

Opportunities and Risks Related to Emerging Technologies

The Asset Stewardship team conducted thematic engagements to gain insights into how companies in the Information Technology and Communications Services sectors are managing opportunities and risks related to artificial intelligence and other emerging technologies.

Introduction

“Emerging technologies” refer to technologies like artificial intelligence (AI), which is “a machine’s ability to perform the cognitive functions we associate with human minds, such as perceiving, reasoning, learning, interacting with the environment, problem-solving, and exercising creativity,”¹ and its applications that have steadily evolved in the last few years. These technologies may create new business opportunities and provide a competitive advantage to companies when implemented. However, companies may face potential risks as they leverage emerging technologies. Some of these risks are described in the Appendix.

Thematic Engagement

To gain insights into how companies identify and manage opportunities and risks related to emerging technologies, we conducted a series of thematic engagements in 2024 with several of our largest holdings in the Information Technology and Communications Services sectors that are involved in the development and/or implementation of emerging technologies. We selected these sectors because technology companies are at the forefront of innovation, and identifying opportunities and managing risks are increasingly relevant to their businesses.

Key Takeaways From Engagements

- **Recognizing Opportunities and Risks:** Each company we spoke to recognized the significant potential of emerging technologies to have a transformative impact to their business. Many of them have been thoughtful about the implications and trade-offs, developing principles and processes around AI adoption.
- **Board Oversight and governance:** We learned from companies that internal controls, effective governance mechanisms, and board oversight are essential for managing opportunities and risks related to emerging technologies.
- **Transparency Into How Models Operate:** Some companies highlighted the importance of providing transparency and explainability on how AI systems make decisions to customers so that they can make informed decisions.
- **Working With Stakeholders:** We learned that it is important for companies to have mechanisms in place for customers and employees to raise concerns and share inputs. Several companies described their efforts to engage with regulators, policymakers, and peers and highlighted the need for uniform standard setting and regulation to govern AI.

Engagement Insights

Identification and Management of Opportunities and Risks

Insights from our engagements are discussed in further detail below.

Companies shared examples of how they identify opportunities and risks related to emerging technologies:

- **Identifying Opportunities:** The majority of the companies we spoke to discussed the potential of AI and Generative AI² as tools to enhance employee productivity. Some companies also highlighted opportunities for development of new services and solutions. **Deutsche Telekom AG**, a German telecommunications company, told us about the importance of using AI technology to provide a better customer experience. The company also described its partnership with **SK Telecom Co., Ltd.** to develop an industry-specific large language model (LLM).³ The company shared that the LLM would be specifically tailored for the telecom industry and could be utilized in chatbots. **NVIDIA**, an American technology company, described opportunities for building infrastructure that will support developments in AI including data factories for generative AI services, tools to curate and validate unbiased datasets for computer vision, and security features like confidential computing among others.⁴
- **Conducting Due Diligence to Identify Potential Risks:** **Adobe Inc.**, an American software company, told us that their product teams that develop AI complete impact assessments that evaluate the potential impact of AI features and products, so that the company can remediate any risks.⁵ **Microsoft Corporation**, an American technology company, states in its Responsible AI Transparency Report that development of generative applications begins with an impact assessment as required by their Responsible AI Standard.⁶ During our engagement, the company informed us that it conducts enhanced due diligence for high-risk generative AI applications. We heard from **Prosus N.V.**, a global technology investor and operator, that the company aims to assess how potential investee companies' AI applications align with its own AI principles.

We also heard examples of how companies manage risks once they're identified:

- **Addressing Potential Bias in Algorithms:** We heard from **SAP SE (SAP)**, a German software company, about its AI Ethics policy, which says that “AI systems shall not intentionally generate unfairly biased outputs.”⁷ Depending on the AI use case, SAP conducts reviews of AI system outputs for fairness and equity. **Salesforce, Inc.**, an American software company, uses adversarial testing to identify potential biases in Generative AI models.⁸
- **Managing Risks Related to Misinformation and Disinformation: Alphabet Inc.**, an American internet media and services company, shared that it has established policy frameworks that set guardrails on the types of content its models generate, and that it regularly reviews and updates the content and enforcement of these policies. **Adobe Inc.** discussed its participation in the Content Authenticity Initiative (CAI) during our engagement.⁹ CAI is a cross-industry community of major media and technology companies. It develops open-source tools for verifiably recording the provenance of any digital media, including content made with generative AI, so that the authenticity of the content can be verified.
- **Establishing Robust Policies on Data Security and Privacy: Verizon Communications Inc.**, an American telecommunications company, utilizes a privacy impact assessment process to understand how a new product or system collects, uses, retains, and shares data, and to identify relevant legal, regulatory, and policy requirements.
- **Ensuring Human Oversight in the Design and Development of AI as Applicable:** Several companies emphasized the importance of human oversight in the design and development of AI. **Capgemini SE** a French technology services and consulting company, has published a Code of Ethics for AI which states that “appropriate measures should be implemented from the AI solution’s design phase, with the appropriate level of human oversight depending on the AI solution application area and potential risks.”¹⁰

