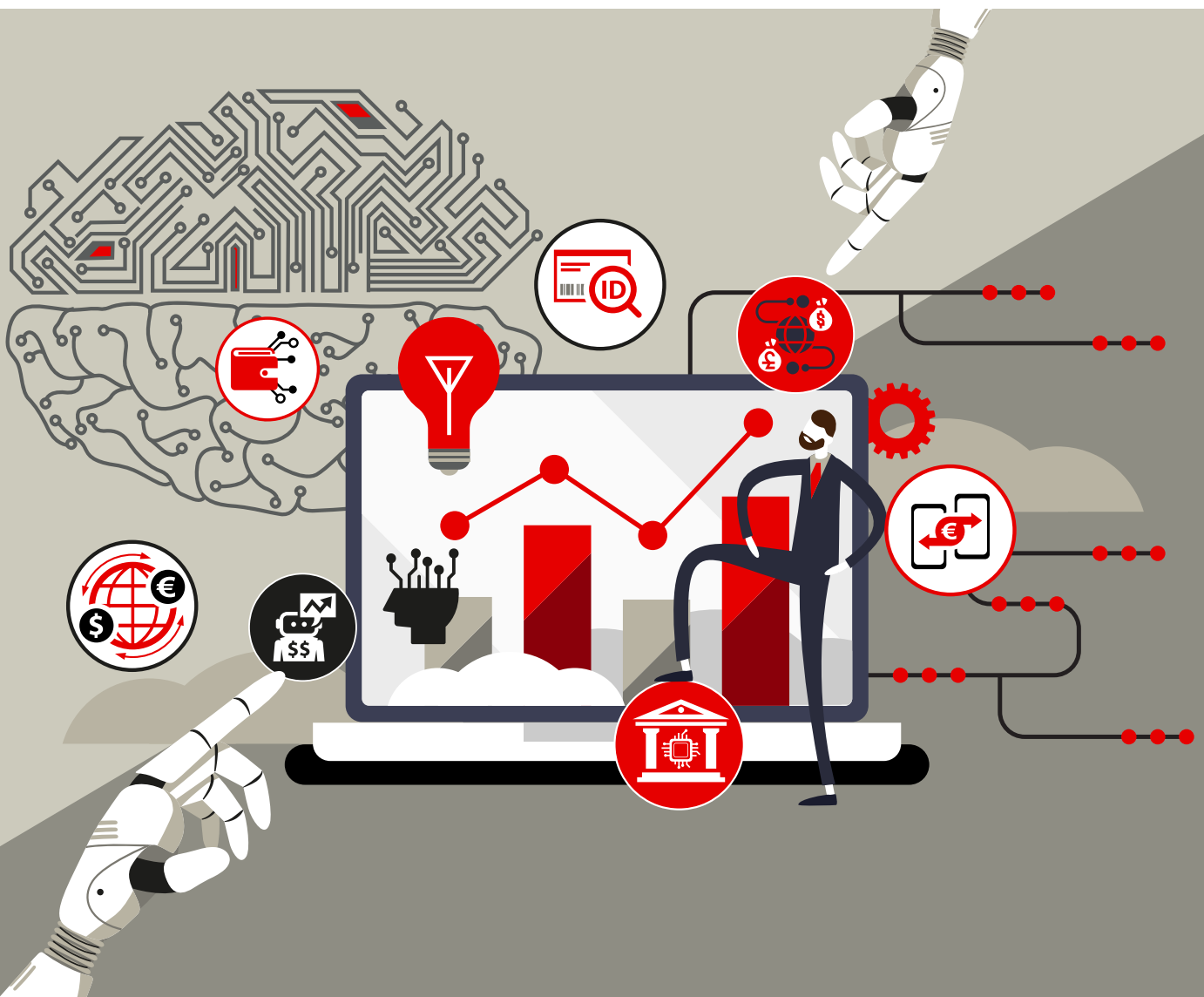


# Finding value in generative AI for financial services



## Preface

“Finding value in generative AI for financial services” is an MIT Technology Review Insights report developed in partnership with UBS Group. This report is based on six in-depth interviews with senior executives and experts conducted in June to September 2023. The report looks at the early impact of generative AI within the financial sector, where it is starting to be applied, and the barriers that need to be overcome in the long run for its successful deployment. Paul Kielstra was the author of the report, KweeChuan Yeo was the editor, and Nicola Crepaldi was the publisher. The research is editorially independent and the views expressed are those of MIT Technology Review Insights.

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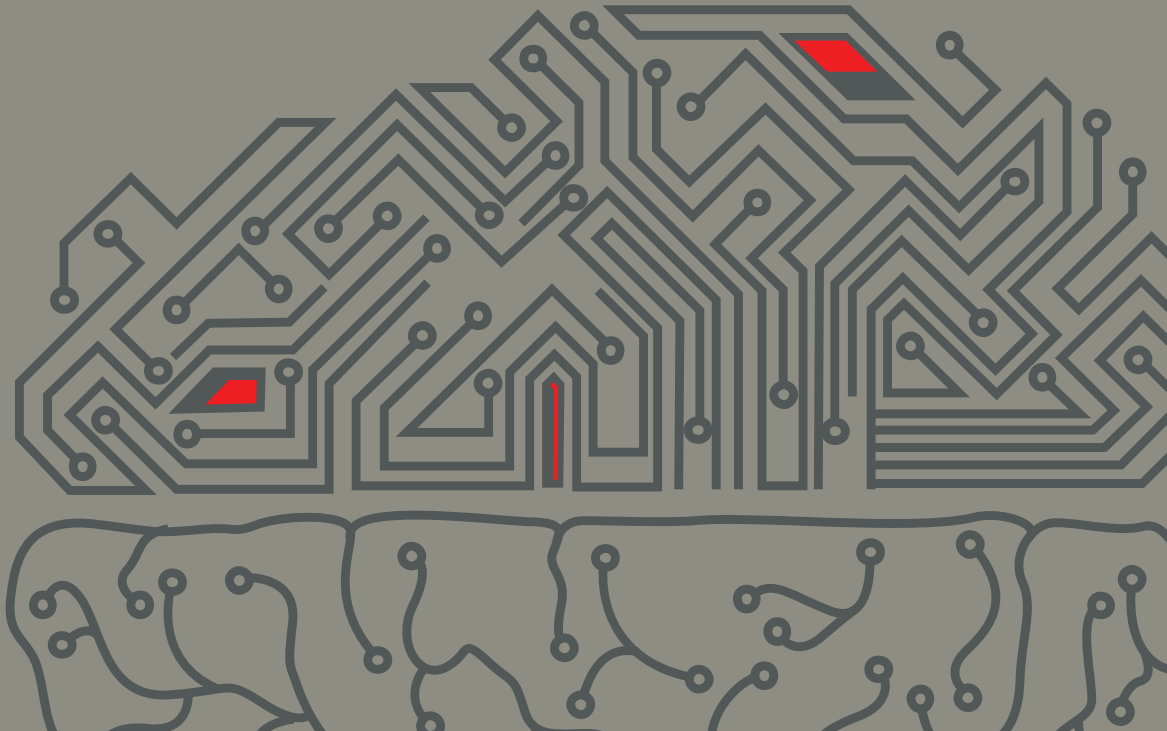
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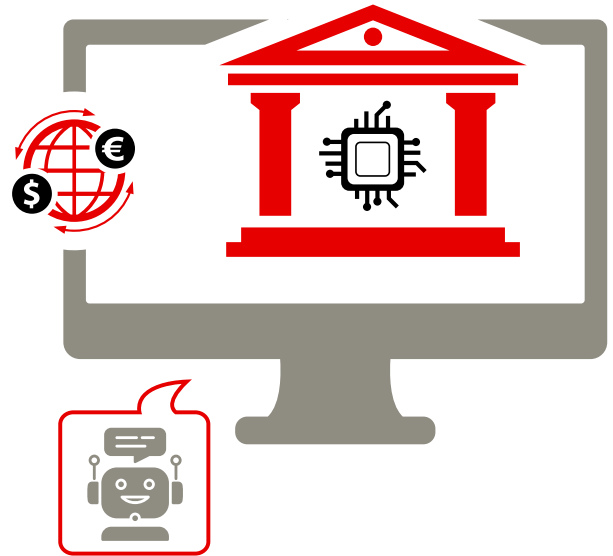
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# 01 Executive summary



With tools such as ChatGPT, DALLE-2, and CodeStarter, generative AI has captured the public imagination in 2023. Unlike past technologies that have come and gone – think metaverse – this latest one looks set to stay. OpenAI’s chatbot, ChatGPT, is perhaps the best-known generative AI tool. It reached 100 million monthly active users in just two months after launch, surpassing even TikTok and Instagram in adoption speed, becoming the fastest-growing consumer application in history!

