ARTIFICIAL INTELLIGENCE IN BANKING AND RISK MANAGEMENT

Keeping Pace and Reaping Benefits in a New Age of Analytics

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Introduction: The Path to Viability

Is it real or is it hype? Any fast-emerging, highly touted technology attracts that kind of skepticism. Artificial intelligence, as hot and hyped as anything in today's tech marketplace, is no exception. But neither does AI fit neatly into any pre-existing patterns or assumptions about IT hype and reality. There are indications, both anecdotally and in market research, that AI is enjoying a rush of commercial interest, fueling expectations that it will be game-changing, groundbreaking, even revolutionary in its impact on business and other aspects of society.

To be sure, AI in its various forms – including machine learning, natural language processing and robotic process automation – is still, in terms of business applications, early-stage. Also, perhaps paradoxically, the technology is not exactly new. As a science, AI is well over a half-century old, gaining early notoriety through popular culture ("2001: A Space Odyssey") and for winning chess games. However, as computing power has improved in the era of big data, the excitement now is the potential of AI to disrupt nearly every aspect of our lives, from automated vehicles to cancer treatment. And those high expectations do not seem unrealistically distorted. That is one takeaway from a recently conducted survey by the Global Association of Risk Professionals (GARP) and analytics leader SAS: **Four out of five respondents (81%) said that AI technologies are already benefiting their institutions.**

Majorities said they were currently using AI systems for optimization and forecasting, with machine learning not far behind at 34% (and another 46% planning to use it).

And there are plenty of practical and operational challenges, ranging from the need for a basic familiarity with these systems, to finding the necessary technical talent, to managing the quality of big-data inputs and being able to understand and explain how AI models produce their outputs. As one survey participant summarized: "In my field of work [model risk], AI is currently viewed as something unavoidable, and with many potential benefits but also many potential issues regarding model understandability, good modeling practices, etc."

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Adoption Trends

How Institutions Are Currently Using AI Technologies

AI Technology	Currently Use	Plan to Use
Forecasting	54%	33%
Optimization	51%	36%
Machine learning	34%	46%
Robotic process automation	29%	37%
Natural language processing	23%	43%
Virtual agents	22%	35%

Top AI Application Areas

52% Automation of manual processess

Credit scoring **45%**

43% Data cleansing

Risk grading **37%**
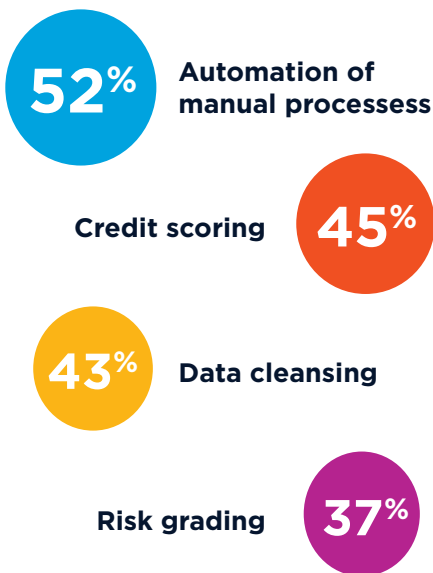
The GARP/SAS survey, conducted online in December 2018, drew more than 2,000 total responses from across the financial services industry, including banking, investment banking/securities and wealth/asset management. The most common departmental functions were risk (48%), finance (14%), and IT (9%); and executive levels included a healthy mix of director-level and above titles (28%), team leader/senior manager/manager (36%) and analyst (31%).

For the survey, AI included machine learning, natural language processing, computer vision, forecasting and optimization. In terms of current usage of AI technologies, forecasting (54%) and optimization (51%) were followed by machine learning (34%), robotic process automation (29%), natural language processing (23%), computer vision (23%) and virtual agents (22%).

Sizable percentages of current non-users said they are planning to use the technology. That would, for example, bring the machine learning penetration up to 80%, and natural language processing 66%.