Board Oversight and Governance

- **Establishing Internal Controls and Governance Structures:** Some of the companies we spoke to have committees comprised of cross-functional teams of experts, executives, and employees with legal, technical, and policy backgrounds to provide guidance and oversight for development of AI. Examples include **SAP’s** “AI Ethics Steering Committee” and “AI Ethics Advisory Panel” and **International Business Machines Corporation’s (IBM)** “AI Ethics Board.”
- **Board Oversight:** Most of the companies discussed how their boards of directors oversee opportunities and risks related to emerging technologies. We heard about regular discussions at the board level on the topic and board committees such as audit committees and corporate governance committees being responsible for risk oversight. **Capgemini SE** shared that the board receives regular reports on cybersecurity risks and AI.

Transparency Into How Models Operate

- **Providing Transparency and Explainability to Customers and Users:** Some companies highlighted the importance of providing transparency and explainability to customers on how AI systems make decisions. **Salesforce, Inc.** discloses that it publishes model cards that describe how models were created, intended and unintended use cases, societal implications, and performance scores.¹¹ **IBM** states that “technology companies must be clear about who trains their AI systems, what data was used in that training and, most importantly, what went into their algorithm’s recommendations.”¹²

- **Soliciting Feedback From Customers, Users and Employees: Salesforce, Inc.** discloses that it educates and empowers customers to make informed decisions about how to use its AI responsibly and creates tools and resources to help Salesforce employees, customers, and partners identify and mitigate bias in the systems that they are building or using. The company also invites feedback from customers through Customer Advisory Boards and open dialogue as part of its engagement efforts.¹⁰
- **Engaging With Regulators and Peers on Standard Setting:** Some companies highlighted the need for standard setting in the industry and expressed support for uniform global regulations on AI. We heard from **Amazon.com, Inc.**, an American technology company, about its commitment to continued collaboration with the US federal government, policymakers, technology organizations, and the AI community to advance the responsible and secure use of AI.¹³ In February 2024, the company joined the US Artificial Intelligence Safety Institute Consortium, established by the National Institute of Standards and Technology (NIST), as part of its efforts to further government and industry collaboration to advance safe and secure AI.¹⁴

Disclosures on Opportunities and Risks Related to Emerging Technologies

Companies seeking to offer insight into their approach to managing opportunities and risks related to emerging technologies could consider disclosing the following information:

- **Processes to Identify and Manage Opportunities and Risks Related to Emerging Technologies:** These could include descriptions of:
 - Responsible AI principles that articulate specific risks that a company has identified and is managing;
 - Due diligence efforts conducted by companies such as impact assessments to manage risks;
 - Efforts to detect and mitigate bias and fairness in AI models;
 - Measures taken to ensure the security and privacy of data used in AI models' and
 - The role of human oversight in the AI decision-making process.
- **Governance and Board Oversight:** Information about internal mechanisms and controls for oversight of opportunities and risks related to emerging technologies as well as board oversight of key technology-related risks.
- **Transparency Into How Models Operate:** Information provided to customers and users on how AI systems make decisions or produce specific results and the data they rely on.
- **Engagement With Stakeholders:** Discussion of how companies engage with various stakeholders like employees, customers, regulators and peers on emerging risks as well as what mechanisms exist for people to raise concerns.

Conclusion

Given the impact of AI on companies around the world, companies are increasingly focusing on and providing information to investors on opportunities and risks related to emerging technologies. We will continue to seek to understand how companies are managing opportunities and risks related to emerging technologies. This may include themes such as the role of AI in companies' efforts to enhance productivity and improve customer experience, adoption of AI based solutions by companies in various sectors, the impact of AI on the workforce, and environmental impacts of AI.

Appendix

Thematic engagements were conducted with the following companies:

Company	Country
Adobe Inc	United States
Alphabet Inc	United States
Amazon.com Inc	United States
Capgemini SE	France
Deutsche Telekom AG	Germany
Fujitsu Ltd	Japan
Infosys Ltd	India
International Business Machines Corporation	United States
Meta Platforms Inc	United States
Microsoft Corporation	United States
NVIDIA Corporation	United States
Prosus NV	Netherlands
Salesforce Inc	United States
SAP SE	Germany
Verizon Communications Inc	United States

Some potential risks related to emerging technologies are described below.