Several innovations inherent within generative AI have obvious potential benefits for businesses. Its large language models (LLM) can learn from even bigger quantities of data than classical AI, including incorporating information from unstructured inputs. Users can interact with generative AI tools and receive responses in natural language. And finally, according to user needs, generative AI can – as the name indicates – generate a range of new outputs including text, pictures, computer code, and data streams.

Such breakthroughs have led to high expectations. According to a McKinsey report, generative AI could add \$2.6 trillion to \$4.4 trillion annually in value to the global economy.<sup>2</sup> The banking industry was highlighted as among sectors that could see the biggest impact (as a percentage of their revenues) from generative AI. The technology “could deliver value equal to an additional \$200 billion to \$340 billion annually if the use cases were fully implemented,” says the report.

For businesses from every sector, the current challenge is to separate the hype that accompanies any new technology from the real and lasting value it may bring. This is a pressing issue for firms in financial services. The industry’s already extensive – and growing – use of digital tools makes technology advances particularly likely to affect the sector’s companies.

According to a recent UBS report on the impact of generative AI, statistics from the U.S. Bureau of Labor suggest that banks and insurance are among the industries with the greatest proportion of their workforces exposed to potential automation.<sup>3</sup> This MIT Technology Review Insights report delves further into that possibility, examining the early impact of generative AI within the financial sector, where it is starting to be applied, and the barriers that need to be overcome in the long run for its successful deployment.

The following are the report’s key learnings:

**Corporate deployment of generative AI in financial services is still largely nascent.** The most active use cases revolve around cutting costs by freeing employees from low-value, repetitive work. Companies have begun deploying generative AI tools to automate time-consuming, tedious jobs, which previously required humans to assess unstructured information. Employees are thereby freed for more creative work, and in some cases, the tools outperform people. The following are common areas of deployment:

- **Customer service:** Generative AI chatbots are already deployed to assist human customer service agents and may soon directly advise customers on basic questions. An academic study found that they increase customer service agent productivity and consumer happiness.
- **Fraud prevention and risk management:** The technology allows software to incorporate a wider and richer set of data into risk and fraud detection.
- **Coding:** Tools that can produce bespoke code for specific tasks have begun to appear. In a controlled experiment, an Australian bank found that these raised programmer productivity by 46%.
- **Information analysis and summarization:** Generative AI tools are already creating summaries of business conversations – a previously human task. On a larger scale, BloombergGPT provides the company another channel to monetize its archives by letting subscribers search them using natural language questions.

**There is extensive experimentation on potentially more disruptive tools, but signs of commercial deployment remain rare.** Academics and banks are examining how generative AI could help in impactful areas including asset selection, improved simulations, and better understanding of asset correlation and tail risk – the probability that the asset performs far below or far above its average past performance. So far, however, a range of practical and regulatory challenges are impeding their commercial use.

**Legacy technology and talent shortages may slow adoption of generative AI tools, but only temporarily.** Many financial services companies, especially large banks and insurers, still have substantial, aging information technology and data structures, potentially unfit for the use of modern applications. In recent years, however, the problem has eased with widespread digitalization and may continue to do so. In addition, newer companies, notably fintechs, do not face this issue. The burden of legacy technology will therefore likely diminish, a process that generative AI, if anything, can accelerate.

As is the case with any new technology, talent with expertise specifically in generative AI is in short supply across the economy. For now, financial services companies appear to be training staff rather than bidding to recruit from a sparse specialist pool. That said, the difficulty in finding AI talent is already starting to ebb, a process that would mirror those seen with the rise of cloud and other new technologies.

**More difficult to overcome may be weaknesses in the technology itself and regulatory hurdles to its rollout for certain tasks.** Financial services companies aiming to benefit from generative AI face several hurdles. First, general, off-the-shelf tools are unlikely to adequately perform complex, specific tasks, such as portfolio analysis and selection. Companies will need to train their own models, a process that will require substantial time and investment.

Once such software is complete, its output may be problematic. The risks of bias and lack of accountability in AI are well known. Finding ways to validate complex output from generative AI has yet to see success. Any new tool has to be designed to avoid violating other actors' intellectual property (IP) rights; and generative AI algorithms may act unpredictably – even illegally – especially when interacting with other ones. Finally, so-called “hallucinations,” or confident wrong answers, are a worry with any use of generative AI. These risks mean that financial services companies must be cautious in how they deploy generative AI.

Financial regulators are certainly wary about how these tools may be used. Companies are hoping for guidance, but this will take time. Authorities acknowledge that they need to study the implications of generative AI more, and historically they have rarely approved tools before rollout. Meanwhile, the possible benefits of any extensive use of generative AI need to be weighed against regulatory dangers.

Adoption of generative AI is growing in the financial services sector, but it is so far limited to automation of low-value activities where its use can be monitored by humans or would not pose unacceptable risks.

# 02

## The promise of generative AI



To much of the public, the release of ChatGPT in late 2022 was the first shot in a new technological revolution. Since then, interest in generative AI has soared. For example, Google searches for the term have risen dramatically in the past year (see Figure 1).

With this interest has come rapid adoption by users across societies and economies. International Monetary Fund (IMF) research shows that uptake of ChatGPT alone – just the most prominent of many generative AI tools – has been extremely rapid even by the standards of popular technology adoption (see Figure 2).<sup>4</sup>

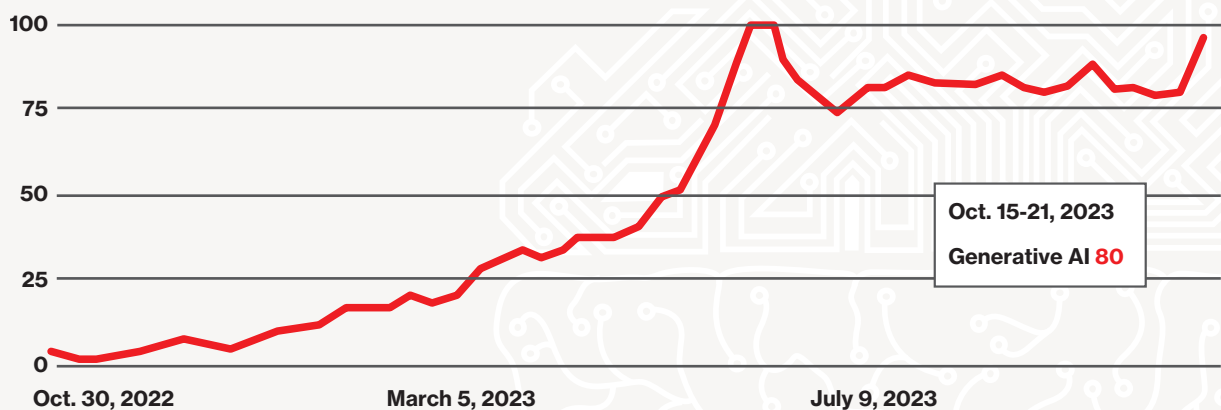
**“We tend to overestimate the impact of any new technology in the short run and underestimate it in the long run.”**

**Chia Hock Lai**, Co-Founder, Global Fintech Institute

### Figure 1: The internet discovers a new interest

Searches for the term “generative AI” by Google users have surged since late 2022, reflecting rapidly growing interest in the technology.