"This is largely consistent with what we're seeing in the field," says Katherine Taylor, SAS senior data scientist. "We've seen a lot of customers exploring use cases and starting to implement them."

The top area of AI use is automation of manual processes (52%), followed by credit scoring (45%), data cleansing and enhancement (43%), risk grading (37%), model validation (35%), and model calibration (34%). Some newer-emerging AI applications with 20% or higher response rates were regulatory reporting, loan approvals, collections, and loan pricing.

Mahdi Amri, national services leader – Canada for Omnia AI, Deloitte's AI practice, notes that AI helps risk and marketing teams to more effectively pool quantities of credit data and develop products more tailored to customers' needs. "AI enables them to use all the data, making results more precise, and so helping to reduce risk," Amri says.

Does size of institution matter? Of the survey respondents, 27% work at institutions with $100 billion or more in assets – which would be expected to be aggressive in investing in new technology – and 30% work at institutions with less than $5 billion in assets. (The rest fall somewhere in the middle or said asset size was not applicable.) According to SAS' Taylor, today's economics of computing can bring AI within reach of smaller players. She recalls working with a smaller bank that "was interested in AI because it could bring all of its data together in one place, and once it had the data ready it could do all sorts of analytics" – thereby sidestepping the problem larger organizations face when having to modernize and integrate siloed legacy systems.

The Future and Its Challenges

On the likelihood of adopting AI technologies over the next three years, 43% and 41% said it was very or extremely likely in process automation and process refinement, respectively. Just behind, among 13 areas listed, was 39% in data cleansing and enhancement, 36% in risk grading and 33% in model calibration. All of those percentages were augmented by more than 30% saying "somewhat likely."
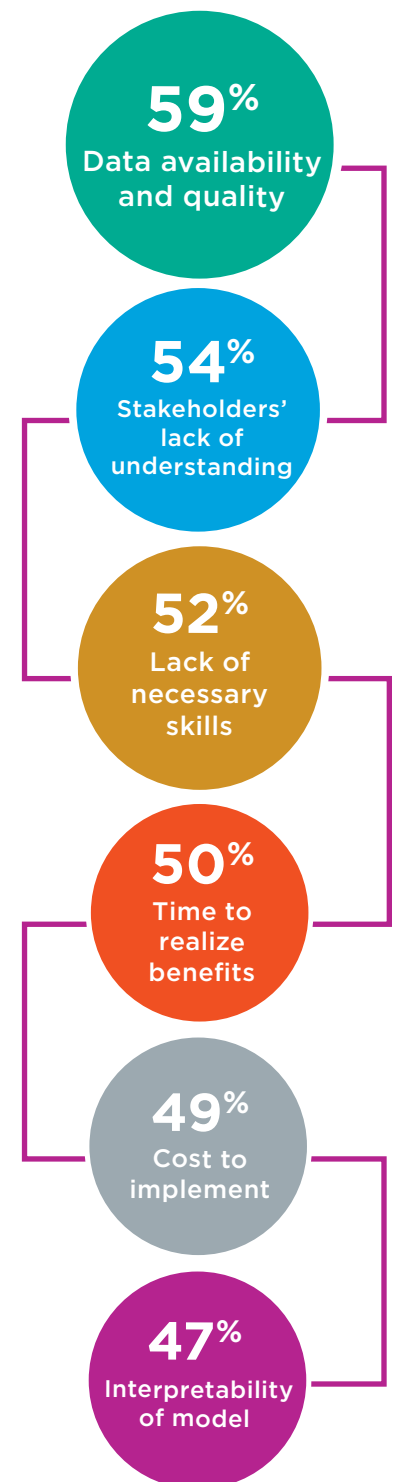
Automation, productivity and data insights top the list of anticipated benefits from AI over the next three years.

