Bank Governance Leadership Network

June 2021

BGLN

VIEWPOINTS

Expanding artificial intelligence and machine learning applications in banking

On May 25, 2021, Bank Governance Leadership Network (BGLN) participants met virtually to discuss the opportunities and risks for banks as they expand applications of artificial intelligence (AI) and machine learning, as well as implications for regulation and oversight in this area. This *ViewPoints* draws on pre-meeting conversations with participants and the discussion on May 25th, and focuses on the following areas:[1]

- **Banks are exploring a wide range of applications**
- **Addressing risk and oversight concerns will take time**

Banks are exploring a wide range of applications

AI and machine learning have the potential to transform the banking sector. Katherine Wetmur, Morgan Stanley's international chief information officer, recently stated, "We are only scratching the surface of the potential that AI has for the industry."[2] Some commentators make bold claims about the future of banking as a result: Chris Skinner, a well-known financial services consultant and author, predicted, "Most trading and investment roles will disappear over time, probably most roles that require human services will be automated. What you will end up with is banks that are run primarily by managers and machines. The managers decide what the machines need to do, and the machines do the job."[3]

Even now, firms are exploring a wide range of applications for the technology. JPMorgan Chase CEO Jamie Dimon described the breadth of current use cases in his annual letter to shareholders: "We already extensively use AI, quite successfully, in fraud and risk, marketing, prospecting, idea generation, operations, trading and in other areas–to great effect, but we are still at the beginning of this journey." The journey is expected to advance at pace; banks and insurance companies expect an 86% increase in AI-related technology investments by 2025, according to *The Economist.*[4] As one participant put it,

"There is more usage of basic AI and machine learning in banking currently than most people realize."

In the meeting on May 25th, participants discussed some examples of where AI can meaningfully improve results or efficiency.

Credit underwriting is a promising use case

"There is more usage of basic AI and machine learning in banking currently than most people realize."

– Participant

Participants discussed the potential for financial institutions to use AI to determine credit worthiness, with some predicting it will be an area of rapid expansion for the technology in the coming years. One stated, *"I believe that globally all flavors of credit will be empowered by AI within the next five-to-ten years. You can have a far better consumer product, more profitability for the banks, and you can do it in a way that is safe and resilient."* Using AI for credit analysis could expand credit provision, benefitting customers and banks. A participant noted, *"The way it is done today, enormous numbers of people are not recognized as credit worthy who should be, while others are deemed worthy without good reason, because the tools are very blunt and not terribly predictive."* The same participant added, *"Banks can create better and more profitable lending systems while also serving their customers better, which is ultimately what matters."*

"I believe that globally all flavors of credit will be empowered by AI within the next five-to-ten years."

– Participant

Many lenders are experimenting with AI credit underwriting. Chinese financial group Ant Financial was able to grow rapidly, at least in part, due to its ability to use data on customers and corporates to "predict credit risk and provide customized services," a goal accomplished via AI.[5] Upstart, a fintech that went public in late 2020, partners with banks and "uses artificial intelligence and alternative data like education and employment history to assess a person's creditworthiness, eschewing the simpler FICO-based models favored by other lenders."[6] Discover Financial has announced a partnership with Zest Finance and plans to use AI to "assess hundreds of unusual characteristics about personal-loan applicants…" when evaluating personal loan applications.[7] Some banks are beginning to use AI to help make decisions for customers who fall into a *"grey area,"* to help make final determinations.

Machine learning applications in trading will continue to proliferate

A participant said, *"The use of machine learning is pervasive in this area and has been for many years … Machine learning thrives in situations where data is voluminous, opportunities to make decisions are very frequent, and each individual decision is relatively unimportant on its own."* The longer track

record of AI applications in trading gives some bank leaders greater comfort in expanding their use. A director observed, *"In investment banking we have been using the technology–algorithms and models–for years, and there are a lot of lessons learned, established best practices, and good governance around it. It is not an unknown or scary space."*

"It is surprising how there are significant pockets of trading that are still far from being automated or using machine learning."