#### Interest over time

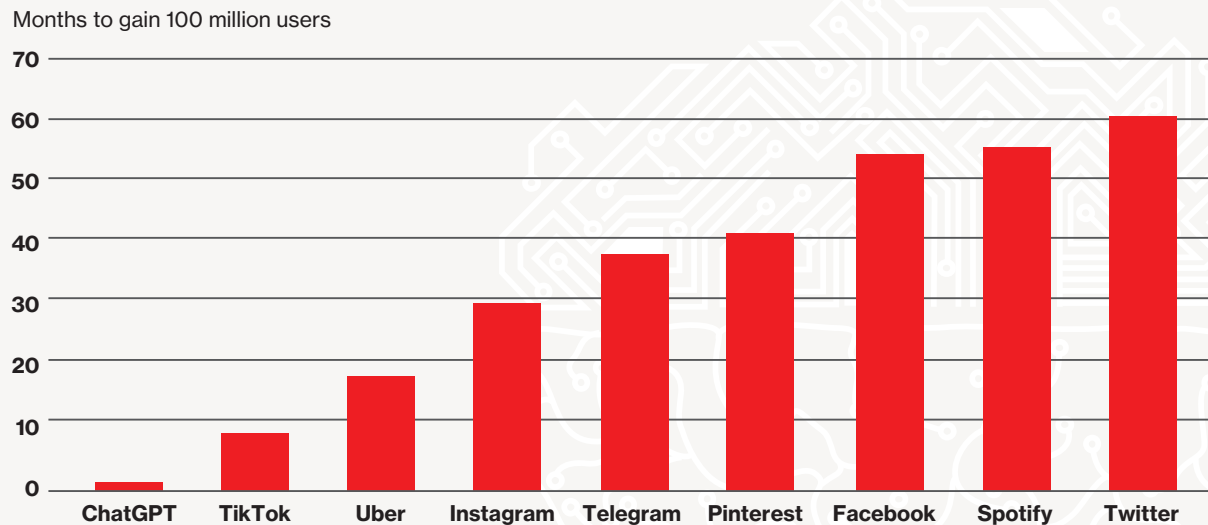


Note: Interest over time: A value of 100 is the peak popularity for the term. A value of 50 means that the term is half as popular.

Source: Compiled by MIT Technology Review Insights, based on data from [Google Trends](https://www.google.com/trends/), 2023.

## Figure 2: The breakout technology of 2023

ChatGPT gained more than 100 million active users across the globe within a span of two months, a much faster rate than that of other platforms.



Source: Compiled by MIT Technology Review Insights, based on data from "Generative Artificial Intelligence in Finance: Risk Considerations," International Monetary Fund, 2023.

As with every new technology, a degree of excessive expectation – and fear – is inevitably driving the discussion. Chia Hock Lai, co-founder of the Global Fintech Institute, says he sees a lot of hype now: "We tend to overestimate the impact of any new technology in the short run and underestimate it in the long run."

### Time for a more measured assessment

Indeed, Gartner reported in August 2023 that generative AI had peaked in its emerging technologies hype cycle, after which it would likely take two to five years to become integrated into business productivity tools.<sup>5</sup> To an extent, the febrile current discussion around generative AI, however, obscures some attributes that will shape its impact.

First, generative AI is a rapidly evolving field: it did not spring into existence with the release of ChatGPT and its development is far from complete. McKinsey describes "a rush to throw money at all things generative AI" between 2017 and 2022. During those years, private investments in the technology rose at an average annual compound rate of 74%, far outstripping the equivalent growth rate for AI as a whole of 29%.<sup>6</sup> Similarly, tools and products incorporating generative AI have continued to develop rapidly in recent months (see Figure 3).

Second, generative AI looks set to build on and supplement existing technologies, rather than necessarily replace them on a grand scale. As Chia notes, "you definitely need a clear use case to start trying out any new technology." Any such cases will arise from what generative AI can do compared to existing tools.

These may be more limited than popular imagination appreciates. Tools enabled by older versions of AI, for example are now called "just software," says John Mileham, chief technology officer at Betterment, a robo-advisor that assists users in automated investing. And such tools have already played a crucial role in the ongoing digitalization of financial services firms and other companies. There's little point in deploying generative AI where less advanced technologies are doing the job as effectively and at low cost. Indeed, some analysts project that, while generative AI will have a very large economic impact, it will be markedly less than that of earlier iterations of AI.<sup>7</sup>

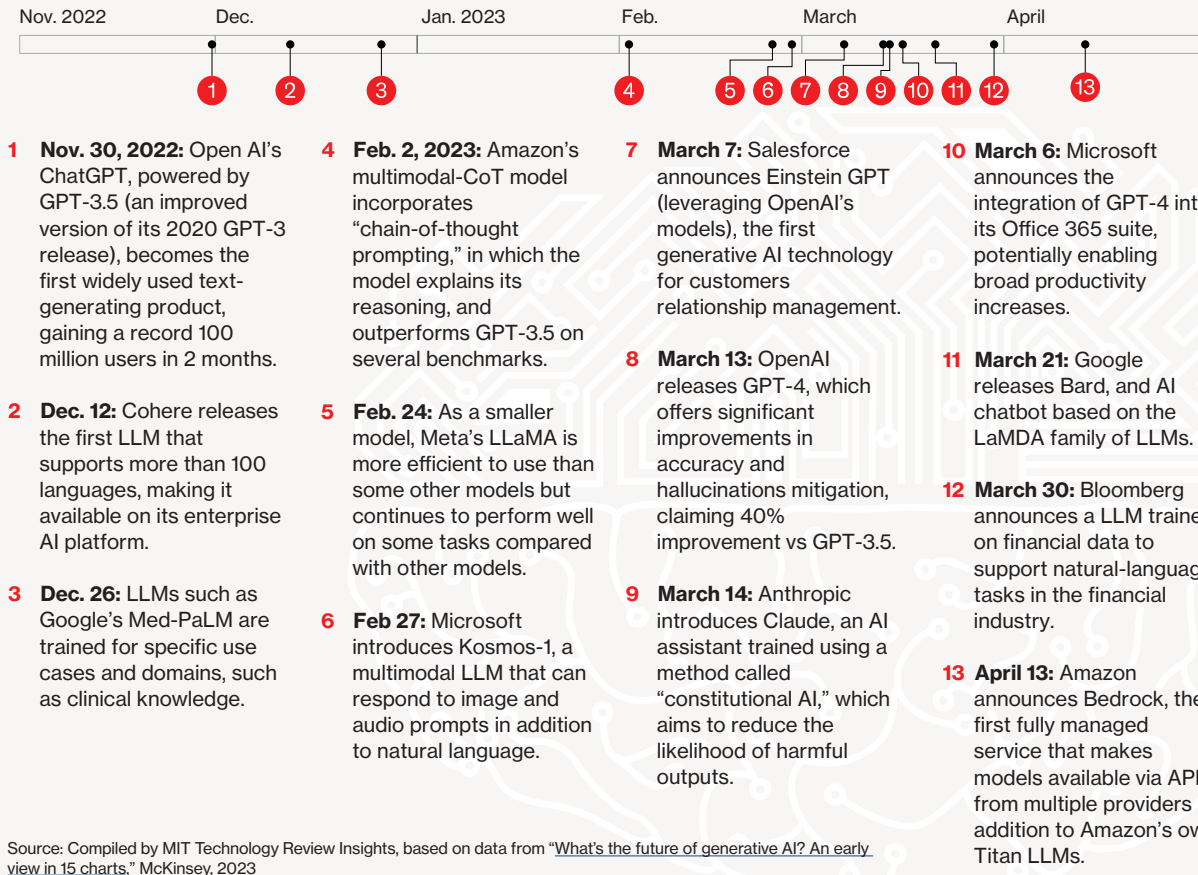
### It's not 'magic'

The use cases will arise from what generative AI can deliver that other tools cannot. The striking new capacity of generative AI is best illustrated by a brief

### Figure 3: Six months in the life of generative AI

Starting in late 2022, new iterations of generative AI technology have been released several times a month.

#### Timeline of major large language model (LLM) developments following Chat GPT's launch



comparison with older forms of AI. Put simply, older AI tools can train themselves on huge amounts of structured data and can answer specific questions asked in programming-like language.

Generative AI can learn from an even larger body of information – including unstructured data – and it can create apparently novel content in response to natural language questions. Older AI tools, for example, can tell users if something is a cat. Generative AI can generate a new image of a cat.

In short, generative AI's strength is that it allows users to ask questions in natural language and receive output that provides readily comprehensive answers in different formats based on a huge corpus of information. This can involve, among other things, the

generation of new text, pictures, computer code, or even large data sets.

The potential value of this creativity is substantial but should not be overestimated. For example, generative AI can generate a data set based on existing ones, says Rama Cont, chair of mathematical finance and head of the Oxford mathematical and computational finance group at Oxford University. However, while it may be even "100 times larger, it won't have more information," he explains. "It can extrapolate to certain situations, provided you have similar data sets on which to train it."

In the cat example, the picture will rely on existing knowledge of cats but will be unable to create something new. Such extrapolation of existing data "is a nice feature" of generative AI, says Cont, "but not magic."



## The road ahead

Generative AI holds out substantial opportunities for financial services companies. Boston Consulting Group, for example, projects that the sector is one of three with the highest potential for growth arising from the technology in the near term. In particular, the consultancy argues that generative AI “can generate personalized investment recommendations, analyze market data, and test different scenarios to propose new trading strategies.”<sup>8</sup> Certainly, interest exists for applying generative AI in all these areas. “The financial sector has been very quick to understand the usefulness of these tools,” says Cont.