When survey respondents were asked to rate anticipated benefits from AI technologies over the next three years, automation, productivity and data insights shot to the top. A total of 78% saw faster time to gain insights from data as a significant or major benefit; 77% said the same about reduction in manual tasks; and 73% about higher productivity. One respondent tied the benefits together as: "Faster time to market, better accuracy, and deeper insight."

For all their optimism about the potential of AI, respondents were realistic about the challenges of achieving it.

On a scale of 1 (not challenging) to 5 (extremely challenging), data availability and quality was rated 4 or 5 by 59% in the survey. Taylor notes that the effectiveness of machine learning, for example, "is all about getting data. You must have good-quality data and large amounts of it to train these models."

Top Challenges to Use of AI

59%
Data availability and quality

54%
Stakeholders' lack of understanding

52%
Lack of necessary skills

50%
Time to realize benefits

49%
Cost to implement

47%
Interpretability of model

Other challenges with majority 4s and 5s were key stakeholders' lack of understanding of AI (54%), lack of necessary skills to implement and maintain the technology (52%), and time required before benefits can be achieved (50%).

Getting buy-in from senior decision-makers is critical for pursuing any major initiative, and Taylor says the hurdle can be high for AI because it is new and unfamiliar. "The topic of AI, its core methodologies, is just now being taught in schools," she says. "In addition, the hype for AI can overshadow its practical benefits."

Amri says that interpretability is essential for financial institutions both internally and from a regulatory standpoint; in fact, the latter depends on the former. "The business must first understand what the model is saying, and when it is convinced that the model is good and improves upon what is already being used, then companies can seek approval from the regulators to use the models," the Deloitte expert says.

A total of 76% of respondents were at least somewhat concerned about transparency and interpretability of their firms' AI models. Steps they are taking to ensure model transparency include fostering close collaboration between domain and AI experts (45%), using post-modeling techniques to shed light on the models (38%), and using sophisticated models engineered for explanation (27%). (Twenty-eight percent answered "don't know" on the question about transparency measures.)
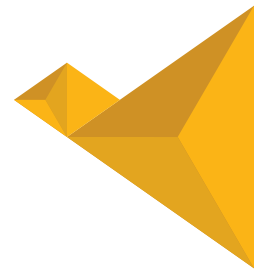
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Best Practices Begin to Emerge

SAS has worked closely with financial industry clients to implement and operationalize the various forms of AI technology. The result: a firsthand view of emerging best practices to address the accompanying challenges.

The ability to compete for AI-related talent – to implement and maintain the technology – was a concern for GARP/SAS survey respondents. While the recruitment hunt is ongoing, SAS senior data scientist Katherine Taylor recommends equipping existing risk talent with data-science skills, enabling them to better map the new technology to the problems that must be solved.

Establishing central teams for AI governance appears to aid in adoption of the technology across the company, Taylor says, adding that it is vital to introduce the technology by tackling a well-defined, real-world problem. She points to one investment bank client that turned to neural networks to improve approximations of real-time portfolio repricings, because traditional methods were breaking down under stress. The neutral networks indeed ran faster and provided much better approximations.

Mahdi Amri of Deloitte's Omnia AI says that because of budget or resource constraints, companies have to be selective in where they deploy AI. They must set priorities and align the technology with business strategies and opportunities.

Amri lists three main AI building blocks: vast quantities of data, including alternative and unstructured data; large-scale data processing and storage capability, increasingly practical today with cloud technology; and rigorous algorithms for analytical and predictive accuracy.

"Banks' logistic regression models are not dead yet, and they are proven and easy to understand," Amri says. "But machine learning and other AI techniques can enhance those models."

AI and Changing Skill Sets

When asked about anticipated benefits from AI technologies, 55% said exciting new career paths would be a significant or major benefit; 32% said "some" benefit.

Almost all respondents expect AI to improve their jobs at least somewhat over the next three years in various ways: higher productivity (96%), faster time to gain insights from data (95%) and more data insights for faster, better decisions (95%).

