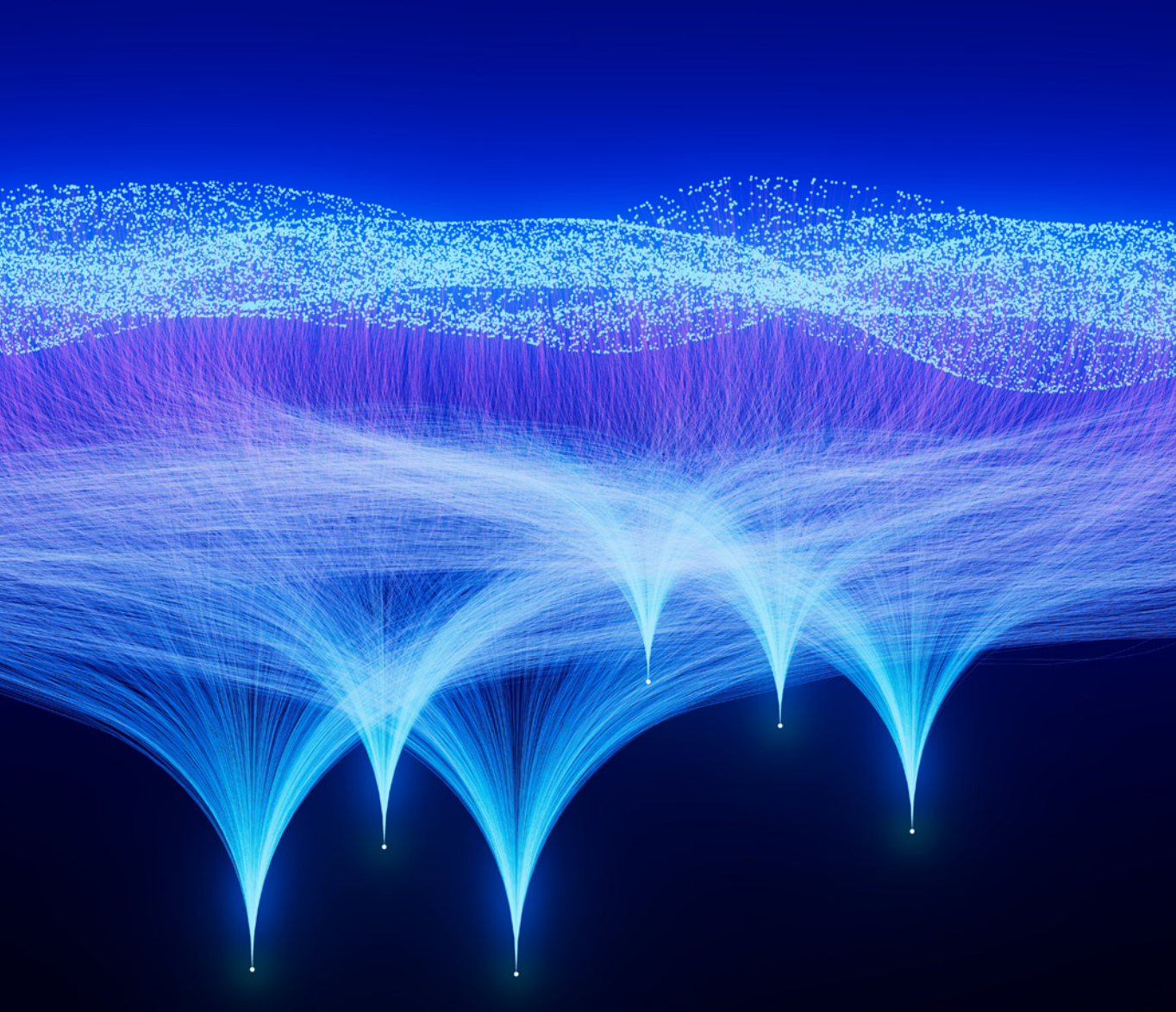# AI- The Coming Disruption of Banking

Equipping the C-Suite with an intelligent case for AI consideration

August 2024

Content:

A Brief History of AI

Fig1. The Ratio Club with guests outside Peterhouse, University of Cambridge. Alan Turing, upfront left.

Early Development:
1950s: Alan Turing introduces the concept of machines that can think.

Foundation of Computation Theory:
- Conceptual Model: The first machine that provided a formalization of the concept of algorithms and computation.
- Universality: It introduced the universal model of computing, meaning it could simulate any algorithm.