With limited and at most partial exceptions, however, the industry has not gone beyond experimentation in such areas. Jason Napier, head of European banks research at UBS, says that while “later there will be other, probably more important, deployments, a lot of the potential of AI appears really nascent at this stage.”

Rather than generative AI revolutionizing the industry over the short to medium term, companies are focused on using it to address a range of specific tasks that typically involve the automation of low value-added jobs that previously required humans to assess unstructured information. Interest in doing more exists, but the still experimental state of generative AI-powered tools and, equally important, regulatory issues stand in the way.

“While later there will be other, probably more important, deployments, a lot of the potential of AI appears really nascent at this stage.”

**Jason Napier**, Head of European Banks Research, UBS



# 03

## Reality check: Recent deployments of generative AI



To be useful, any new technology or tool must solve a problem. So far, generative AI is being applied to a range of specific tasks or problems, rather than for the wholesale design of operating models across entire companies. This is the case across much of the economy. McKinsey estimates that roughly three-quarters of the value created by generative AI overall will arise from just four areas: customer operations, marketing and sales, software engineering, and research and development.<sup>9</sup>

Cost cuts for now; income generation will have to wait

Where financial services differ from other sectors is that generative AI is largely not being used to drive revenue. According to UBS research, so far “the real value being seen is from cutting costs.” (see Figure 4).

“We will leverage on generative AI to change the anatomy of work, including our internal processes, by automating typically tedious tasks and workflows.”

Lito Villanueva, Chief Innovations Officer and Executive Vice President, RCBC

**Figure 4: Expected impact of generative AI in the financial sector**

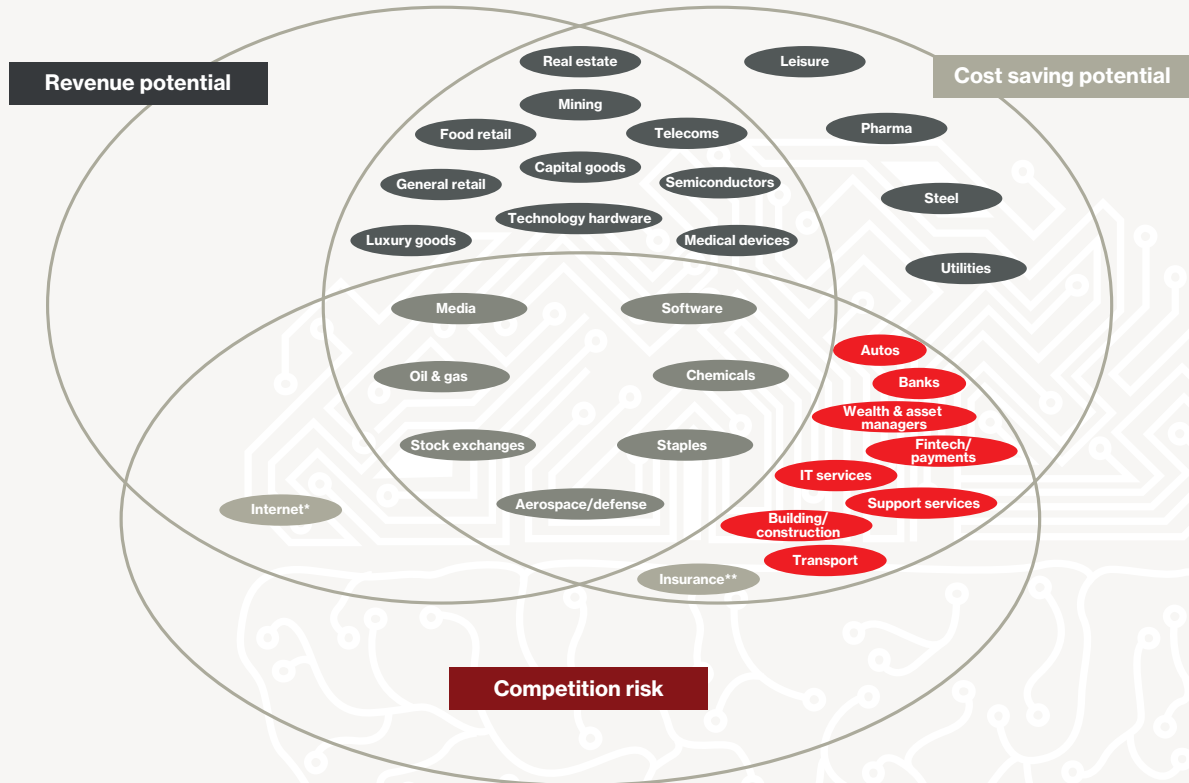
UBS analysts say generative AI’s main opportunity for the financial sector is lower costs, as staff expenses represent a relatively high portion of total costs.

|   | Revenues  | Costs     | Competition |
|---|-----------|-----------|-------------|
| <b>Banks</b>                                      | Neutral   | Reduction | Increase    |
| <b>Exchange &amp; financial business services</b> | Increase  | Reduction | Increase    |
| <b>Fintech &amp; payments</b>                     | Neutral   | Reduction | Increase    |
| <b>Insurance</b>                                  | Reduction | Reduction | Increase    |
| <b>Real estate</b>                                | Increase  | Reduction | Neutral     |
| <b>Wealth &amp; asset managers</b>                | Neutral   | Reduction | Increase    |

Source: Compiled by MIT Technology Review Insights, based on data from “Will Generative AI deliver a generational transformation,” UBS, 2023

### Figure 5: General Impact of generative AI

Overall, UBS analysts see cost savings as the most likely outcome from advances in generative AI, based on analysis of 31 sectors.



\*Internet identified an increase in costs as well as greater revenue and competition potential.

\*\*Insurance saw a negative risk to revenues as well as cost-saving potentials and risk of increased competition

Source: Compiled by MIT Technology Review Insights, based on data from "Will Generative AI deliver a generational transformation," UBS, 2023

According to its assessments of a range of industries (see Figure 5), the main impact of generative AI lies in cost cutting, rather than on income generation. This is true in every part of the sector, including in banking, wealth management, insurance, and payments.

These savings, in most cases, arise from using technology to free human employees from the need to analyze large amounts of often unstructured data and to produce output in response to directions given in natural language. "We will leverage on generative AI to change the anatomy of work, including our internal processes, by automating typically tedious tasks and workflows," says Lito Villanueva, chief innovations officer and executive vice president at Rizal Commercial Banking Corporation (RCBC), a Philippines-based bank. RCBC is not alone.

According to a *Fortune* article published in June 2023, "so-called generative AI is already helping to speed up mundane tasks known to crush the spirit of junior Wall Street employees, hedge funds say – from reviewing reams of market research to writing basic code and summarizing fund performance."<sup>10</sup>

### Eyeing higher-value work

These innovations are not typically designed to reduce employment levels so much as to give time for staff to focus on higher-value work. Mileham notes that even the limited applications deployed at Betterment so far represent "an unmitigated boon" in the day-to-day operations of the firm. "There are efficiency benefits across the board. The value is real, and we get a lot out of it," he says.

# “As of yet, it’s not like you’re going to be putting a generative AI directly in front of customers and setting it free.”

**John Mileham**, Chief Technology Officer, Betterment

Another potential improvement is that generative AI applications may sometimes outperform people when evaluating unstructured data. A University of Chicago business school study, for example, found that a generative AI tool could quickly and accurately process the implications of bloated financial disclosure information, which might seek to hide the truth through verbiage.<sup>11</sup>

In contrast, academic research into the ability of a generative AI tool to help customer service operations found that it increased average productivity in terms of issue resolution per hour. However, it had “the greatest impact on novice and low-skilled workers, and minimal impact on experienced and highly skilled workers.”<sup>12</sup> In other words, it helped new employees get up to speed, but was less useful to those who already knew the ropes.

## Uses of generative AI in the finance sector

Financial services firms have focused generative AI deployment on several specific tasks that share the kind of attributes described above.

**Customer service:** Chia speaks for many when he notes “a very strong use case for generative AI in customer service – going 24/7 for customer service, even to the extent of providing advice for customers.” Indeed, the academic research noted above on use of the technology in customer service found that it increased the number of issues solved per hour by 14%, improved client sentiment, and reduced requests for managerial intervention.<sup>13</sup>

The most common customer service–related innovation is the creation of chatbots for either direct use by customers or company service agents. These tools represent not so much a new development as an evolution. At Betterment, for example, a chatbot based on predictive AI has already “reduced the workload on

our customer service team drastically,” Mileham says, even before the integration of generative AI. That step is being considered carefully.