– Participant

Despite the widespread use of the technology already in trading, participants noted there remains considerable room for expansion. One said, *"It is surprising how there are significant pockets of trading that are still far from being automated or using machine learning …You'd be surprised how much, in things like securities lending, is still someone with a spreadsheet getting bids and pressing buttons. I'd expect a lot more automation there in the coming years."* Still, there are limits to what the technology can currently do in a trading environment. Another participant clarified, *"Can machine learning find alpha? Not yet. Prediction is not the same as a model. Prediction, e.g. this stock will go up, is when the work has just started. How much will it go up? How much should you buy? How quickly? How long to hold? When and how should you liquidate? There are lots of parameters that need tuning. It works better for the optimization of strategies, rather than creating strategies. People still need to do that."*

AI can improve transaction monitoring

Several participants noted that their firms use AI for transaction monitoring and expect countering fraud to be a growing area for application of AI. A director said, *"This is an area that's going to expand very quickly. Humans cannot oversee transactions in a real time payments world. It is not possible for that human element to dive in for fraud, sanctions, or AML. But, when a high value payment is intercepted and held up, that could be a real detriment to the customer if the wrong decision has been made. We are accountable to our regulators, customers, clients, on these decisions."* In 2020, Visa introduced a deep learning AI system capable of approving or declining credit or debit transactions on behalf of banks whose own networks are down. Testing showed that the "model was 95% accurate in mimicking the bank's decision on whether to approve or decline a transaction."[8]

Addressing risk and oversight concerns will take time

As AI and machine learning continue to attract significant attention and investment dollars across the sector, bank leaders and regulators are working to understand the potential, but also the unique risks these applications might present. An EY expert said, *"Most of us do not have a lot of experience, there*

"It … has a blend of quantitative science and qualitative ethical and social implications. It is that intersection that makes it so difficult to assess the risk in its applications."

– EY Expert

are new use cases emerging, and we can't, therefore, anticipate all of the consequences. A lot of current applications of the technology in banking are in lower risk areas. That creates fear and barriers to scaling the use of AI." An industry survey found that just 11% of risk managers in banking, capital markets, and insurance say they are fully capable of assessing AI related risks.[9] The EY expert added, *"It is a technology that has a blend of quantitative science and qualitative ethical and social implications. It is that intersection that makes it so difficult to assess the risk in its applications."*

Participants identified concerns regarding risks of broader adoption

Participants highlighted a number of concerns regarding the expanding use of AI:

- **Transparency and explainability.** A common concern among bank leaders is that AI represents a black box, which is difficult for laypeople, and sometimes even technical experts, to understand and explain. A director said, *"There's a danger with AI that the machine develops its own way of thinking that is not necessarily clear and cannot be easily explained to the customer. People want things explained to them, they do not want to hear that they did not get approved for something because the God-machine said so."* As banks adopt machine learning, some are concerned about the ability to "audit" the process, i.e., to determine and then explain why an algorithm arrives at a decision. Explainability is more important with certain uses of the technology than others. A director said, *"If it's customer facing or has customer implications, there should be an expectation of explainability."* A regulator expanded, *"In addition, the type of explainability also varies depending on who is asking for the explanation. Explainability for a consumer is very different from explainability for a model developer."*

"People want things explained to them, they do not want to hear that they did not get approved for something because the God-machine said so."

– Director

- **Ethical use and potential for bias.** Participants shared concerns about the potential risks of uses of data that could be ethically questionable and bias in outputs, particularly as machine learning technology is employed. One director said, *"You need to make sure it in no way has any kind of bias in it. We have had the investigation into whether our algorithms to determine credit are biased … they were cleared, but the perception among the consumer population is that there was bias somehow built in."* Biased results could pose significant reputational risks to firms and is also a concern for supervisors. A regulator asked, *"It's a question of bias. Are you allowing systematic bias into decision-making in an industrialized way?*

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"There are ways to mitigate these concerns. And not just theoretical ideas of how to mitigate these risks, but actual bank lending programs that have been up and running for years."