Basis for Modern Computers:
- Blueprint for Digital Computers: The idea that a machine could follow a set of instructions to perform complex calculations laid the groundwork for the development of programmable computers.
- Memory as a concept: Turing's concept proved that a machine could store its program in memory and it would be directly reflected in modern computer architectures.

Influence on Artificial Intelligence:
- Cognitive Modelling: Turing's work suggested that human cognitive processes could be mechanized. This central theme is central to the development of AI.
- Turing Test: The Turing Test as a measure of machine intelligence evaluates whether a machine's behaviour is indistinguishable from that of a human, which remains a foundational concept in AI research and philosophy.
- 1956: Dartmouth Conference, where the term "Artificial Intelligence" is coined.

Key Milestones in AI

1960s-70s:
Development of early AI programs and expert systems.

2000s:
Advancements in deep learning and neural networks.

1980s:
Introduction of machine learning algorithms.

2010s- Present:
Rapid growth in AI applications due to big data, improved algorithms, and increased computing power. AI becomes integral in various industries, including banking.

Key Milestones in AI

1

The invention of GANs (2014) Generative Adversarial

Networks (GANs) were the key technological innovation which would eventually enable realistic-looking AI generated images and videos. GANs use neural networks, a popular machine learning model based on the way neurons in the brain work.

2

Sophia the robot is activated (2016)

Sophia the robot, the world's first non-human to be recognised with legal personhood, was activated in February 2016. Sophia, a humanoid robot combines vision algorithms, that process visual inputs from its camera eyes, with speech algorithms that employ natural language processing to process and produce speech, to create a human-like impression.

3

The AI audio generator WaveNet is launched (2016)

Google DeepMind launched WaveNet. an AI voice-generator which uses a 'generator' algorithm, similar to that found in a GAN. The generator algorithm is trained on an example dataset and can then produce new, similar-sounding examples which weren't part of the training data.

4

AlphaGo beats the world's Go champion (2016)

GO is so ridiculously complex that the amount of possible moves is a googol greater than in chess. Developing computer programs that can beat humans at logical games, a benchmark for increasingly capable algorithms, had been a goal for AI researchers since a computer first mastered noughts and crosses in 1952.

* A googol is a number greater than there are atoms in the universe

5

The birth of deepfakes (2017)

The term 'deepfakes' was coined when the Reddit user 'deepfakes' began posting hyper-realistic AI videos online – mostly involving pornographic videos with celebrities' faces super-imposed onto actresses without their consent. But now, deepfake videos, with the use of GAN technology, allow anyone to easily produce convincingly real videos, and they're only getting better.

Key Milestones in AI

6

The first 'Transformer' lays the technological foundation for large language models (LLMs) (2017)

Instead of individually translating each word, Transformers read whole sentences at once, capturing the dependencies between words and extracting meaning based on the context. The way Transformers extract and generate meaning from patterns would become central to the technology used in subsequent AI breakthroughs like AlphaFold and large language models.

7

OpenAI releases GPT-1 (2018)

The first Generative Pre-trained Transformer was released by OpenAI in 2018. It was able to answer questions and generate blocks of text. It gained these abilities after being trained using two large datasets: one with around 8 million web pages, and one with over 11,000 books.
Although this language processor was fluent and accurate on an unprecedented scale, it was unable to coherently generate longer blocks of text and was prone to repetition.

8

AlphaFold wins protein folding contest (2020)

Characterising specific protein structures used to require years of excruciating laboratory tests. In 2020, Google DeepMind released the AI algorithm AlphaFold, which, after being trained on a public database of 170,000 protein sequences, reached an accuracy comparable to the lab work at predicting protein structure. This revolutionised biological research and is contributing to novel drug design.

9

Generative AI goes mainstream (2022)

OpenAI introduced ChatGPT to the public in 2022, and users surpassed one million a week after - the fastest-growing consumer application in history. This was welcome news to OpenAI, who were using the users' data to improve their product In the same year, DALL-E 2, a textto-image generative AI model, and GitHub Copilot, a code writing assistant, among others, were also released sparking widespread experimentation and usage at the easiest level of accessibility.

10

The release of Chat GPT-4 (2023)

The newest GPT to date was launched in March 2023 with key advancements – such as the abilities to take in videos and images, rather than just text, as input prompts, as well as to access the internet in real time.

