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# Regulatory and Compliance Insights

This volume, titled "**Regulatory and Compliance Insights**", focuses on the significant progress and ongoing challenges in the field of financial regulation and compliance. The articles are organized to cover key themes such as, capital markets, independence of financial supervision, digital transformation, and capacity building, reflecting the comprehensive approach needed to address the dynamic nature of financial markets.



1.5  
Professional Insight

# **AI and the Future of Supervision: How Artificial Intelligence will impact Financial Supervisory Authorities**

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## Authors' Bios



**Nicolas Vasse** With more than 20 years of experience in Financial Markets, Regulation and Innovation, Nicolas is today Director at IBM Promontory. His teams accompany large financial institutions solving complex strategic regulatory challenges: assessing impact and defining strategies to implement new regulations, balance innovation and risks, enhance programs for regulatory, compliance and conduct risk, and fight financial crime and fraud. Before joining IBM Promontory, Nicolas spent 11 years as Chief Operations Officer (COO) of the European Securities and Markets Authority (ESMA). He was part of the founding executive team of the European Securities and Markets Authority – in charge of Information Technology, Human Resources, Finance and Procurement, and Facility Management. As part of the Executive Committee of ESMA, he participated to the set up of all regulatory developments led by ESMA (MiFIR, EMIR, AIFMD & SFTR, etc...). In his position, Nicolas led the set up of all operational matters of the new Authority (including Security, Risk and Compliance), and its growth from 30 to 350 staff members. Prior to his experience at ESMA, Nicolas was the IT Director of the Committee of European Securities Regulators (CESR) where he set up the first paneuropean IT system exchanging all transactions executed in Europe across its 28 financial regulators.



**Richard Gigax** is a seasoned consultant with over six years of experience in Governance, Risk, and Compliance advisory-consulting for financial institutions, focusing on Technology Risk and Anti-Financial Crimes. His expertise spans AML Transaction Monitoring and CDD, AI Control Framework, DORA, and Risk Assessment, including Integrity Risk Analysis and SIRA. Starting as an AML Analyst at Promontory Risk Review, Richard honed his skills in monitoring alerts and cases, conducting CDD reviews, and training analysts. After two years as an AML Analyst, he transitioned to Promontory Financial Group, where he excelled in third-party assessments and strategic remediation program improvements. With proven project management and governance skills, Richard has provided comprehensive support to financial institutions, ensuring robust compliance with AML/CTF regulations and enhancing operational resilience. His experience in municipal bond finance further enriches his understanding of the financial environment.



**Thanh Tran Tien** is currently a Product Manager at Banque de France. He previously worked as a consultant at IBM Promontory, contributing to regulatory assessments and AI compliance analyses for major European banks. Thanh holds a Master's in Consulting and Management from CELSA – Sorbonne University, and has legal training from Paris 2 Panthéon-Assas. His expertise bridges regulatory strategy, financial law, and digital transformation in the banking sector.



**Sipke Hiemstra.** After having been responsible for the regulatory compliance of the financing company of IBM in France, Sipke Hiemstra is now consultant in banking regulations at IBM Promontory. He started his career in IT analytics (programming and data) and then continued in internal audit and internal controls.

## Abstract

This article explores the impact of Artificial Intelligence (AI), especially Generative AI, on financial supervisory authorities. The evolution of AI — from traditional models to advanced Large Language Models (LLMs) — is likely to transform the regulatory and supervisory landscape by enhancing risk assessment, automating processes, and offering predictive insights. The European Union's AI Act, with its risk-based regulatory framework, will serve as a first legislative response to AI-related challenges in the financial sector and is likely to be complemented by sector specific hard and soft law in the coming years. While AI offers numerous opportunities for improving supervisory activities, such as detecting market abuses or money laundering, it also introduces risks, particularly due to the opacity of AI models, its probabilistic approach and inherent biases of the data used to train models. The article emphasizes the need for supervisory bodies to adopt AI strategically, ensuring compliance with new regulations while leveraging AI to bolster efficiency and effectiveness in overseeing financial institutions. As AI should become integral to financial supervision, regulators are urged to lead the change, establish AI hubs, and foster collaborations with the private sector to harness AI's potential while mitigating its risks.

# AI and the Future of Supervision: How will Artificial Intelligence impact Financial Supervisory Authorities?

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## Introduction

The rapid advancement of Artificial Intelligence (AI) has transformed numerous sectors, including finance. With the advent of Generative AI<sup>1</sup> and Large Language Models (LLMs)<sup>2</sup>, the impact on financial supervisory authorities has become a critical area of focus. This article explores how AI, particularly Generative AI, is reshaping the landscape of financial supervision, the regulatory responses to these changes, and the future challenges and opportunities for supervisors.