– Participant

Getting everything wrong rather than everything right?" Another agreed, saying, *"At the highest level there is absolutely an ethical dimension. Is it right that a machine actually takes that particular decision? Is the data being brought into that decision accurate?"* Another participant clarified, *"Bias as a scientific term is well understood and can be measured. The broader question is about fairness. The social construct of fairness creates tension because it is not prescribable.*

- **Regulatory and legal uncertainty.** Several participants noted that while traditional models are currently accepted by regulators and society, the guidelines for AI remain in their infancy. A director said, *"I do believe that you can put risk controls and explainability around this, but the issue is more what the regulators think and accept. Will we have safe harbor? I am fascinated by this approach to credit, it is very attractive, but at the end of the day will it be acceptable to regulators and society? Right now, FICO is."*

The risks can be managed, but bank leaders will need to be assured

Despite the promise, large banks appear hesitant to expand AI uses in sensitive areas like credit. A participant said, *"The risks are solvable, but right now, I do not see evidence of it being used in credit decisioning by a major bank really at all."* While directors and regulators are understandably focused on understanding the risks, a participant cautioned against framing the concerns about AI as *"ambiguous and unmeasurable risks"* that the industry at large has yet to properly consider: *"I appreciate that there are many issues and opinions with respect to AI and its use in lending, but there are ways to mitigate these concerns. And not just theoretical ideas of how to mitigate these risks, but actual bank lending programs that have been up and running for years, generating profits, measuring and reporting for bias, delivering consumer-friendly explanations when an application is denied, enduring examinations from regulators, etc."*

"I do believe that you can put risk controls and explainability around this, but the issue is more what the regulators think and accept."

– Director

In some cases, like credit underwriting, a participant questioned why AI models couldn't actually improve explainability relative to traditional models: *"There seems to be a broad-based assumption that AI cannot be explainable. Adverse action notices are required for every decline of credit, by law. Any system, whether rules based or AI based is required to give the consumer a reason for declining. Is telling the customer, 'I'm sorry your FICO score is below 700,' really explaining anything? Somehow the industry accepts that."*

In addition, a director suggested boards remain focused on the promised benefits as much as the other risks identified: *"As a board member, I would be asking as much about the commercial viability as about the quantitative or ethical issues. Is the system doing what we need it to do? Can it provide information about customer behavior that we otherwise would not have? How efficient is the system?"*

Regulation and supervision are also playing catch up

Some participants said regulators are lagging the banks in grappling with the potential risks of AI and machine learning. One director said, *"I think regulators are as far behind on this as anyone, I do not think they know how to think about this or regulate it either, actually."* An EY expert said, *"As a regulatory topic it is broadly in its infancy. It tends not to be a pure AI conversation when regulators talk about this topic, it's typically AI plus something like big data or controls in a trading environment."*

> *"Some might say we're behind the curve, but I'm pleased to say we are not asleep at the wheel."*
>
> – Regulator

Regulators noted they are looking to establish supervisory expectations while encouraging responsible use of the technology. One said, *"Some might say we're behind the curve, but I'm pleased to say we are not asleep at the wheel. We do not want to stifle innovation on this, we are keen to work with the industry. But there are really thorny issues to get into."* They are still considering what one participant described as *"foundational, high-level principles,"* including core questions– *"Can you understand the decisions being made?"*–and ethical questions– *"is it right that a machine takes this decision? Is it ethically desirable that you use some forms of data?"*

In March, five federal financial regulatory agencies in the US, including the Federal Reserve, announced a request for information (RFI) regarding financial institutions' use of artificial intelligence, noting, "More specifically, the RFI seeks comments to better understand the use of AI, including machine learning, by financial institutions; appropriate governance, risk management, and controls over AI; challenges in developing, adopting, and managing AI; and whether any clarification would be helpful."[10] In April, the European Commission proposed the first ever legal framework on AI, stating, "Faced with the rapid technological development of AI and a global policy context where more and more countries are investing heavily in AI, the EU must act as one to harness the many opportunities and address the challenges of AI in a future-proof manner."[11]