Overall, AI breakthroughs weren't quite as sudden as they might have seemed in the news. But looking back on the past decade, the rate of progress is still pretty breath-taking.

The History of AI Uptake in Banking

Early Automation in Banking:

1960s:
Introduction of ATMs, enabling automated cash withdrawals.

1970s-80s:
Adoption of mainframe computers for transaction processing.

Early Examples:
Citibank (1990s): Utilized AI for credit card fraud detection.
JP Morgan (2000s): Applied AI for algorithmic trading, significantly increasing efficiency and profitability.

1990s:
Introduction of rule-based systems for credit scoring and fraud detection.

2000s:
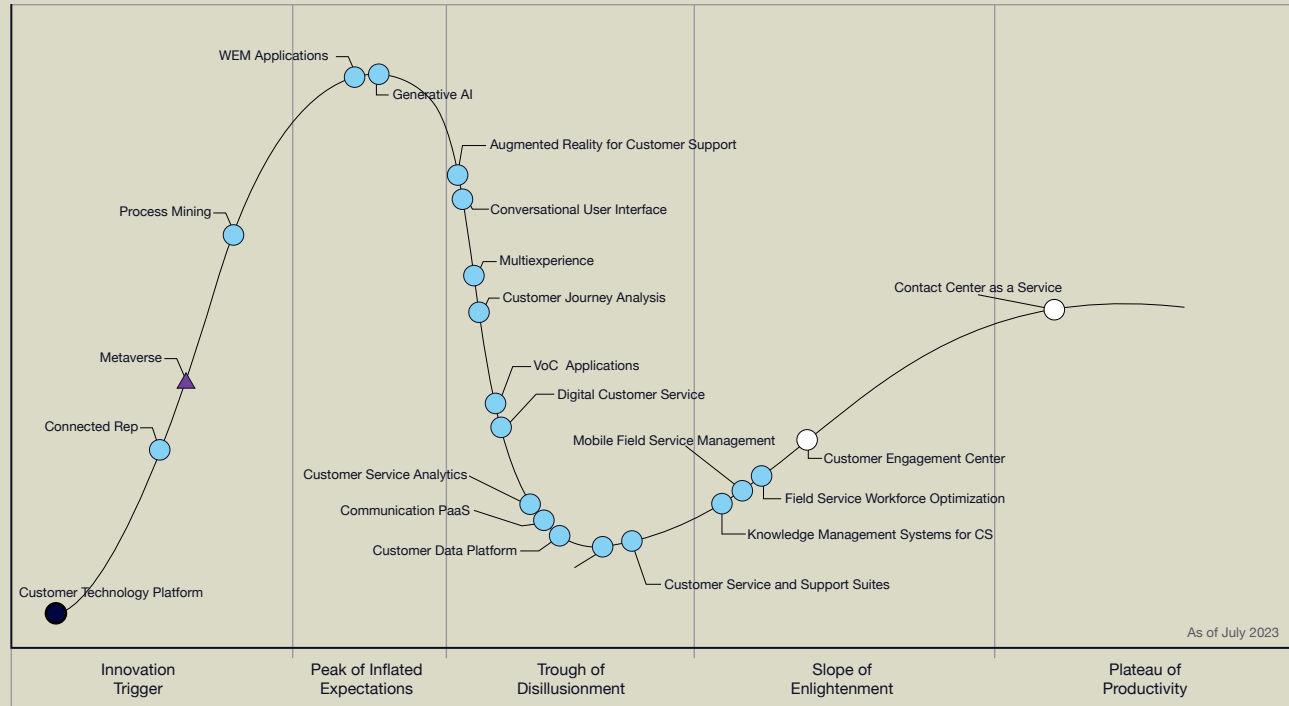Use of AI for automated trading and portfolio management.

2010s-Present:
Integration of AI in customer service (chatbots), risk management, and personalized banking services.

Transition to AI:

The Relevance of AI to Banking

fig 1: Gartner Hype Cycle for Customer Service and Support Technologies, 2023

Plateau will be reached: ○ < 2 yrs. ● 2- 5 yrs. ● 5- 10 yrs. ▲ > 10 yrs.

North American banks published 80% of all bank AI research and made 60% of all bank AI-related investments in 2022, while filing 99% of all AI-related bank patents in 2021.