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1 Generative AI Definition: artificial intelligence technology that creates content — including text, images, video, and computer code — by identifying patterns in large quantities of training data, and then creating original material that has similar characteristics. *New York Times Artificial Intelligence Glossary* (New York Times, 27 March 2023) originally at <<https://www.nytimes.com/article/ai-artificial-intelligence-glossary.html>> archived at <<https://web.archive.org/web/20230901183440/https://www.nytimes.com/article/ai-artificial-intelligence-glossary.html>> accessed 8 October 2024.

2 Large Language Model Definition: a type of neural network that learns skills — including generating prose, conducting conversations, and writing computer code — by analyzing vast amounts of text from across the internet. The basic function is to predict the next word in a sequence, but these models have surprised experts by learning new abilities. *New York Times Artificial Intelligence Glossary* (n 1).

## 01

# The (r)evolution of Artificial Intelligence

AI is not a novel concept. Since the emergence of large-scale computing in the 1950s and 1960s, both theoretical and practical research on AI has been extensively conducted<sup>3</sup>. Initially, AI was developed based on the concept of neural networks<sup>4</sup>, which simulate brain function to solve problems that conventional algorithms cannot address.

AI is distinct from traditional Information Technology (IT) systems due to its probabilistic nature<sup>5</sup>. The core principle of AI lies in its ability to be trained on a specific dataset, often referred to as the training base. By leveraging this training base, AI generates the most probable responses based on the data it has assimilated.

A prominent example of AI in action is image recognition. While recognizing a face might seem trivial to a human, programming an algorithm to accomplish this task is complex. One must define the facial features and account for variations due to different angles and lighting conditions. However, when AI is trained on a large dataset of facial images, it can accurately identify faces without relying on a complex algorithm.

Over recent decades, what is now referred to as traditional AI<sup>6</sup> has been used to address specific challenges that conventional IT systems cannot resolve. Since the early 2010s, financial supervisory authorities have utilized AI in various capacities, particularly for transaction monitoring related to Anti-Money Laundering (AML) and Market Abuse.

## 02

# The rise of Generative AI and its broader implications

The year 2023 marked the emergence of a new form of AI, known as Generative AI. This advancement stemmed from two pivotal developments:

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- 3 Wikipedia Article on Early AI Successes, 'History of Artificial Intelligence' — Early Successes (1956 – 1974)' *Wikipedia* <[https://en.wikipedia.org/wiki/History\\_of\\_artificial\\_intelligence](https://en.wikipedia.org/wiki/History_of_artificial_intelligence)> accessed 8 October 2024.
  - 4 Neural Network Definition: a mathematical system, modeled on the human brain, that learns skills by finding statistical patterns in data. It consists of layers of artificial neurons: the first layer receives the input data, and the last layer outputs the results. Even the experts who create neural networks do not always understand what happens in between. *New York Times Artificial Intelligence Glossary* (n 1).
  - 5 'What's the Difference Between AI and Regular Computing?' (Royal Institution of Great Britain Blog, 12 December 2023) [Decision-Making section] <<https://www.rigb.org/explore-science/explore/blog/whats-difference-between-ai-and-regular-computing>> accessed 8 October 2024.
  - 6 Traditional AI is a subset of artificial intelligence that focuses on performing preset tasks using predetermined algorithms and rules. These artificial intelligence applications are designed to excel in a single activity or a restricted set of tasks, such as playing chess, diagnosing diseases, or translating languages. This definition comes from 'What's the Difference between Traditional and Generative AI?' (US Chamber of Commerce, 16 October 2023) <<https://www.uschamber.com/co/run/technology/traditional-ai-vs-generative-ai>> accessed 8 October 2024.



1. The Internet, which provided access to vast datasets for training, and
2. The enhanced processing power of modern computers and cloud computing, which enabled the handling of massive data by large neural networks requiring large processing capacities.

Unlike traditional AI, which is trained on a specific dataset to perform a designated task, Generative AI is trained on vast amounts of data available on the Internet, with the goal of generating content — such as producing text or engaging in human-like conversations. Generative AI differs significantly from its predecessors in that it can execute multiple tasks, support a variety of languages, and in some instances, outperform traditional AI models in specific tasks.