The addition of generative AI elements to chatbots brings obvious benefits. These include interaction in natural language and the possible integration of potentially huge repositories of unstructured data into the tool’s knowledge base. Accordingly, Villanueva says that a generative AI–based chatbot is one of RCBC’s leading digital priorities. That’s because it enables “real-time quality customer service interactions and contributes to a seamless customer experience” by facilitating the filing of complaints, accommodation of client requests, and collection of relevant customer data.

RCBC is not alone. In May 2023, tech company Kasisto launched KAI-GPT, the first banking-specific LLM, and the initial program built to use KAI-GPT was KAI Answers, which aids employees in replying to customer queries.<sup>14</sup> Meanwhile, various banks have announced development of generative AI-powered information tools for the direct use of customers or customer service agents.<sup>15</sup> Similarly, Cowbell Insurance has launched MooGPT to provide answers to its customers and agents.<sup>16</sup> Most of these tools appear designed to improve customer-employee interactions rather than replacing them, except in cases where the aim is providing basic information.

This is intentional. Two considerations are at play. First, notes Mileham, any integration of generative AI into existing chatbots needs to be done safely. “As of yet, it’s not like you’re going to be putting a generative AI directly in front of customers and setting it free,” he says. Second, some financial services firms have reported an increased need for human customer service staff. “We’ve seen people wanting more human interactions for retail transactions instead of fewer,” says Villanueva. As a result, the Philippines-based

bank's generative AI chatbots are being designed to "allow our talents to maximize their time and move toward more highly specified customer concerns that require more detailed and sensitive attention," he adds.

**Fraud prevention and risk management:** For some years, financial services companies have been using advanced technologies, including predictive AI, to improve risk management and fraud prevention. Generative AI will allow the sector to go further, including through greater integration of unstructured data into these efforts. Chia says that using such information will allow companies to identify new patterns and anomalies with associated risks at both a micro level – such as the potential for an individual to default – and a broader one – such as market trends.

More specifically, according to UBS research, reducing fraud is key for the payments industry in general. Visa and PayPal have both deployed generative AI to prevent fraudulent transactions by blocking suspicious ones.<sup>17</sup> More generally, fintechs such as Datavisor, Feedzai, and Forter have all integrated generative AI into their off-the-shelf solutions to reduce payment fraud.<sup>18</sup> At the same time, the new technology allows the sector to go beyond reinforcing existing anti-fraud defences, says Villanueva. He adds that RCBC is hoping to use it to engage customers more actively in fraud prevention, through more targeted and effective awareness and education campaigns.

**Coding:** The financial services industry is, in many ways, a knowledge-based one. Michael Briest, head of European technology research at UBS, notes that "as a sector, banks spend more as a percentage of revenues on IT than any other, and a lot of banks still do software design and maintenance in house." Accordingly, ways to improve the efficiency of such activities will interest companies. If properly trained, a generative AI tool can produce requested computer code as easily as others can answer questions or generate pictures.

A leading U.S. bank has started using generative AI tools to help its code developers.<sup>19</sup> It is not alone. Westpac, a large Australian bank, ran a trial with generative AI to assist its coders and found a 46% increase in productivity against a control group.<sup>20</sup>

Mileham says his company, Betterment, uses generative AI software to help with debugging. They have also procured GitHub Copilot, a cloud-based AI tool, to help with code generation and auto-completion. As with other uses, he stresses that this should happen only in the context of robust review and testing, and a person taking ultimate responsibility for any new code. Even within these constraints, Mileham says it's a worthwhile effort. "Everybody who has deployed it [at Betterment] spends less time banging their heads against the wall, not knowing the right answer [to relatively straightforward questions], and more time being creative," he explains.

**“Definitely, there will be a lot of automation of routine tasks like report generation.”**

**Chia Hock Lai**, Co-Founder, Global Fintech Institute



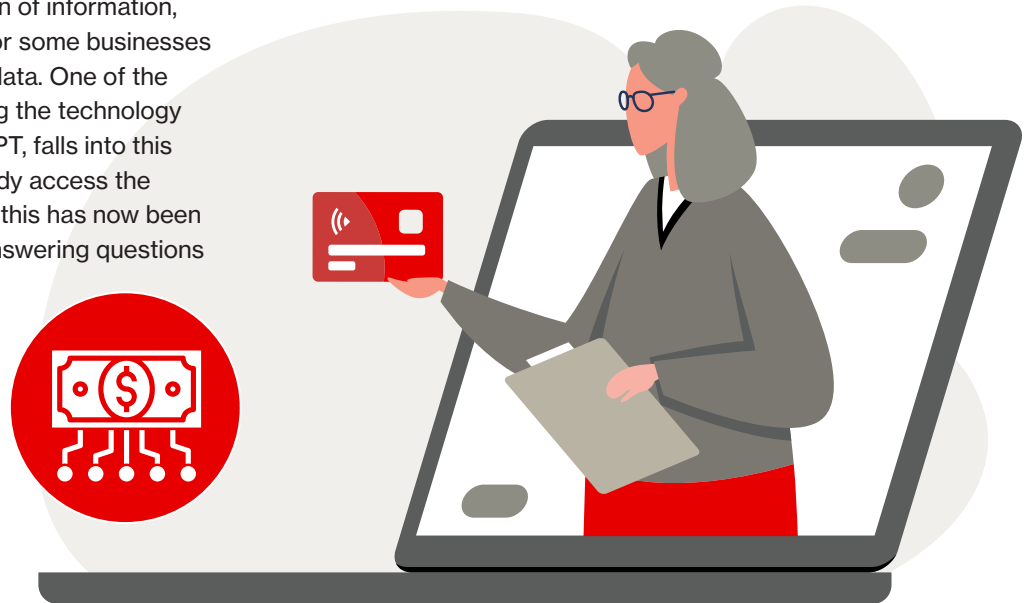
“Some fintech startups have started this model, sharing or commercializing the generative model but not the data.”

**Rama Cont**, Chair of Mathematical Finance and Head of the Oxford Mathematical and Computational Finance Group, Oxford University

**Diverse forms of information analysis and summarization:** One of the strengths of generative AI is its ability to use the information in its model to answer questions. The same capacity is already finding various uses within financial services. Mileham cites the example of using generative AI to create the first draft of summaries following a business meeting or phone conversation. This, he says, allows a minor, everyday task to “be compressed into a review rather than being a drafting exercise.” Similarly, at Man Group – a large hedge fund – managers have found that generative AI can speed up initial research by reviewing academic papers and spotting patterns.<sup>21</sup> Meanwhile, a blue-chip Wall Street firm is rolling out an app to act as a virtual assistant to help wealth managers find client-relevant research or forms.<sup>22</sup> Looking ahead, Chia expects such activity to grow, saying, “Definitely, there will be a lot of automation of routine tasks like report generation.”

Beyond this quotidian manipulation of information, however, will be the opportunity for some businesses to use generative AI to monetize data. One of the most high-profile innovations using the technology in financial services, BloombergGPT, falls into this category. Subscribers could already access the company’s large data archive, but this has now been turned into a specialist LLM for answering questions related to financial services.<sup>23</sup>

Such subscription tools, however, do raise questions around how generative AI will change thinking around the role and value of data. Major news organizations have taken steps, for example, to block ChatGPT’s web crawler from accessing their websites.<sup>24</sup> On the other hand, Cont says generative models can now be shared without revealing the underlying data on which the model was trained. “Some fintech startups have started this model, sharing or commercializing the generative model but not the data,” he explains. “That is a new possibility.” Ultimately what data is commonly retained, what is shared, and how, remains a question for markets – and regulators – to answer.



# Only half-speed ahead: Wariness about more extensive innovation



While the buzz around generative AI has somewhat eased in the second half of 2023, optimism still surrounds its long-term impact. “Generative AI is an exciting development,” says Mileham. “There is a lot of opportunity.”

On the other hand, a distinct disconnect exists between the current deployment of generative AI with its perceived potential. Today’s effort will have an effect, but only on a limited number of functions. Moreover, the innovation, so far, appears more to be improvements to current practices than the kind of fintech-driven disruption seen in payment services and wealth management in recent years.

## Great expectations

That hasn’t stopped other companies and researchers from looking further. In Cont’s view, the financial sector has been quick to adopt new technologies at an experimental level. “Their deployment could be very easy as long as they [companies] are comfortable with the output,” he says.