Current Landscape:

Statistics:

- "According to a McKinsey report, AI can potentially deliver up to $1 trillion of additional value each year in global banking."
- "Gartner predicts that by 2025, AI will handle 95% of customer interactions in banks.

"Digital Customer Service, Conversational User Interfaces and Generative AI will Have the Biggest Impact on Customer Service and Support Strategies"
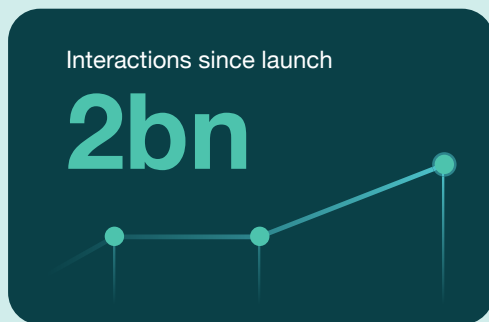
Interactions since launch

2bn

fig 1: BoA's Erica interactions since launch
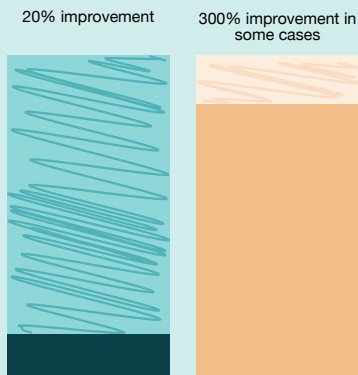

20% improvement

300% improvement in some cases

fig 2: Mastercard AI powered fraud detection solutions

Competitive Edge:

Personalized Customer Experiences:

- Example: Bank of America's Erica, a virtual assistant, handling over 50 million customer requests.
- Erica Surpasses 2 Billion Interactions, Helping 42 Million Clients Since Launch
- Clients engage 2 million times per day for help with everyday financial needs, and the occasional joke took four years to reach 1 billion interactions, and just 18 months to reach the second billion.

Fraud Detection:

- JPMorgan Chase using AI to reduce fraud losses with Omni AI
- J.P. Morgan's COiN platform automates the analysis of legal documents including commercial loan agreements - saving thousands of human hours annually.
- Mastercard's AI-powered fraud detection solution, for instance, has demonstrated a 20% improvement in fraud detection rates, with some cases reaching up to 300% improvement.
- HSBC's ML-driven anti-money laundering system has accelerated the detection ofpotential financial crimes by up to 20 times.
- Citigroup and JPMorgan Chase, have already implemented NLP-based compliance and reporting solutions, realizing significant time and cost savings while enhancing regulatory adherence.

Operational Efficiency:

- Wells Fargo using AI for process automation, reducing operational costs by 20%. Fargo™ is a virtual assistant for customers.
- The Customer Engagement Engine gives Wells Fargo bankers insights into what sort of goals or conversations would be the most useful for customers.
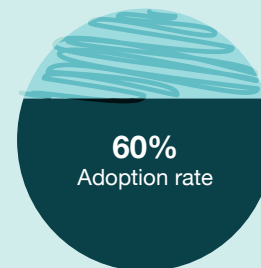
Market Trends And Statistics:

Adoption Rates:

"The adoption of AI in the banking sector has increased by 60% in the past two years."

Customer Expectations:

"70% of banking customers expect personalized experiences powered by AI."

60%
Adoption rate

70%
customer expectations

Key AI Technologies
and Use Cases

Customer Service And Personalization:

Chatbots and Virtual Assistants:
Case Study:
  Bank of America's Erica: Helps customers with everyday banking needs,
  providing a seamless experience.
Scenario:
  A customer asks a chatbot about their recent transactions and gets instant
  answers, reducing wait times and improving satisfaction.

Personalized Recommendations:
Case Study:
- HSBC: Uses AI to analyse customer spending patterns and offers personalized financial advice.
- AI suggests investment opportunities based on a customer's financial history and goals.
- By understanding the customers' spending patterns, HSBC wanted to deliver personalized insights like:
  - View of wealth portfolios
  - Highlights on gains and losses
  - Level of insurance protection per the net assets, family size, and cashflow

One of the actionable insights on the platform is to suggest customers increase their
insurance coverage per their financial position, which helps the bank to cross-sell. The bank
also hopes to send personalized offers to credit card customers based on their spending patterns.

