
Artificial Intelligence:
**A primer for corporate
directors**

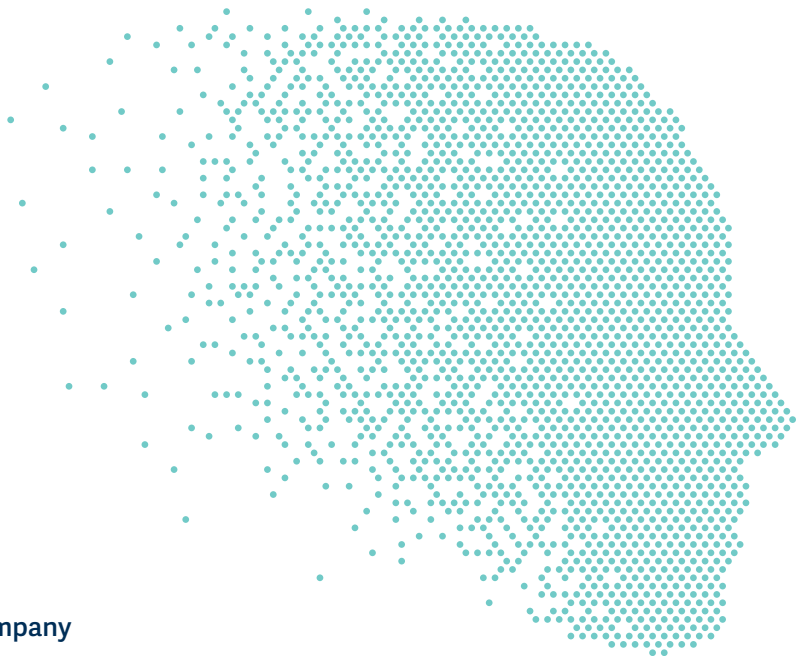
The term “artificial intelligence” has become part of common parlance – used casually in business publications and corner offices - but it often lacks definition. What does it really mean? Contrary to popular belief, it’s not synonymous with a takeover by an army of robots, nor does it equate to an endless dialogue with Siri or Alexa. Increasingly, though, it’s something every business has to consider embracing, and that corporate directors need to be able to discuss with their executive leadership teams.

To help you prepare for that next conversation, we’ve assembled key terms and concepts behind artificial intelligence (AI) that every board member needs to know, examples of how it is being used in the market, and questions to help you probe into how your company is putting, or might put, this technology to work.

Just how big is artificial intelligence in business terms?

Companies across all industries are making investments in artificial intelligence, whether developing capability in house, partnering with leaders in relevant technologies, or acquiring companies outright to gain access to needed technology. According to data from CB Insights, the most active corporate investors in artificial intelligence are:¹

1. Intel Capital
2. Google Ventures
3. GE Ventures
4. Samsung Ventures
5. Bloomberg Beta
6. In-Q-Tel
7. Tencent
8. Nokia Growth Partners
9. Microsoft Ventures
10. Qualcomm Ventures
11. Salesforce Ventures
12. AXA Strategic Ventures
13. New York Life Insurance Company



IDC estimates that corporate spending on AI will hit \$12.5 billion in 2017, and grow to over \$46 billion in 2020. In 2017, most of that spending – \$9.7 billion – will be in the United States, followed by Europe, Middle East, and Africa (EMEA), and then Asia/Pacific (APAC). By 2020, APAC is expected to trail only the United States, fueled by heavy investment in Japan and China.²

Part of that spending will be on human capital. In the United States this year, companies will spend over \$650 million on salaries for 10,000 jobs related to artificial intelligence, according to a recent study by Payscale. Most of those employees are in well-known technology leaders: Amazon, Google, Microsoft, NVIDIA, and Facebook are the five largest employers of AI workers today.³

¹ <https://www.cbinsights.com/research/most-active-corporate-investors-artificial-intelligence/>

² <https://www.idc.com/getdoc.jsp?containerId=prUS42439617>

³ <http://fortune.com/2017/05/01/automation-jobs-will-put-10000-humans-to-work-study-says/>

What are we talking about when we talk about _____ ?

Artificial Intelligence	“Artificial intelligence” is an area of computer science that focuses on creating machines that can work and react like humans. Some common capabilities of these machines include speech recognition, learning, planning, and problem solving.
Machine Learning	“Machine learning” is at the heart of artificial intelligence: It provides computers with the ability to learn without being explicitly programmed. Machine learning focuses on the development of computer programs that can change when exposed to new data.
Artificial Neural Network (ANN)	“Artificial neural network,” often seen simply as “ANN,” is a computing model based on the structure and functions of biological neural networks. Information that flows through the network affects the structure of the ANN because a neural network changes – or learns, in a sense – based on that input and output. One of ANN’s most recognized advantages is the fact that it can actually learn from observing data sets.
Cognitive Computing	“Cognitive computing,” often used as a synonym for AI, is slightly different in that it generally provides information for a human to solve a problem and stops short of providing the solution itself. The concepts overlap in many ways, however, as cognitive computing is based on the simulation of human processes in a computerized model. Like AI, it involves self-learning systems that use data mining, pattern recognition, and natural language processing.
Deep Learning	“Deep learning” is a subfield of machine learning with algorithms inspired by the structure and function of the brain called artificial neural networks (ANN). It is a growing trend in machine learning due to some favorable results in applications where the target function is very complex and datasets are large.
Computer Vision	“Computer Vision” is the science that aims to give a similar, if not better, vision capability to a machine or computer. Computer vision involves the automatic extraction, analysis and understanding of useful information from a single image or a sequence of images.