The transformative impact of Generative AI is not only attributable to the technological advancements themselves but also to the technology's immediate accessibility to the public. The release of ChatGPT by OpenAI, made available to anyone with an Internet connection, had an unprecedented media impact<sup>7</sup> and brought widespread awareness of these advancements. Unlike previous technologies, which typically remain in the hands of a select few for years before becoming mainstream, ChatGPT was different as it was immediately adopted by a global user base.

Along with ChatGPT, numerous foundational models or LLMs have been developed in recent years.<sup>8</sup> These models, trained on extensive datasets, have been designed to generate statistically probable outputs when prompted. A key innovation of Generative AI is its ability to produce content, including coherent conversations, which was not feasible with earlier AI systems.

Despite its capabilities, Generative AI remains a probabilistic technology, in contrast to the deterministic nature of traditional IT systems. This distinction implies that the outputs of Generative AI, being based on probabilities, are not always correct. Moreover, AI systems often function as “black boxes,” with internal processes and decision-making mechanisms that remain opaque to both users and developers. Additionally, while AI systems can process large datasets to generate predictions and responses, they are inherently statistical and may produce biased or flawed outcomes, particularly if the training data contains inherent biases. This risk is heightened by the human-like presentation of AI-generated content, which may seem credible even when it is not.

The implications of these characteristics are profound, as they introduce new risks that differ from those associated with traditional technologies. Addressing these risks is crucial, especially given the rapid and widespread adoption of this technology.

As AI technology continues to evolve, financial supervisory authorities must now ensure that the risks associated with the deployment of AI within the entities they oversee are appropriately managed and controlled, thereby safeguarding the stability and integrity of financial markets.

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7 *'How the media is covering ChatGPT' - Columbia Journalism Review (cjr.org).*

8 *'ChatGPT and the rise of large language models: the new AI-driven infodemic threat in public health' - PMC (nih.gov).*

03

## Regulatory response: the European Union's AI legislation

On 12 July 2024, the European Union (EU) published its first comprehensive AI legislation in the Official Journal.<sup>9</sup> This landmark legislation seeks to standardize regulations governing the use of artificial intelligence across the EU. As the first major legislative effort of its kind, the AI Act does not only establish a harmonised framework for AI regulation within Europe but is also poised to influence the development of similar regulatory frameworks globally.<sup>10</sup>

The AI Act adopts a “risk-based approach” to AI regulation, imposing stricter requirements on AI systems depending on the potential risks they pose to society. Specifically, the greater the risk associated with an AI system, the more rigorous the regulatory measures. This approach mirrors the long-established practices of financial regulation and supervision, which have been applied in Europe for the last decades.

In the financial sector, high-risk AI systems include those used for assessing creditworthiness or credit scores, as well as those involved in risk assessment and pricing for life and health insurance.<sup>11</sup>

The legislation also promotes the creation of AI regulatory sandboxes,<sup>12</sup> offering an innovation-friendly legal framework that allows for the testing of new AI systems under real-world conditions.<sup>13</sup>

Parallel to the development of the EU-wide AI Act, national financial regulators across Europe have issued their own guidance, recommendations, and principles concerning AI-related systems. For example, France published a discussion paper on AI governance in June 2020,<sup>14</sup> and Germany issued principles for the use of algorithms in decision-making processes in June 2021.<sup>15</sup> Additionally, the European Commission launched a consultation in June 2024 on the application of AI in the financial sector.<sup>16</sup>

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9 Regulation (EU) 2024/1689 of the European Parliament and of the Council <[https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=OJ:L\\_202401689](https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=OJ:L_202401689)> known as the AI Act.

10 *'The EU's new AI Act could have global impact'* (Chatham House – International Affairs Think Tank).

11 As outlined in Annex III of the AI Act.

12 AI regulatory sandbox: A controlled framework set up by a competent authority which offers providers or prospective providers of AI systems, the possibility to develop, train, validate and test, where appropriate in real-world conditions, an innovative AI system, pursuant to a sandbox plan for a limited time under regulatory supervision. Definition in point (55) of article 3 of the AI Act.

13 Considerations (25) and (139) of the AI Act.

14 <[https://acpr.banque-france.fr/sites/default/files/medias/documents/20200612\\_gouvernance\\_evaluation\\_ia.pdf](https://acpr.banque-france.fr/sites/default/files/medias/documents/20200612_gouvernance_evaluation_ia.pdf)>.