Risk Management And Fraud Detection:

AI in Fraud Detection:
Case Study:
  JPMorgan Chase: AI models that identify and prevent fraudulent transactions in real-time.
Scenario:
  AI detects an unusual transaction on a customer's account and alerts the customer instantly.

Risk Assessment:
Case Study:
  Capital One: Uses AI to assess credit risk, enabling faster and more accurate loan approvals.
Scenario:
  AI analyses a loan applicant's financial history and assesses their creditworthiness within minutes.

Operational Efficiency:

Process Automation:
Wells Fargo: Automates back-office processes, reducing manual errors and operational costs.
Scenario: AI processes loan applications, automating data entry and verification tasks.

Data Analysis and Decision Making:
BBVA: Uses AI to analyze customer data and make strategic business decisions.
Scenario: AI provides insights into customer behavior, helping the bank tailor its services.

Increasing Speed of Complex Analytics:
HSBC used the Databricks platform to unify disparate data sets across the bank to build one
unified dataset.
- Faster data pipelines increased data processing time from six hours to six seconds
- Moved from 14 databases to a single unified data store with Delta Lake
- 4.5X improved engagement levels
- Deployed predictive data models

The Upcoming Disruption For Retail Banking

Generative AI

- Gartner predicts that by 2025, 80% of customer service and support organizations will be applying generative AI technology in some form to improve agent productivity and customer experience (CX).
- Generative AI, which is currently at the Peak of Inflated Expectations, will primarily be used for content creation, AI-supported chatbots and automation of human work.
- Generative AI's biggest impact is likely to be on customer experience. According to a recent Gartner poll, 38% of leaders see improving customer experience and retention as the primary purpose of initiatives to deploy applications trained on large language models.
- "The impact of AI on the customer service function cannot be overstated," said Kraus, "Not only do we expect organizations to replace 20-30% of their agents with generative AI, but also anticipate it creating new jobs to implement such capabilities."

Conversational User Interfaces

The computer age has gone from coding into terminals, to the GUI. Now the CUI is upon us.
Methods of interaction are rapidly changing. Customers increasingly expect to be able to interact with the applications they use in a natural way. Siri and Alex were the first step towards this but handled limited tasks which were largely ecosystem based. But this has been accelerated by the emergence of large language model-enabled enterprise applications, such as OpenAI's ChatGPT and Microsoft 365 CoPilot.

- CUIs are human-computer interfaces that enable natural language interactions for the purpose of fulfilling a request, such as answering a question or completing a task.
- When used to automate support via chatbots, this technology improves customer experience and self-service adoption.
- The limitation for African Banks is that most of the current LLMs are Caucasian inclined. The opportunity is for native LLMs that can both understand the nuances and phonetical leanings of the African customer as well as an ability to respond to native languages to deepen accessibility and inclusion. Similar concerns have been expressed in China, Russia, The Gulf and Korea.

Digital Customer Service

- The quickly changing digital customer is changing ever much faster spurred on by innovations coming from everyday consumer technology they're used to. Now with the world 4 biggest tech companies rapidly integrating AI into familiar landscapes, the absence of it will soon seem like a bother and an indication of backwardness. These are the bare facts.
- As other banking and non-financial institutions introduce a proliferation of digital engagement channels, customers are growing to expect instantaneous, effortless customer service experiences.
- Digital customer service offerings focus on seamless conversation orchestration across digital channels. The desire for self-service, and general aversion to banking hall hassles, combined with the emergence of conversational AI, presents an opportunity to evolve most engagement models. CX is going to become a competitive edge and a contributor to the bottomline in a few years. Banks who fall behind in building quickly for this new era may be stunned at the effects. BofA's Erica sudden uptake is a good indicator of what our current reality is.
- Reducing friction and unnecessary customer effort will reduce churn and enhance customer satisfaction and recommendation.

AI Adoption Challenges and Solutions

fig 1: Employee optimizing code using AI

Challenges:

Data Privacy and Security:
Concerns about protecting customer data.
Example: GDPR compliance in AI applications.

Integration with Legacy Systems:
Difficulty in integrating AI with existing IT infrastructure.
Example: A bank struggling to integrate AI with its core banking system.

Skills Gap:
Lack of skilled personnel to manage AI systems.
Example: Banks needing to upskill their workforce in AI technologies.

Lack of Organisational Guidance:
The role for the CAIO is becoming more necessary than it has ever been in place of a CIO or CTO who is unfamiliar with the AI terrain.