A regulator shared some of the areas they are exploring: *"Where does responsibility start and stop and what can we reasonably expect? Then, is the governance structure fit for purpose?"* Another provided some guidance

regarding their expectations for governance around AI: *"What is the understanding within the governance chain here? What is the line of control around the people involved and how does the board have oversight? Then ultimately, what is the response if things go wrong? How do you stop it in real time when it behaves strangely? Who is accountable?"* Some regulators have addressed specific areas of concern. For example, a report by the FCA called for a goal of "sufficient interpretability," as a standard for explainability, noting "'Sufficient' reflects the fact that explainability comes with a cost, can also never be absolute, and will be valued in some settings (and by some stakeholders) more than others."[12]

To effectively regulate AI applications, one participant asserted that regulators need to quickly get up to speed on how the technology works, otherwise *"it's like coming up with guidelines for surgeries without anyone discussing what actually happens in an operating room, what the tools are, etc."*

Adapting oversight and governance

To establish oversight of AI, it is important to understand how the technology is being applied and the nature of the risk it presents. Participants highlighted some of the challenges for boards and management to better understand and oversee emerging AI applications:

"What separates newer, deep learning, from machine learning is it starts combining the steps to understand the data and project based off the data."

– Participant

- **Understanding how AI applications are evolving.** As is often the case with emerging technologies, the level of understanding of AI lags the hype around its potential. Participants acknowledge that even terminology can be confusing, as AI and machine learning are often used interchangeably. An EY expert said, *"There is a lot of confusion around these terms, they have evolved over time and are often used interchangeably."* Further, the industry has used certain aspects of machine learning for years, while others are still in early pilots. The Bank of England defines machine learning as, "A set of statistical algorithms applied to data for making predictions or identifying patterns in data."[13] Such algorithms and models have been at the heart of certain aspects of bank operations for some time. An EY expert explained, *"Some uses of machine learning in banking are already very well established and have been around for a long time. It is understood, regulated, there is a whole ecosystem around it. But, when you look at things like deep learning and using deep neural networks to understand behavior, that is at a more nascent stage. It really depends on what you are talking about."* Another participant added, *"Machine learning has been around a long time at this*

point, decades really. What separates newer, deep learning, from machine learning is it starts combining the steps to understand the data and project based off the data."

"As a risk committee chair, it is important to put something in a box and think about the risks of it … At that point definitions do become important because that is how you put structures around these things."

– Director

- **Clarifying what is novel about emerging applications.** While participants discussed the need to define more carefully what is truly AI, what is machine learning, and how oversight of these applications might differ from traditional model governance, one asserted, *"I do not think the definitions are particularly useful … Giving definitions of what a model is or is not, is not going to help you contain the risks of models and algorithms."* Others noted, however, the relevance of terminology in determining which models should be subject to governance and model risk management practices. As one director said, *"As a risk committee chair, it is important to put something in a box and think about the risks of it. Unfortunately, we are in a regulated entity, they want to regulate what we do, and at that point definitions do become important because that is how you put structures around these things."* An EY expert added, *"Definitions do matter. Different aspects and uses create different risks that need to be thought of separately. They matter to the extent that they impact how you regulate AI, and even how institutions oversee the processes and keep both the institution and customer safe."* Ultimately, boards and senior management are trying to determine which applications of AI represent a meaningful break from existing practice, e.g. where decisions are completely automated with no human intervention, so they can get a sense for the nature of risks they should be considering. *"There are tradeoffs,"* a participant noted, *"For example, a deep neural network can be much more accurate than a simple AI application, but it is not as explainable."*

"There has to be an expectation that AI will be wrong sometimes."

– Participant

An EY expert said, *"A lot of the risks are not unique to AI: operational vulnerability, IT lapses, cyber threats, third parties, all of that. There are potentially unique manifestations of each risk, of course, but they are not new risks."* A regulator agreed, *"AI just amplifies existing risks rather than creates new ones, as the board you need a framework in place to understand those and react accordingly."* Participants said that existing governance and risk management frameworks can and should be adapted to oversee AI implementation. *"There has to be an expectation that AI will be wrong sometimes,"* according to one participant, who added, *"It is going to be just like generating a reserve for credit losses, there needs to be an expectation for how much you are willing to accept …The technology offers many great benefits, but of course there is some level of loss, and it then becomes about*

mitigating losses." Strong governance of this area will require early detection, mitigation, and remediation of failures, in addition to a robust exception process.