An area of particular interest is asset selection. One aspect of this is finding tools that balance portfolio-wide risk and return.<sup>25</sup> Other research seeks to develop

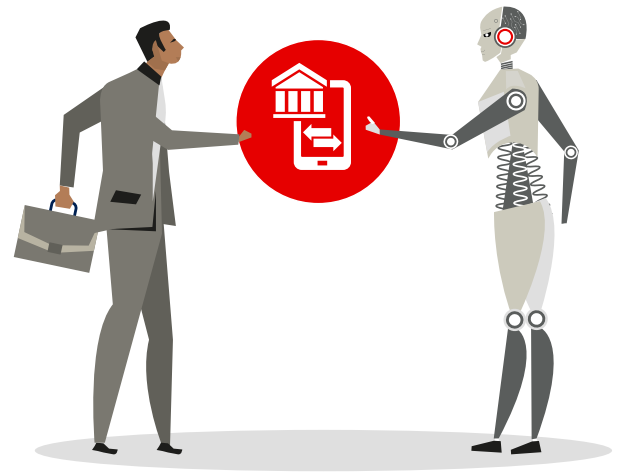
algorithms that beat passive asset selection.<sup>26</sup> Risk management is another field where generative AI is seeing use as an advanced research tool that goes beyond its current rollout. Use cases here include trying to better understand asset correlation<sup>27</sup> and tail risk, among others.<sup>28</sup>

While much of the abovementioned activity has occurred in academia, some companies are interested as well, at least in principle. UBS, for example, is researching the use of generative AI for trading applications. One compelling avenue is using the technology to express news, in the form of unstructured text, as a numerical vector in order to assess its impact on asset prices.

The company’s preliminary results show promise in improving the ability to forecast volatility changes driven by incoming news. Meanwhile, a blue-chip Wall Street firm has applied for a trademark for what it hopes will be a tool that will advise customers on stock selection.<sup>29</sup> In practice, however, Briest observes that the banking industry’s restrained approach reflects the one being taken across the financial services industry as a whole. “The sector is relatively conservative in adopting new technological trends,” he says.

**Risk management is another field where generative AI is seeing use as an advanced research tool that goes beyond its current rollout.**

# Two general challenges for new technology adoption



When grappling with the challenge of adopting new technologies, companies often have to tackle the confluence of legacy technology and a tight labor market.

## Legacy technology

Financial services companies, especially banks, were among the early adopters of IT decades ago. Choices made then, though, have long resisted further change. The most striking example of this phenomenon is that, as late as 2017, 43% of banking systems relied on a six-decade-old computer programming language, COBOL, which was also behind 80% of credit card transactions and 85% of ATM activity.

Typically, COBOL drove large mainframe computers because it was the only option decades ago. Although such arrangements have provided substantial stability, they make it difficult to add new capabilities arising from more recent technological developments.<sup>30</sup>

COBOL encapsulates the broader legacy-technology deficit in the financial sector. It's a problem that encompasses old software and siloed data storage arrangements that have evolved to meet challenges across decades but are no longer fit for purpose.

According to an Accenture survey of large banks, even though the respondent pool consisted of companies interested in cloud usage, only 31% had moved more than half of their previous mainframe activity to the new platforms.<sup>31</sup> "A lot of banks maintain old IT systems," says Briest. "We're hearing from technology companies about a lot of pilot projects starting and companies moving quite quickly to the next step, but this is going to take some time." It's an observation shared by Chia. "Most financial services organizations have a lot of data that is usually poorly structured or even fragmented," he says.

Despite this enduring challenge of legacy IT for many companies, the problem has been diminishing across the industry because of extensive digitalization in recent years. "A lot of financial services firms have invested heavily in digital transformation," says Chia. "Most have gained a certain capability in data management and there's already a level of fundamental readiness in terms of technology investment."

One of them is RCBC, which was established in 1960. "The past three years have been pivotal for our digital transformation," says Villanueva. "The introduction and expansion of generative AI solutions will be smooth and easy." Meanwhile, new entrants do not have a technological deficit to overcome. Mileham says that

**More generally, companies have a big opportunity to use "generative AI to accelerate the shift off some legacy applications that maybe it was just cost-prohibitive to consider previously."**

**Michael Briest**, Head of European Technology Research, UBS



Betterment, as a cloud-native company, can deploy generative AI as broadly as it sees a use for it relatively quickly. “I’m confident that major cloud providers are going to be able to productize these capabilities and expose them to companies very efficiently,” he says. Cont also says that he believes that financial companies are, overall, “pretty ready” to make use of generative AI.

Even those who currently are not in such a state may be able to use the technology to help modernize existing IT infrastructure. Generative AI itself, notably its ability to generate code, can help with the transformation away from legacy systems and data storage.<sup>32</sup> More generally, says Briest, companies have a big opportunity to use “generative AI to accelerate the shift off some legacy applications that maybe it was just cost-prohibitive to consider previously.”

### A tight talent market

Another challenge around adoption of new technology is a lack of talent and expertise. “Currently, generative AI is so new that you can’t really hire a whole lot of experience,” says Mileham. Villanueva agrees that “it is challenging to find talent because of the highly competitive labor market.”

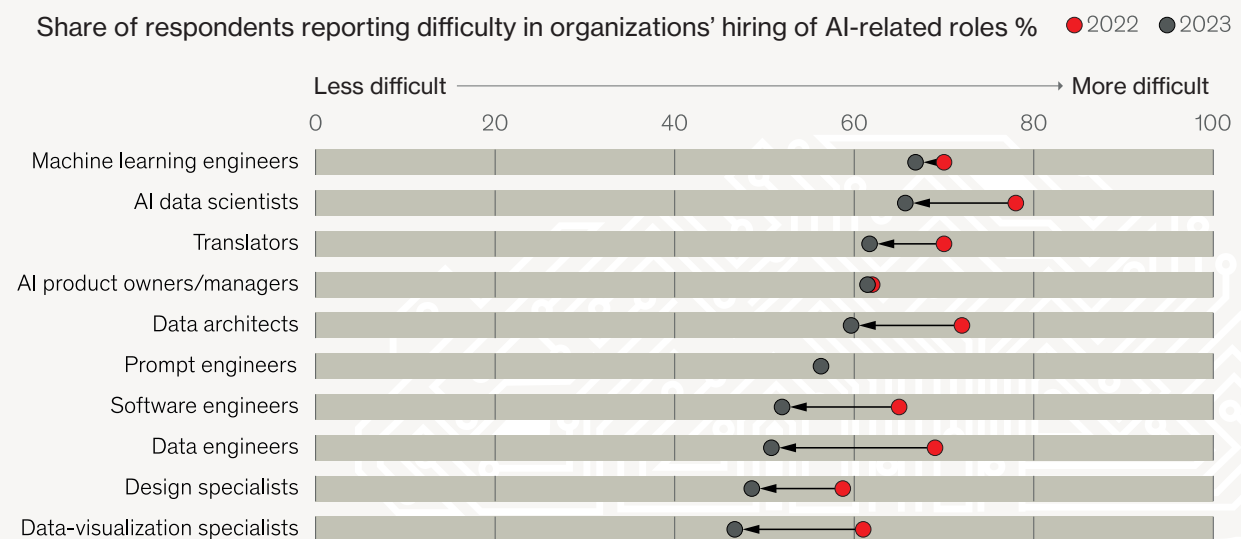
Despite the current shortage in generative AI talent, some see this as an expected problem, common to every industry. “I don’t see it as a long-term problem,” says Briest. He explains that the same talent shortage has accompanied the appearance of other new technologies, such as cloud, but that a supply of the necessary talent has developed. An April 2023 survey indicates that for generative AI, finding talent is already growing easier (see Figure 6).

Experts say that as the technology evolves over time, finding talent could become less of a problem. First, new entrants into the workforce will increasingly have been educated with the technology in mind. At the same time, while generative AI is new, it overlaps with other fields of AI and machine learning.

The past can offer some lessons, says Cont. Consider, for example, financial services professionals using earlier AI to conduct simulations for investment banks. “A lot of quants switched to data scientist roles,” he says. “They just changed their business cards. There’s not a shortage of people. The tech is new, but the math and computational foundations are not.”

### Figure 6: Hiring for AI-related roles

Responses in McKinsey’s survey suggest that hiring tech talent has become somewhat easier since 2022.