Solutions:

Strategic Roadmaps:
Importance of a clear AI adoption strategy.
Example: Developing a phased AI implementation plan.

Partnerships and Collaboration:
Partnering with AI specialists and consultants.
Example: Collaborating with AI firms for technology and expertise.

Training and Upskilling:
Continuous training for staff.
Example: Implementing AI training programs for employees.

Organisational sandboxes:
Along with a figurehead to begin to experiment where AI might be useful both within the organisation and for the general customer or product experience.

So... where do we go from here?

Start.

AI isn't on its way.

It's not the future.

It's already here.

- Rapid advances in artificial intelligence capabilities are set to boost productivity and cut costs across non-bank institutions such as asset managers and insurance firms.
- Many companies are still in the early stages of assessing AI, with compliance and fraud processes stand-out areas gaining immediate traction.
- The ethical issues underlying an AI rollout also need to be considered and included in an overarching AI governance framework.

Fortunately, or unfortunately Africa tends to lag behind in adoption of technological advancements in general so that presents us with a wealth of case studies and best practices from those who have gone ahead.

However, disruption will happen and when it does, those equipped with those same practices and
potentially better market readiness will win. It won't be about being a big bank or a small bank. It will
be about being a customer ready bank.
Not many will be able to recover.

Interactive Q&A Session.

How to Start with AI in Banking

Identify Business Needs:
- Determine areas where AI can add value (customer service, fraud detection,) Conduct a needs assessment.

Build a Strategy:
- Develop a clear AI strategy aligned with business goals.
- Outline short-term and long-term AI projects with measurable objectives.

Data Collection and Management:
- Ensure access to high-quality, relevant data.
- Implement robust data management practices.
- Invest in Technology and Infrastructure:
- Acquire necessary AI tools and platforms.
- Ensure IT infrastructure supports AI workloads.

Develop Skills and Expertise:
- Upskill workforce through AI and data science training.
- Hire AI specialists and data scientists if needed.

Pilot Projects:
- Start with small-scale pilot projects.
- Demonstrate value and refine models.

Collaborate with Experts:
- Partner with AI vendors, consultants, Fintechs and research institutions.
- Join industry consortia or forums.
- Go to as many conferences and learn as much as you can. This is new for all of us.

Monitor and Iterate:
- Continuously monitor AI performance.
- Iterate on AI models and strategies based on feedback.

What is the ROI of AI in Banking?

Operational Efficiency:
- Automating routine tasks reduces associated man hours and labor costs.

Process Optimization:
- AI optimizes processes like loan approval and fraud detection, making better productivity from staff working time.

Personalized Services:
- Increases customer satisfaction and loyalty

Innovation:
- Develops innovative financial products based on active customer knowledge, product usage patterns and personalised data.

Fraud Prevention:
- Identifies and prevents fraudulent activities.

Credit Risk Assessment:
- Improves accuracy of credit risk assessments.

Customer Experience:
- **24/7 Support:** Provides round-the-clock customer support.
- **Enhanced Interaction:** Offers personalized recommendations and financial advice.

Data-Driven Insights:
- **Better Decision-Making:** Provides actionable insights.
- **Predictive Analytics:** Predicts market trends and customer behaviour. This goes a long way to help customer facing teams.

How to Ensure Data Privacy with AI?

Compliance with Regulations:
- Adhere to data privacy regulations (GDPR, CCPA) and implement data protection policies and procedures.

Data Anonymization:
- Remove personally identifiable information from datasets.

- Use masking, encryption, and tokenization.

Secure Data Storage and Access:
- Store data securely with encryption and access control.
- Restrict access based on roles and responsibilities.

Data Minimization:
- Collect and process only necessary data
- Regularly review and delete outdated data.

Transparency and Consent:
- Inform customers about data usage
- Obtain explicit consent.

Regular Audits and Monitoring:
- Conduct regular audits.
- Monitor AI systems for breaches or privacy issues.

Ethical AI Practices:
- Implement ethical guidelines for AI.
- Avoid harmful or exploitative uses of AI.

Collaboration with Data Privacy Experts:
- Work with data privacy experts and legal advisors.
- Stay updated on emerging trends and best practices.

We are at the beginning – there's no question

-Rebecca Engel, Director, Financial Services Industry, Microsoft.

Schedule a free 30-minute consultation to discuss how your
bank can start its AI journey.

About the Editors:

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