Participants see a role for the board in exercising oversight of the technology but the extent of that oversight remains a work in process at some firms. A director said, *"We need honest conversations about what objectives we have with the application of the technology, what the regulatory requirements are, what duty of care do we have to stakeholders, and make sure all of that is brought forward at the beginning."* Another participant said, *"Some situations you might use AI, but others could be totally inappropriate because you need explainability or other reasons, but at what point does that come to the board level and a decision is made? That's something that needs to be established."* Participants suggested that currently very few of these types of questions are coming to the board for deliberation.

"Some situations you might use AI … but at what point does that come to the board level and a decision is made? That's something that needs to be established."

– Participant

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The potential for AI and machine learning is vast across an array of business and internal applications. To capitalize on the potential bank leaders and regulators need to get comfortable that banks are managing the risks and applying these tools appropriately. Incumbents are not only competing amongst each other to adopt the technology; they are also likely to be increasingly pressured by newer entrants and big technology firms. According to *The Wall Street Journal,* "Fintech and big technology companies could outpace traditional banks in the race to develop AI tools that help personalize services, evaluate credit risk and more."[14] An executive said, *"There are many risks, but the biggest risk is not doing it. I think you can 100% sit out on crypto or some of these other hyped trends, but I do not think you can at all sit out of AI or machine learning because you risk missing out on the future of the industry."* Some shared concerns that while banks should be aware of potential risks, they should not let those concerns unnecessarily impede innovation. A participant said, *"All of these questions are important and valid, but it's also important that, before you get worked up about terrible things that can happen and the risks, establish the use cases and how they can be beneficial."* Financial institutions remain in the early days of their AI journey and boards may not yet have seen a comprehensive AI strategy from management. Directors will need to challenge the mitigation of risks, as much as they do the capitalization of opportunities.

"There are many risks, but the biggest risk is not doing it … I do not think you can at all sit out of AI or machine learning because you risk missing out on the future of the industry."

– Executive

Appendix

The following individuals participated in these discussions:

Participants

- Homaira Akbari, Non-Executive Director, Santander
- Nora Aufreiter, Corporate Governance Committee Chair, Scotiabank
- Agnes Bundy Scanlan, Non-Executive Director, Truist
- Beth Dugan, Deputy Comptroller for Large Bank Supervision, Office of the Comptroller of the Currency
- Lynn Dugle, Technology and Operations Committee Chair, State Street
- Terri Duhon, Risk Committee Chair, Morgan Stanley
- Mary Francis, Non-Executive Director, Barclays
- Morten Friis, Risk Committee Chair, NatWest Group
- Dave Girouard, Co-founder and Chief Executive Officer, Upstart
- Tobi Guldimann, Audit Committee Chair, Commerzbank
- Julian Hancock, Model Approval Head of Retail, Lloyds
- Petri Hofsté, Audit Committee Chair, Rabobank
- Jamey Hubbs, Assistant Superintendent, Deposit-Taking Supervision Sector, Office of the Superintendent of Financial Institutions Canada
- Brad Hudd, Senior Director, Bank of England
- Kavita Jain, Deputy Associate Director, Innovation Policy, Federal Reserve Board
- Michael Kearns, Professor and National Science Chair, Department of Computer and Information Science, University of Pennsylvania
- Phil Kenworthy, Non-Executive Director, ClearBank
- Tom Killalea, Non-Executive Director, Capital One
- Richard Meddings, Audit Committee Chair, Credit Suisse and Chair of the Board, TSB Bank