Multiple terms, all related

Artificial intelligence is an area of computer science that focuses on creating machines that can work and react like humans.

↳ **Machine learning** is at the heart of AI. It means computers can learn simply by being exposed to new data, rather than explicitly programmed.

↳ That learning often hinges on an **Artificial Neural Network**: a computation model based on the structure and functions of human brain networks.

↳ ANNs allow **deep learning**: the sorting and analysis of large and complex data sets, where one level of machine learning informs the next level.

How are businesses using artificial intelligence?

Companies are leveraging natural language processing, machine learning, artificial neural networks, and other technological advancements both to improve productivity and effectiveness of internal operations and to offer new services and solutions to the market. Here are examples in seven different industries:

Automotive

AI is being employed to learn and emulate human behavior and judgement behind the wheel, which enables safety features in today's vehicles and paves the way for autonomous vehicles in the future. Similarly, AI is being leveraged to track quality and reliability from the factory to the road for vastly improved predictive maintenance.⁵

Hospitality

Hilton, Radisson Blu, and other hotel chains are now using AI-fueled concierges that allow guests to ask for restaurant recommendations, request more towels and even play games via automated text messages.⁷

Retail

AI-powered recommendation engines help you find the perfect gift (for yourself or others), intelligence gleaned from sensors helps retailers automatically track inventory and better manage supply chains.⁹

Auditing

Big Four firms are investing in AI to enable full reviews of massive data sets and imagining ways that image recognition and specialized drones could replace junior-level auditors in simple counting or verification tasks.⁴

Energy

UK-based BP, Italy's Eni, and Pioneer Natural Resources in the US are using AI to make better guesses when it comes to spotting oil and gas deposits and deciding where to drill.⁶

Insurance

New York City-based Lemonade uses a bot to craft renters' and home insurance policies. Its website promises 90 seconds to buy insurance and 3 minutes to get claims paid. French start up Shift Technology inserts AI into the claims processing cycle to detect fraud.⁸

Software

Rainforest QA, a San Francisco-based software quality assurance firm, manages a network of some 60,000 remote workers (largely part-time) via a network of algorithms.¹⁰

⁴ www.accountingtoday.com/opinion/how-ai-will-turn-auditors-into-analysts, <https://www.ft.com/content/0898ce46-8d6a-11e7-a352-e46f43c5825d>

⁵ www.forbes.com/sites/brianrashid/2017/05/16/how-ai-pioneers-will-affect-the-car-industry-and-why-its-a-good-thing

⁶ www.ft.com/content/d20085a6-4ea1-11e7-a1f2-db19572361bb

⁷ www.forbes.com/sites/janetwburns/2016/05/10/radisson-blu-hotel-guests-can-now-text-edward-the-chatbot-for-service/

⁸ www.lemonade.com, www.shift-technology.com

⁹ www.forbes.com/sites/kimberlywhitler/2016/12/01/how-artificial-intelligence-is-changing-the-retail-experience-for-consumers/

¹⁰ qz.com/se/machines-with-brains/1017298/rainforest-qa-manages-its-60000-remote-employees-exclusively-through-a-series-of-algorithms/

What questions should we be asking our executives, or discussing as a board?



- 1** Where are we starting to use – or considering the use of – artificial intelligence in our organization? Are we choosing those parts of the business opportunistically or strategically?
- 2** Who is overseeing the development or adoption of AI in our business? Are they looking at the organization holistically, or are they focused on a narrow part of the company?
- 3** What type of AI expertise do we have on staff? Do they have the skills and experiences that we need? If not, how do we augment that team?
- 4** What are our competitors doing with artificial intelligence? What can we learn from their efforts, and how the market has responded? What are they missing, or where are they stumbling?
- 5** What partnerships can we develop to enhance our understanding of how AI might work in our industry, for our company?
- 6** Are there any legal or regulatory issues that we should take into consideration when adopting AI?

How should we be addressing AI from a talent perspective? Should we be recruiting a Chief Artificial Intelligence Officer?

At a high level, artificial intelligence is one example among many of how technology and digital capability is transforming organizations. Many businesses will consider this a discipline of digital transformation or data and analytics, and if so, the chief digital officer or chief analytics officer may already be overseeing not only the technology, but the team responsible for it. In a few organizations, this may even be overseen by the chief strategy officer.

Regardless of title, whomever is overseeing AI needs to be able to connect business strategy to emerging AI capability, work cross-functionally, and carefully evaluate whether to build, buy or partner to gain the right AI capability for your organization. When looking at specific candidates, consider assessing them in these areas:

- 1. Strategic acumen:** AI can be leveraged to create disruptive market offerings as well and to fundamentally transform internal operations. Leaders will need to know how to challenge the status quo and push for change, while also being realistic on what the company can do, and how much change it can manage.
- 2. Technical understanding:** Data is key to the functioning of AI, so a successful AI leader needs to understand any type of pre-established data strategy at a given company. Additionally, they need in-depth knowledge and currency on the different forms of AI and the impact they can have on the business.
- 3. Ability to work across functions:** AI can be applied in myriad ways across a business. It will be important for an AI leader to make sure the technology is evaluated and applied across functions and business lines in synergistic fashion to avoid duplication of effort in multiple siloes.
- 4. Strong entrepreneurial skills:** AI gives companies the opportunity to create new products and businesses (for example, connected devices), so a strong leader needs to have an entrepreneurial spirit to help create and guide innovations.
- 5. Ecosystem partnering:** Given the current extreme scarcity of AI technical talent, few companies will be able to hire large AI teams and invest robustly enough to create their own technology from scratch. Whoever oversees AI will therefore need to be able to work with other entities to gain access to the right capability through purchase or partnership.



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