- **Potential for Bias in Algorithms:** AI systems can sometimes make inaccurate decisions or produce biased outcomes, usually due to the historical data on which these systems are trained.¹⁵ For example, a company that developed an AI tool for resume screening discovered that the tool had a disproportionate selection bias towards men over women because it was trained on a historical dataset where the majority of candidates were male.¹⁶
- **Misinformation and Disinformation:** The United Nations defines disinformation as “inaccurate information intended to deceive and inflict harm” and misinformation as the “unintentional spread of inaccurate information shared in good faith by those unaware that they are passing on falsehoods.”¹⁷ AI can automate the creation of so-called “fake news” or generate fake images and audio content (“deepfakes”) which can spread false information. Generative AI chatbots and tools might also perceive patterns or objects that are nonexistent and create non-accurate outputs called hallucinations.

- **Data Security and Privacy:** AI systems rely on vast amounts of data for training and decision making, which might amplify risks related to the inadvertent leakage of confidential and sensitive information. The potential for generative AI tools to be trained on protected data can also be a challenge as it increases vulnerabilities in the event of a cybersecurity breach.¹⁸
- **Regulatory Developments:** According to the AI Index Report 2024, the number of AI-related regulations have risen significantly between 2016 to 2023 globally. In March 2024, the European Parliament approved the Artificial Intelligence Act. In the U.S., last year alone, the total number of AI-related regulations grew by 56%.¹⁹ With evolving regulations on the topic, non-compliance or breach of regulations due to lack of effective risk management processes could pose a risk to companies.

Endnotes

- 1 "What is AI (artificial intelligence)?," McKinsey & Company, April 3, 2024, <https://mckinsey.com/featured-insights/mckinsey-explainers/what-is-ai>.
- 2 Generative AI is a type of artificial intelligence that can be used to generate new content such as text, images, audio, video and more, based on existing data or in response to a prompt or query.
- 3 SK Telecom and Deutsche Telekom develop LLM for telcos," March 23, 2023, Deutsche Telekom AG, <https://telekom.com/en/media/media-information/archive/sk-telecom-and-deutsche-telekom-to-jointly-develop-llm-1051746>.
- 4 <https://nvidia.com/en-in/ai-data-science/trustworthy-ai/>.
- 5 "Building safe, secure and trustworthy AI: Adobe's commitments to our customers and community," Adobe Inc., September 12, 2023, <https://blog.adobe.com/en/publish/2023/09/12/adobes-ai-commitments-to-customers-and-community>.
- 6 Responsible AI Transparency Report, Microsoft Corporation. <https://cdn-dynmedia-1.microsoft.com/is/content/microsoftcorp/microsoft/msc/documents/presentations/CSR/Responsible-AI-Transparency-Report-2024.pdf>.
- 7 SAP Global AI Ethics Policy, <https://sap.com/documents/2022/01/a8431b91-117e-0010-bca6-c68f7e60039b.html>.
- 8 "How Salesforce Develops Ethical Generative AI from the Start," Salesforce, Inc., <https://salesforce.com/in/news/stories/developing-ethical-ai/>.
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- 10 Code of Ethics for AI, Capgemini SE. https://capgemini.com/wp-content/uploads/2021/06/Capgemini_Code_of_Ethics_for_AI_2021_EN.pdf.
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- 16 Jeffrey Dastin, "Insight - Amazon scraps secret AI recruiting tool that showed bias against women," Reuters, October 11, 2018, <https://reuters.com/article/us-amazon-com-jobs-automation-insight-idUSKCN1MK08G/>.
- 17 Hate speech, mis- and disinformation, The United Nations, https://un.org/sites/un2.un.org/files/notohate_fact_sheets_en.pdf.
- 18 "Privacy in an AI Era: How Do We Protect Our Personal Information?" Stanford University Institute for Human-Centered Artificial Intelligence, March 18, 2024, <https://hai.stanford.edu/news/privacy-ai-era-how-do-we-protect-our-personal-information>.
- 19 Nestor Maslej, Loredana Fattorini, Raymond Perrault, Vanessa Parli, Anka Reuel, Erik Brynjolfsson, John Etchemendy, Katrina Ligett, Terah Lyons, James Manyika, Juan Carlos Niebles, Yoav Shoham, Russell Wald, and Jack Clark, "The AI Index 2024 Annual Report," AI Index Steering Committee, Institute for Human-Centered AI, Stanford University, Stanford, CA, April 2024, <https://aiindex.stanford.edu/report/>.

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* Pensions & Investments Research Center, as of December 31, 2023.

[†]This figure is presented as of December 31, 2024 and includes ETF AUM of \$1,577.74 billion USD of which approximately \$82.19 billion USD in gold assets with respect to SPDR products for which State Street Global Advisors Funds Distributors, LLC (SSGA FD) acts solely as the marketing agent. SSGA FD and State Street Global Advisors are affiliated. Please note all AUM is unaudited.

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