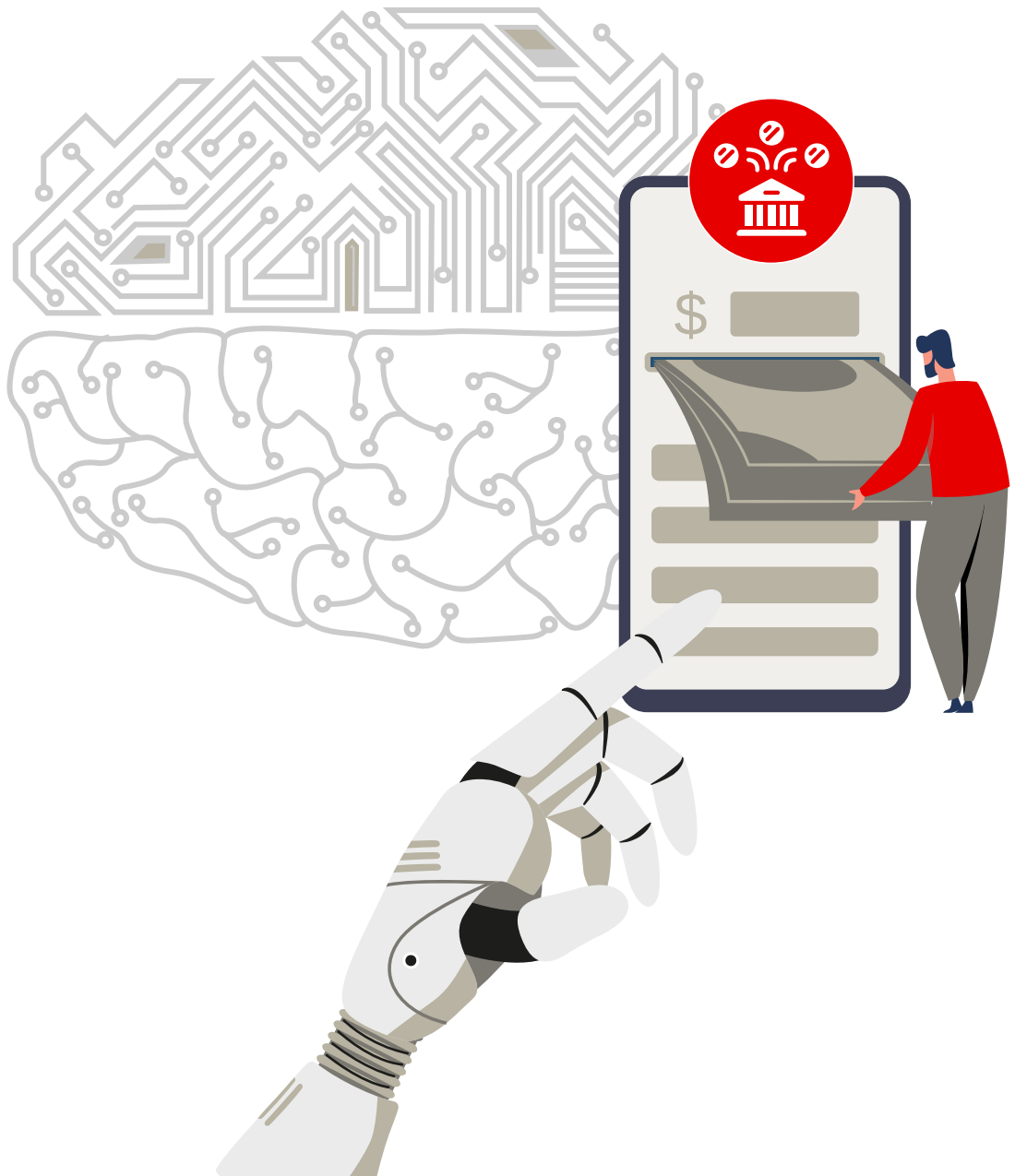
Source: Compiled by MIT Technology Review Insights, based on data from “[The state of AI in 2023: Generative AI’s breakout year](#),” McKinsey, 2023

Meanwhile, companies like RCBC are looking to develop internally the skills needed to use generative AI tools. Villanueva says the bank's approach contributes to employee satisfaction with the new technology. "RCBC has its Digital Academy providing the best-in-class and relevant trainings for its human resources," he adds.

At Betterment, letting people develop their own skills is designed to help both employees and the company. "Our thought is to get the technology into people's hands so that they can start to become the experts," says Mileham.

**"Our thought is to get the technology into people's hands so that they can start to become the experts."**

**John Mileham**, Chief Technology Officer, Betterment



# 06 Tech-specific challenges and the regulatory hurdle



Generative AI applications appear impressive, but they are general-purpose tools that do not address most of the specific needs of financial services companies. “There are different use cases within financial services that will need to use some proprietary data and not the very general kind of data that ChatGPT is using,” says Chia. Companies will need to be prepared for the fact that they’re not going to get immediate results when they start investing in the technology, he warns: “It takes a long time to have a high-quality model.”

## Importance of customization

Companies like Betterment will likely need to create distinct tools to address different uses. “We wouldn’t create an ‘everything machine’ that has all of our customer information in it for anybody to draw from,” says Mileham. “That wouldn’t be a good practice for a serious financial institution.” Even once those use-specific models are in place, Chia says the work doesn’t end there. “In financial services, you will always have new products and new processes, which means that there will always be a need to retrain the models,” he explains.

The difficulties seen in market simulation software illustrate some of the likely, wider challenges for generative AI. According to Cont, while generative AI tools can create new data sets, they will not include any new information if, for example, a company wants better insight into tail risk. More broadly, he adds, users can’t just hope that a generic algorithm will extract what is needed for a niche use. “If you don’t target what you want to learn, you may not learn it,” Cont explains. “You have to ask what you want to use output for and then create a bespoke algorithm tailored to the intended use case. When you generate cat pictures from generative AI, you don’t want a mutant cat, but in financial applications you are typically interested in extreme events.”

## Reliability, bias, and accountability

Additionally, checking the reliability of the output presents important challenges for activities that use substantial amounts of generated data. “There is no easy way to validate the output,” says Cont. “If you want to feed these into a risk management framework or a portfolio optimization problem, you’d better make sure that the output correctly captures the risk of the portfolio. That isn’t obvious at all.”

**“In financial services, you will always have new products and new processes, which means that there will always be a need to retrain the models.”**

**Chia Hock Lai**, Co-Founder, Global Fintech Institute

Other challenges with the technology, according to Mileham, include the “classic” issues of AI such as bias and accountability. According to a recent IMF study, generative AI, if anything, exacerbates these problems. The far greater breadth of data used to train LLMs, for example, leads to a greater theoretical possibility of bias. Similarly, the higher complexity of its architecture and decision-making processes compared to previous AI makes the reasoning behind given output more opaque.<sup>33</sup> “Very often, the sophisticated models of deep learning are black boxes,” says Chia.

Generative AI also poses its own specific challenges. These may arise even when the technology is working as planned. A recent study co-authored by Cont shows that algorithms that have learned from a common set of data – such as the history of asset prices – may end up synchronizing as if they were a cartel even though they are not communicating. “If an algorithm learns to manipulate prices, can you sue anybody?” asks Cont. “It is a legal nightmare. This is one of the questions we are just beginning to study.”<sup>34</sup> Worse still, the potential for a herd-like response inherent in such an unconsciously coordinated response could present a threat to financial stability under a worst-case scenario, according to IMF research.<sup>35</sup> Meanwhile, if generative AI sees increasing use for automated decision-making, it is likely to attract a high number of adversarial attacks.<sup>36</sup>

### Intellectual property rights and hallucinations

Useful answers produced by generative AI may violate the IP rights of other actors, depending on the inputs used for training the model. Already, several artists have launched lawsuits based on the inclusion of their works in training data.<sup>37</sup> Meanwhile, if a generative AI tool is trained on licensed software and generates new code, that may violate the IP rights of the licensor. At the same time, it is not a straightforward question in law if a company can license software created within its computer systems by generative AI with minimal or no human intervention.<sup>38</sup>

Finally, things do not always work as planned. “Hallucinations are the key bit,” says Mileham, referring to incorrect content that can be generated confidently by AI, which brings substantial risk. A lawyer in U.S. federal court relying on ChatGPT recently submitted an affidavit in a personal injury lawsuit that included six fake cases. This led to substantial news coverage for

the firm and potential sanctions.<sup>39</sup> Hallucinations are a known problem but, so far, research to address them has focused on specific cases rather than the general issue.<sup>40</sup>

These kinds of issues make rapid adoption of generative AI tools across a wider range of functions irresponsible. “Institutional leaders must first assess the safety and security of these tools, and address any forthcoming challenges or risks,” says Villanueva.