15 <[https://www.bafin.de/SharedDocs/Downloads/EN/Aufsichtsrecht/dl\\_Prinzipienpapier\\_BDAI\\_en.pdf](https://www.bafin.de/SharedDocs/Downloads/EN/Aufsichtsrecht/dl_Prinzipienpapier_BDAI_en.pdf)>.

16 <[https://finance.ec.europa.eu/regulation-and-supervision/consultations-0/targeted-consultation-artificial-intelligence-financial-sector\\_en](https://finance.ec.europa.eu/regulation-and-supervision/consultations-0/targeted-consultation-artificial-intelligence-financial-sector_en)>.

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## Impact on Financial Supervisory Authorities

As AI becomes increasingly entrenched in the financial sector, supervisory authorities are working to keep pace with its rapid evolution. The International Monetary Fund estimates that financial institutions will more than double their AI-related expenditures by 2027<sup>17</sup>. Simultaneously, the chair of the U.S. Securities and Exchange Commission has raised concerns that the financial stability risks posed by AI necessitate “new thinking on systemwide or macroprudential policy interventions.”<sup>18</sup> This evolving landscape may result in a competitive “arms race” between supervisors and the entities they regulate. Given the intense scrutiny and substantial investments in AI by the financial industry, the next decade will likely be defined by how AI either hinders or empowers supervisory authorities.

Financial regulators and supervisors are impacted by AI in three primary areas:

1. **Legislation and Guidelines:** regulators may need to further develop European legislation and issue guidelines tailored to specific scenarios within the financial sector that the EU AI Act does not fully address. The ongoing consultations may result in new, more specialized soft or hard law, i.e., guidelines or regulations<sup>19</sup>.
2. **Financial Institutions Supervision:** during inspections and oversight of financial institutions, supervisors must ensure that the integration of AI into business processes does not compromise compliance with existing financial regulations or introduce new, unmitigated risks. Additionally, supervisors must verify that institutions adhere to new regulations specifically related to AI usage. In this context, Model Risk Management is to become a particular area of focus as an AI model is ultimately a model used by the Bank and should be managed as any other model.
3. **Supervisory Activities:** AI can be leveraged in various supervisory activities, particularly in the development of risk-based approaches, such as selecting topics and institutions for focused scrutiny. AI can also assist in both on-site and off-site inspections by analyzing large volumes of documents and information efficiently.

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17 <<https://www.imf.org/en/Publications/fandd/issues/2023/12/AI-reverberations-across-finance-Kearns>>.

18 <<https://www.sec.gov/newsroom/speeches-statements/gensler-remarks-fsoc-121423>>.

19 <[https://finance.ec.europa.eu/news/commission-seeks-input-industry-use-artificial-intelligence-finance-2024-06-18\\_en](https://finance.ec.europa.eu/news/commission-seeks-input-industry-use-artificial-intelligence-finance-2024-06-18_en)>.

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## Case Studies and Current Applications

A key component of supervisors' daily responsibilities is the analysis of substantial amounts of information from the entities they oversee. AI tools have already demonstrated their ability to significantly reduce the time required for such analyses. Generative AI, trained on knowledge relevant to banking regulation, can assist supervisors by drafting documents, gathering data, and providing feedback. AI's capacity to quickly identify patterns of misconduct and report incidents has been recognized by institutions such as the European Central Bank (ECB), which has established a SupTech Hub to explore further applications of AI.<sup>20</sup> Recently, the ECB developed several AI-based applications and platforms, identifying more than 40 use cases and proofs-of-concept that demonstrate the potential of Generative AI.

Among the various use cases for financial supervisors, the following stand out:

1. **Enhanced Risk Assessment and Monitoring:** AI can greatly enhance how financial supervisory authorities assess and manage risks. By analyzing extensive datasets, AI can identify emerging risks and patterns that may be challenging for human supervisors to detect. Real-time monitoring of transactions by financial institutions, particularly in areas such as Market Abuse and AML, enable the early detection of anomalies and compliance breaches. Furthermore, AI-powered predictive analytics can help forecast potential crises, allowing for proactive supervisory measures.
2. **Improved Efficiency and Automation:** Generative AI can support routine tasks within regulatory and supervisory authorities, particularly in drafting and legislative activities, thereby improving overall efficiency. AI-driven document processing can accelerate data extraction and analysis, saving time and resources during on-site inspections.

**Enhanced Data Analytics and Insights:** advanced data visualisation tools, powered by AI, can reveal hidden patterns and correlations within complex datasets. AI-driven systems for fraud detection and prevention will further strengthen financial security. Additionally, natural language processing can extract valuable insights from unstructured data sources, such as news articles and social media, providing supplementary information for risk assessment.

