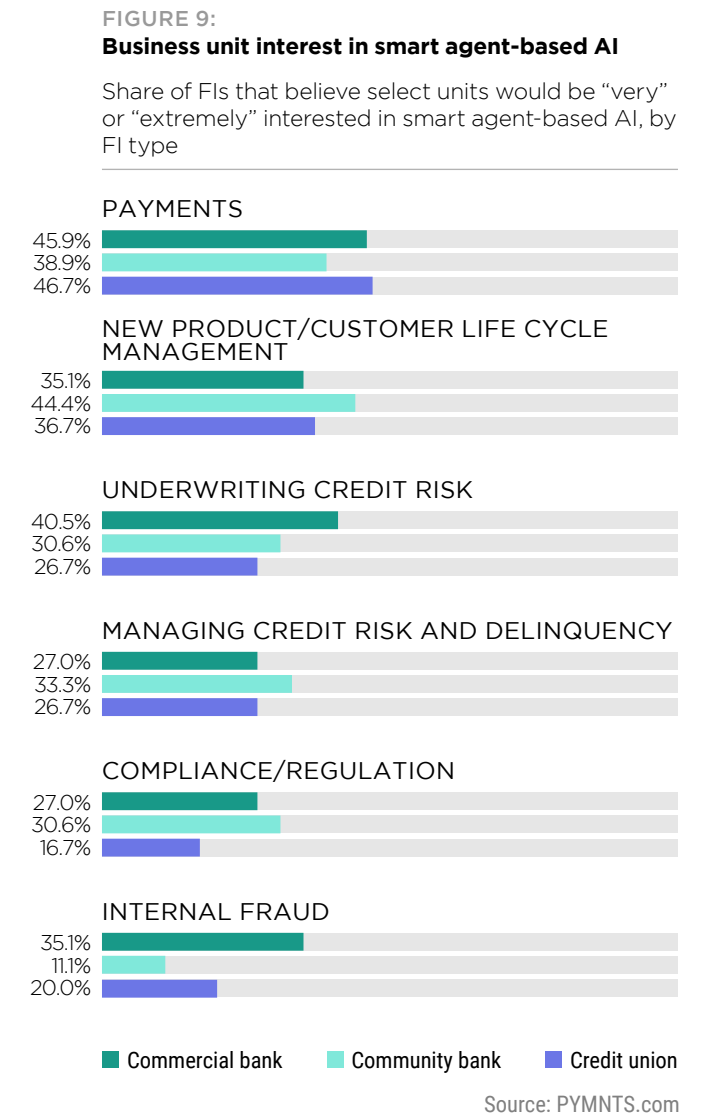


Credit risk is an application in which commercial banks see far more potential for smart agent-based AI than other types of banks. Our research finds that 40.5 percent of commercial bank managers would be “very” or



“extremely” interested in using the system to underwrite credit risk, compared to 30.6 percent of community banks and 26.7 percent of credit unions. This likely reflects that commercial banks are more likely to offer loans and issue credit cards than other bank types. Community banks and credit unions may also feel less market pressure to deviate from long-standing practices.

Whether community banks’ and credit unions’ stances are wise is another question.



Consumers who believe that AI can genuinely improve their account safety and credit access seem likely to ultimately cast votes with their feet — and their wallets.

CONCLUSION

Artificial intelligence has been heralded as transformative for some time. The reality in banking is that AI has so far made only limited inroads relative to more entrenched computational systems that FIs commonly use today. A vanguard of banks has begun using AI, however, and more than one-quarter of banks are highly interested in adopting smart agent-based AI.