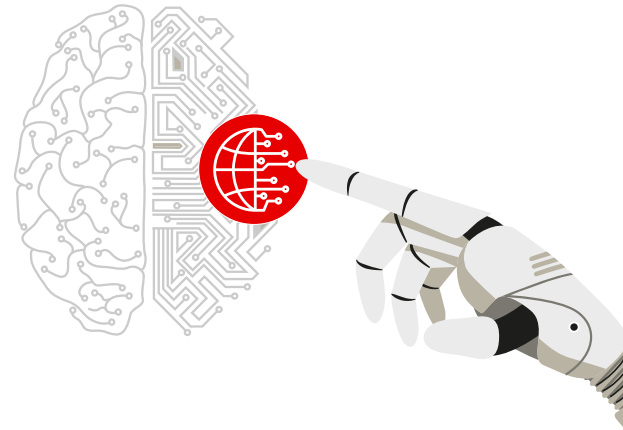
### Regulatory risks of a new technology

Accountability is at the core of industry thinking on the rollout of generative AI. UBS research points to potential regulation as the main barrier to adoption of generative AI in the fintech space. Others argue that the same could be said of the entire financial sector. “AI is not an easy button to use to bypass the accountability that we have to our customers,” says Mileham.

Regulators strongly agree. In a July 2023 speech, the chief executive of the UK’s Financial Conduct Authority (FCA) reiterated: “While the FCA does not regulate technology, we do regulate the effect on – and use of – tech in financial services.... With these developments [the growing use of generative AI], it is critical we do not lose sight of our duty to protect the most vulnerable and to safeguard financial inclusion and access.”<sup>41</sup> A month earlier, the U.S. Consumer Financial Protection Bureau warned that, with the applications already being put in place, “financial institutions risk violating legal obligations, eroding customer trust, and causing consumer harm when deploying chatbot [*sic*] technology.”<sup>42</sup> Meanwhile, the U.S. Securities and Exchange Commission has invited discussion on proposed new regulations regarding AI-enabled tools.<sup>43</sup>

Accordingly, financial services companies are looking to regulators for guidance on how they can use the technology. “We have to start the AI project with a view toward being regulatorily compliant,” says Chia. “There will be growing regulatory content so it is imperative for financial services to be able to engage regulators effectively on what kind of rules and standards there should be.” Mileham adds, “It’s going to be helpful to see regulators looking at this seriously and ensuring that all of the actors in these fields with fiduciary responsibilities understand the depth of those responsibilities.”

# 07 Conclusion: Valuable tool, but yet to be fully disruptive



The arrival of generative AI as a viable technology is important news for the financial services industry. Its application, however, will for now be limited to specific uses where other, cheaper technologies are not already sufficient for requirements and where the weaknesses of the technology do not put off executives and regulators. The difficulty in providing a more detailed forecast is the uncertainty in how today's failings might be overcome.

The strengths of generative AI shape its current application. In particular, with the capacity to learn from large amounts of unstructured data and to create output of various kinds, it is already beginning to play an important role in customer service support, fraud prevention, risk management, code generation, and unstructured data analysis. Its impact in these use cases should not be underestimated simply because the technology is not being deployed more widely. As generative AI is rolled out further in these areas, substantial cost savings – up to \$340 billion annually across the financial services industry – are likely from the shift in human employment away from repetitive, low-value tasks toward more creative and profitable ones. In that sense, it is no exaggeration to say, in Mileham's words, "This is a big moment."

Compared to what might eventually be possible, however, "we are only scratching the surface at the moment," says Briest. The use of generative AI in more sensitive tasks closer to the core of financial service business models – such as making decisions on, or executing, investment strategy for clients or companies themselves – remains some way off. Too many questions hang over the technology itself for companies or regulators to give it free rein any time soon. Villaneuva also urges caution. "As exciting as this technology is, we must be wary before fully realizing the benefits," he says.

Nevertheless, generative AI continues to evolve quickly, and solutions to its drawbacks may rapidly emerge. It is very likely, for example, that ways will be found to reduce the number and extent of hallucinations, although some errors appear to be inevitable.<sup>44</sup> If such problems do persist, the technology might still find new uses in financial services, as long as the potential drawbacks are fully understood by all parties. "We'll have to figure out as a culture, and within the regulatory regime, what that should mean," says Mileham. "It might be that people just get comfortable with the constraints of AI and you're able to, with a straight face, disclose to a customer that this thing is useful, but it is also potentially flawed, so take it with a grain of salt."

As generative AI and societal attitudes inter-evolve, financial services companies should reap the substantial, if constrained, benefits of the new technology while keeping an eye on where it might head.

**The use of generative AI in more sensitive tasks closer to the core of financial service business models – such as making decisions on, or executing, investment strategy for clients or companies themselves – remains some way off.**

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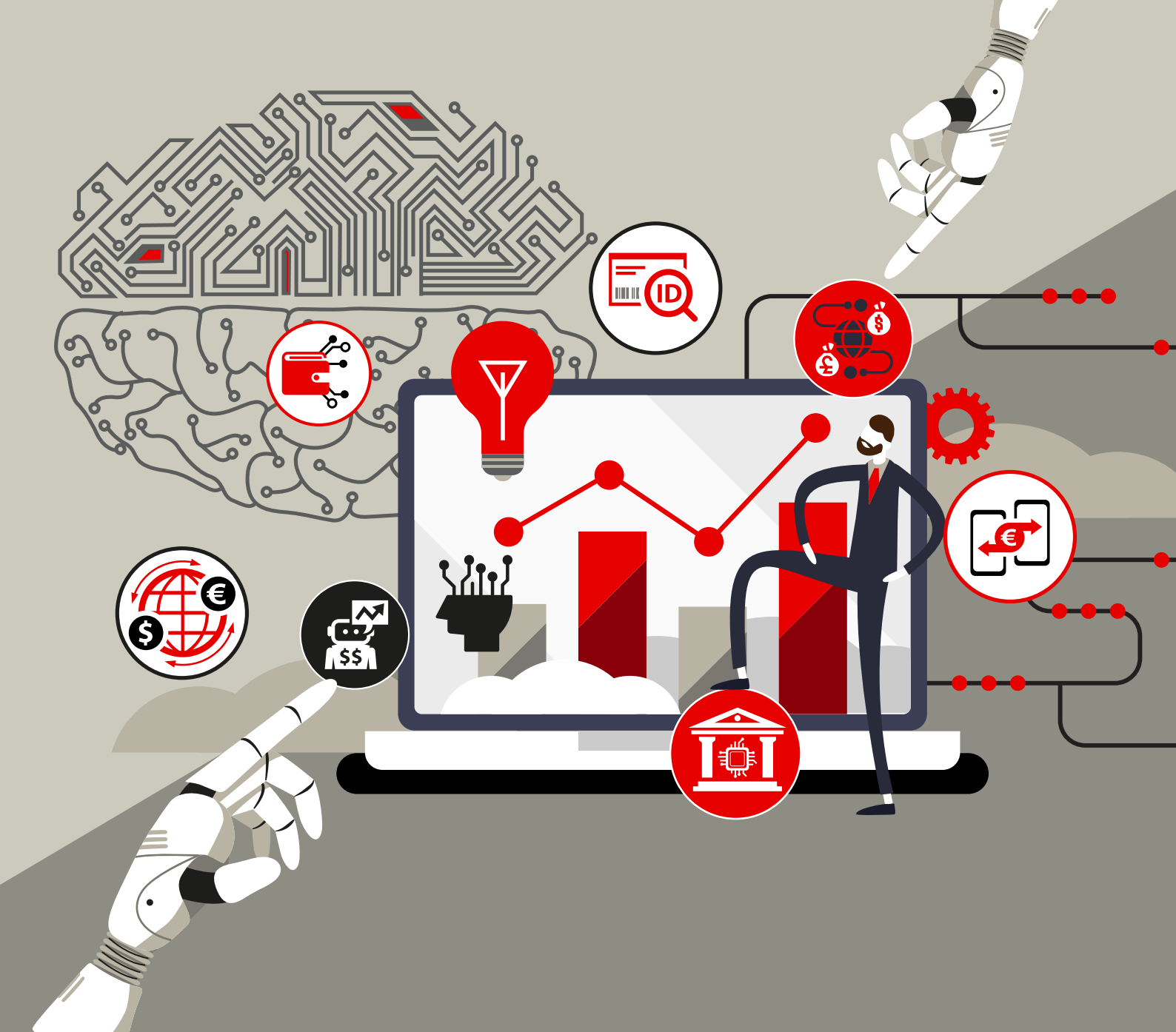
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