- Lyndon Nelson, Deputy CEO, Executive Director, Supervisory Risk Specialists and Regulatory Operations, Bank of England
- Andy Ozment, Chief Technology Risk Officer and EVP, Capital One
- Jane Peverett, Non-Executive Director, CIBC
- Marty Pfinsgraff, Risk Committee Chair, PNC Financial
- Phil Rivett, Audit Committee Chair, Standard Chartered and NED Nationwide Building Society, Standard Chartered
- Alexandra Schaapveld, Audit Committee Chair, Société Générale
- Mark Seligman, Senior Independent Director, NatWest Group
- Gavin Smyth, Chief Risk Officer, Nationwide Building Society
- Jan Tighe, Non-Executive Director, Goldman Sachs
- Suzanne Vautrinot, Non-Executive Director, Wells Fargo
- Nout Wellink, Compensation Committee Chair, Industrial and Commercial Bank of China

EY

- Jan Bellens, Global Banking and Capital Markets Sector Leader
- Cathy Cobey, EY Global Trusted AI Advisory Leader
- Sameer Gupta, North America Financial Services Organization Advanced Analytics Leader
- Christopher Woolard, Partner, EMEIA Financial Services Consulting and Chair, EY Global Regulatory Network

Tapestry Networks

- Dennis Andrade, Partner
- Brennan Kerrigan, Senior Associate
- Tucker Nielsen, Principal

About ViewPoints

ViewPoints reflects the network's use of a modified version of the Chatham House Rule whereby names of network participants and their corporate or institutional affiliations are a matter of public record, but comments are not attributed to individuals, corporations, or institutions. Network participants' comments appear in italics.

About the Bank Governance Leadership Network (BGLN)

The BGLN addresses key issues facing complex global banks. Its primary focus is the non-executive director, but it also engages members of senior management, regulators, and other key stakeholders committed to outstanding governance and supervision in support of building strong, enduring, and trustworthy banking institutions. The BGLN is organized and led by Tapestry Networks, with the support of EY. ViewPoints is produced by Tapestry Networks and aims to capture the essence of the BGLN discussion and associated research. Those who receive *ViewPoints* are encouraged to share it with others in their own networks. The more board members, members of senior management, advisers, and stakeholders who become engaged in this leading-edge dialogue, the more value will be created for all.

About Tapestry Networks

Tapestry Networks is a privately held professional services firm. Its mission is to advance society's ability to govern and lead across the borders of sector, geography, and constituency. To do this, Tapestry forms multistakeholder collaborations that embrace the public and private sector, as well as civil society. The participants in these initiatives are leaders drawn from key stakeholder organizations who realize the status quo is neither desirable nor sustainable, and are seeking a goal that transcends their own interests and benefits everyone. Tapestry has used this approach to address critical and complex challenges in corporate governance, financial services, and healthcare.

About EY

EY is a global leader in assurance, tax, transaction, and advisory services to the banking industry. The insights and quality services it delivers help build trust and confidence in the capital markets and in economies the world over. EY develops outstanding leaders who team to deliver on our promises to all of our stakeholders. In so doing, EY plays a critical role in building a better working world for its people, for its clients and for its communities. EY supports the BGLN as part of its continuing commitment to board effectiveness and good governance in the financial services sector.

Endnotes

[1] *ViewPoints* reflects the network's use of a modified version of the Chatham House Rule whereby comments are not attributed to individuals, corporations, or institutions. Network participants' comments appear in italics.

[2] Nick Huber, "AI 'Only Scratching the Surface' of Potential in Financial Services," *Financial Times,* June 30, 2020.

[3] Nick Huber, "AI 'Only Scratching the Surface' of Potential in Financial Services," *Financial Times,* June 30, 2020.

[4] "Banks and Insurance Companies Expect 86% Increase in AI-Related Investments Into Technology," *Bloomberg,* June 2, 2020.

[5] Gillian Tett, "Artificial Intelligence is Reshaping Finance," *Financial Times,* November 19, 2020.

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[12] Karen Croxson, "Explaining Why the Computer Says 'No'," *FCA,* May 31, 2019.

[13] David Bholat, "The Impact of COVID on Machine Learning and Data Science in UK Banking," *Bank of England,* December 18, 2020.

[14] Jared Council, "Banks See Pressure in AI Race From Fintechs and Big Tech," *Wall Street Journal,* August 21, 2020.