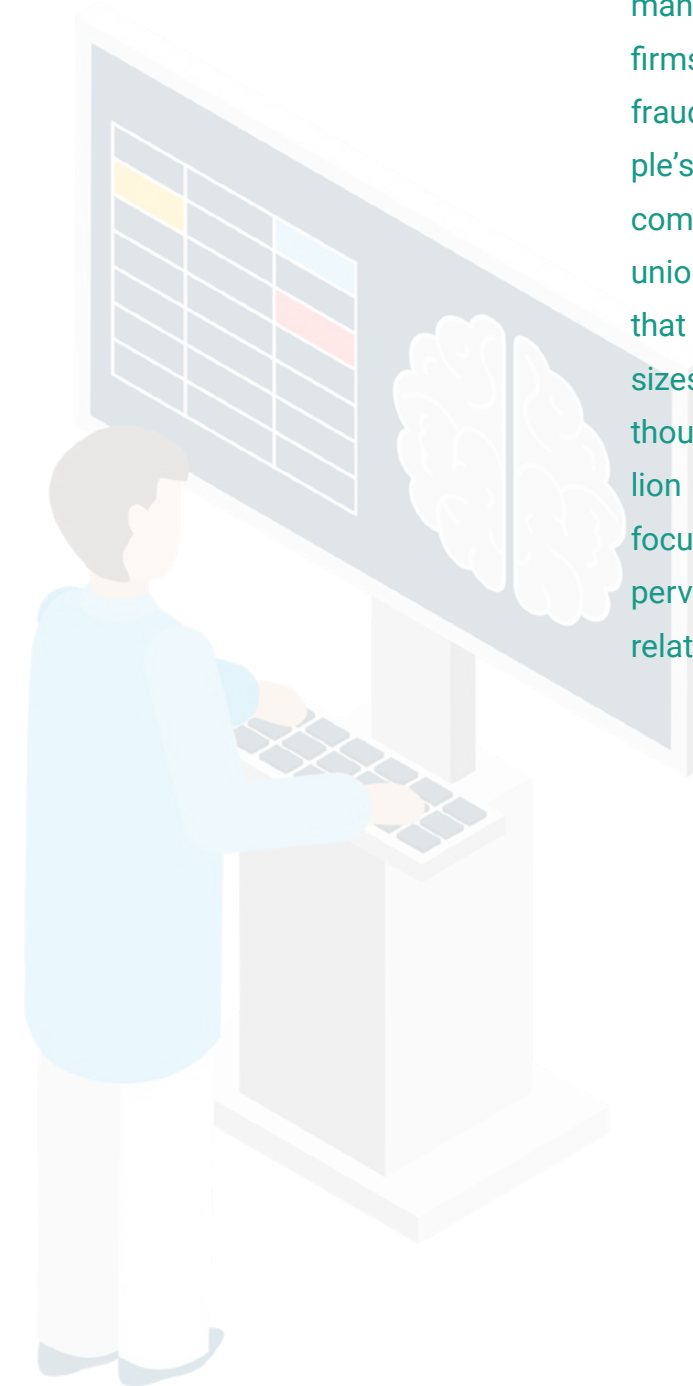
Banks that are using AI are increasingly putting it to work for highly complex and vital functions. Two applications stand out in this regard: those of payment services and managing credit risk. AI users are employing the technology in these business operations far more than in others. Banks are also notably using AI to bring new capabilities to their core operations, not just automate existing tasks. The key payments services applications for AI

users involve system security, authentication and preventing data breaches, and a majority of AI users employ the system in credit decisioning when managing credit risk.

These findings indicate that AI may be crossing a critical threshold in the banking sector, as its slow adoption has often recently been attributed to a lack of use cases. Our research indicates that banks are in fact discovering these applications, which are concentrated primarily in payments and credit risk assessment. The trends revealed in our research suggest that in the not-too-distant future, AI could supplant the legacy computational systems in use at many banks today.

METHODOLOGY

PYMNTS interviewed a total of 150 U.S.-based bank managers who were knowledgeable about their firms' accounts receivable, accounts payable and fraud detection and analysis operations. Our sample's respondents were equally distributed among commercial banks, community banks and credit unions. Almost half of the respondents were from FIs that have between 26 and 100 branches. FIs' asset sizes ranged from \$1 billion to more than \$100 billion, though the majority had between \$1 billion to \$5 billion in assets. The survey consisted of 26 questions focused on banks' current and future plans for supervised and unsupervised learning systems, among related topics.

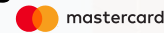


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Brighterion



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