However, there is uncertainty about how jobs may change – or perhaps even be eliminated.

It is a time of transition that John Sjaastad, senior director of global risk consulting at SAS, likens to working in a credit department before credit scoring became commonplace, when the executive leadership was highly skeptical about the models. Some AI techniques today similarly do not lend themselves to a clear understanding about how they work, and that prompts concerns about common sense being replaced by these models.
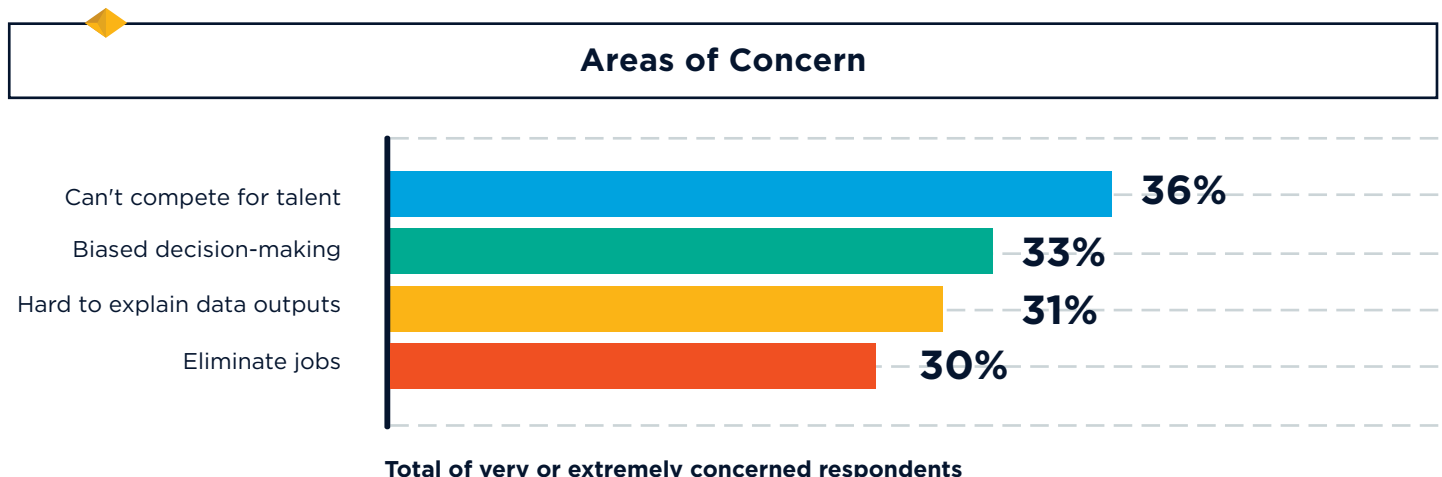
Sjaastad says that being able to understand the models and communicate how they will perform in different circumstances becomes highly valued. That suggests heightened demand for quantitative skills spanning risk, statistics and programming. He believes such training will increasingly be incorporated in advanced degree programs.

"Over time, we'll probably see fewer people in risk, but they'll have a combination of both the domain and quantitative skills that will come to dominate the risk function," Sjaastad says.

Rating various potential consequences of AI on the scale of 1 (not concerned) to 5 (extremely concerned), 36% in the survey gave inability to compete for talent a 4 or 5. That compared with 33% for "it will lead to misguided decision-making through bias or inaccuracies" and 30% for "it will eliminate jobs."

A more positive spin, Taylor says, is the ability to take advantage of AI and expanding computing power to apply risk analytics more widely, such as in trading or marketing. "AI may actually enable more roles to do risk analytics," she says.

As financial firms are adjusting to the new technology, and if explaining it to the C-suite and regulators is a stumbling block, companies may use AI to create "challenger models." These models "are not replacing production models," Taylor says, "but they can provide a lot of insight into improving those existing models."