Supervisory authorities across Europe are increasingly adopting AI technology, despite its nascent state. For instance, the French Prudential Supervision and Resolution Authority ACPR has developed LUCIA, a tool that analyzes banking transactions and compliance data.<sup>21</sup> The ECB employs Heimdall to automatically read and assess fit and proper questionnaires,<sup>22</sup> while GABI assists in generating and optimizing regression models on a large scale,<sup>23</sup> providing more comprehensive assessments. These examples represent only the beginning of AI's integration into supervisory practices.

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20 <https://www.bankingsupervision.europa.eu/press/speeches/date/2022/html/ssm.sp220914~d0201e42a9.en.html>.

21 The financial supervisor in the age of AI, Introductory speech by Denis Beau, First Deputy Governor of Banque de France at the seminar "Artificial intelligence: a game changer for financial supervision?" of the Association Europe Finances Régulations, June 5th, 2024 at [https://acpr.banque-france.fr/sites/default/files/medias/documents/20240614\\_aefr\\_seminar\\_speech\\_dbeau.pdf](https://acpr.banque-france.fr/sites/default/files/medias/documents/20240614_aefr_seminar_speech_dbeau.pdf) (page 3).

22 [https://www.bankingsupervision.europa.eu/press/publications/newsletter/2023/html/ssm.nl231115\\_2.en.html](https://www.bankingsupervision.europa.eu/press/publications/newsletter/2023/html/ssm.nl231115_2.en.html).

23 <https://www.bankingsupervision.europa.eu/press/interviews/date/2024/html/ssm.in240226~c6f7fc9251.en.html>.

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## The Future of Financial Supervision

Prospectively, there are two compelling reasons to believe that financial supervisors can benefit significantly from the adoption of Generative AI:

1. **Textual Nature of Legislation and Supervision:** much of supervisory work involves drafting, quality assurance, and text analysis, tasks at which Generative AI excels.
2. **Risk Mitigation:** Supervisors, with their expertise, are well-positioned to understand and mitigate the risks associated with Generative AI. Several aspects of regulatory writing, such as clarifying ambiguities, explicating implicit assumptions, and breaking down complex issues, are ideally suited for AI prompting.

Additionally, regulatory practice often involves asking the right questions and rephrasing them based on responses, a dynamic that parallels interactions with Generative AI. Moreover, regulators are trained to critically evaluate text, identify inconsistencies, and establish factual bases for assertions — skills that are invaluable in managing AI bias and hallucinations.

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## Coping with Uncertainty and Leading Change

Reflecting on the past two years, it is evident that predicting the trajectory of AI and its role in the financial sector in just a few years from now is an uncertain endeavour. The pace of technological evolution outstrips even the most resourceful innovation and technology offices, a trend that will undoubtedly continue. However, regulators must not remain passive observers, adapting reactively. Public institutions need to reorient their approach toward potential industry disruptors. At a minimum, they should anticipate and prepare for significant changes that could impact current business practices; at best, they should aim to lead these changes.

Currently, Generative AI predominantly employs LLMs trained on substantial amounts of data across multiple domains. These models, which are primarily focused on common text, can be readily adapted, and tailored to specific supervisory needs.

It is imperative that supervisory authorities and regulators now begin to structure their approach to the impending and significant changes brought about by AI. First and foremost, financial supervisory authorities should develop their own strategies for effectively adopting and leveraging AI.

Such strategy should encompass all elements discussed in this article, including consulting on, and adapting legislative frameworks, embedding AI into supervisory toolkits for financial entities, and transforming supervisory institutions into AI-powered entities that utilize AI effectively to conduct risk assessments and execute supervisory tasks and data analysis. This strategy should also emphasize collaboration between regulators and the private sector to foster AI innovation, alongside continuous learning, and adaptation to the evolving AI landscape.

Establishing dedicated AI Hubs must also become a priority for supervisors, along with efforts to attract new talent and leading experts in AI, ensuring that expertise is not concentrated solely within the private sector.

## **Conclusion**

AI is going to reshape the landscape of financial supervision. The rise of Generative AI presents both opportunities and challenges for financial supervisory authorities. By embracing AI, supervisors can enhance their ability to manage risks, improve efficiency, and ensure the stability and integrity of financial markets. However, this requires a proactive and strategic approach to AI adoption, guided by robust regulatory frameworks and a commitment to continuous learning and adaptation.