Areas of Concern

Can't compete for talent	36%
Biased decision-making	33%
Hard to explain data outputs	31%
Eliminate jobs	30%

Total of very or extremely concerned respondents

Summary/Conclusion

Greatest Benefit Expected from AI over the Next Three Years

| **78%**	**77%**	**77%**	**73%**	**66%**	**66%**
Faster insight from data	Reduced manual tasks	Improved decision-making	Higher productivity	Lower operating costs	Product quality/ customer experience

Total responding "significant" or "major" benefit

The GARP/SAS survey results confirm that there is widespread interest in artificial intelligence in the financial services industry, and particularly toward the advancement of risk management functions. Adoption has been rapid and appears to be gaining momentum, as sizable numbers say they are planning to implement machine learning and other forms of AI. Gains in the accessibility and affordability of the technology make it feasible for financial institutions below the top tier that has historically been most able to fund investments in technological innovation.

Along with quick adoption, concerns and challenges have emerged. Some are technical, related to the need to overcome the constraints of legacy systems and otherwise build big-data capabilities to take full advantage of AI. New talent and skill sets may be required to set up, maintain and optimize the technology, as well as meet the model-explainability and interpretability needs of senior managers and regulators.

All indications are that AI technology is here to stay and will become an increasingly important tool in risk monitoring, modeling and analytics. Risk professionals will likely have to broaden their abilities, melding domain expertise with highly quantitative and technical skills. Risk management departments may be re-skilled and reshaped, while quantitative and analytical capabilities are applied more comprehensively in more areas of the organization.

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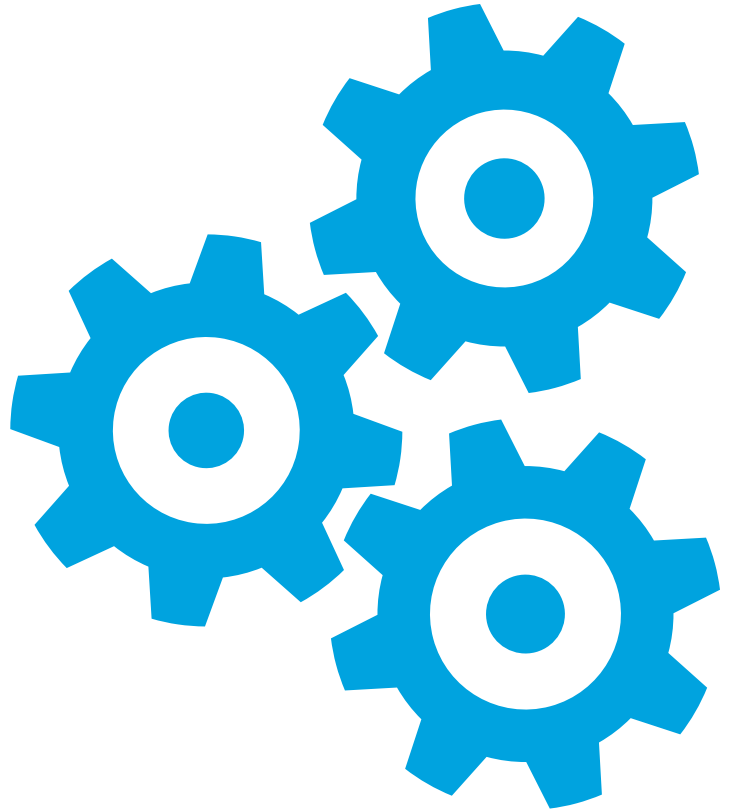
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About GARP | The Global Association of Risk Professionals (GARP) is a non-partisan, not-for-profit membership organization serving the risk management industry. Founded in 1996, GARP advances the profession through education, research and promotion of best practices through the GARP Risk Institute, GARP Benchmarking Initiative and an array of informational and certification programs. GARP has 200,000 members in more than 190 countries and territories, and has certified more than 50,000 professionals.

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