WORLD ECONOMIC FORUM

COMMITTED TO IMPROVING THE STATE OF THE WORLD

Empowering AI Leadership

An Oversight Toolkit for Boards of Directors

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How to use this guide

This resource for boards of directors consists of: an introduction; 13 modules intended to align with traditional board committees, working groups and oversight concerns; and a glossary of artificial intelligence (AI) terms.

Seven modules focus on strategy oversight and the responsibilities connected with them. They cover: brand, competition, customers, operating model, people and culture, technology and cybersecurity. Five other modules cover additional board oversight topics: ethics, governance, risk, audit and board responsibilities.

Each module provides: a description of the topic, the board responsibilities specific to that module topic, the oversight tools, suggestions for setting an agenda for board discussions and resources for learning more about the topic.

The modules are designed to be read independently of one another. It is strongly recommended that all board members read the ethics module; it is also advised that they read the entire guide. Board members can focus on the topics that match their board assignments and interests.

This toolkit is co-created by the World Economic Forum with Centre for the Fourth Industrial Revolution Fellows from Accenture, BBVA, IBM, Saudi Aramco, Suntory Holdings and our Partners and Members: Australian Institute of Company Directors, Best Practice AI, Latham & Watkins, and Splunk, with contributions from AI4All. We are all indebted to the Fellows from Accenture, IBM and BBVA and, in particular, to Ana Rollán of BBVA, who was the project lead.

Strategy modules

Brand: employing AI to maintain brand reputation. Using AI to manage brands, building public trust and protecting the company image; building brand reputation by developing, deploying or using AI to improve society.

Competition: exploiting AI to accomplish the organization's mission. Impact on strategy, competition and industries; using AI to disrupt, compete and grow; anticipating risk.

Customers: strengthening customer relationships with AI. Value to customers; service improvements; customer needs and concerns; building and maintaining trust.

Cybersecurity: building resilience to AI cyber risks. Assessing and addressing security risks from AI; using AI to improve cyber resilience; integrating cyber resilience into strategy.

Operating model: using AI to improve processes. Process and operating model transformation and innovation; improving productivity and efficiency.

People and culture: making it possible for AI and people to work together. Human augmentation; culture and ethics for AI success; inclusion and diversity; staffing and skills; using AI in human resource management.

Technology: managing the implementation of AI. Building AI systems; drawing on existing IT investments; major purchases and partners; envisioning the future of AI technology.

Sustainable Development: harnessing AI to sustain our resources. Optimize the use of natural resources; reduce waste and carbon footprint; reduce AI's own carbon footprint.

Control modules

Audit: complying with obligations. Financial controls and reports; compliance with laws and regulations.

Ethics: setting standards for proper development, deployment and use. Ethics principles for AI; establishing an ethics board; implementing AI ethics codes; risks from ethics failures.

Governance: structuring AI oversight. Setting governance responsibilities for AI; oversight responsibilities of board committees; responsibilities of ethics board.

Risk: managing corporate risks. Risk exposure from AI; integrating AI into risk-management plans; using AI to manage risks effectively; crisis management.

Supporting modules

Responsibility: Oversight duties of board directors that are common to many or most of the modules.

Glossary: Explanation of AI terms.

Introduction

Boards of directors are responsible for overseeing strategy, risk, ethics and social impact, and financial reporting. Occasionally, a world-changing new technology profoundly affects all or most of these areas, whether a company sells information technology or not. Artificial intelligence is one such technology. It is already altering the way people live, work and receive care.[1, 2] Companies are investing and reorganizing to receive their share of the trillions of dollars in value this technology will create. Besides bringing enormous value to those who can produce it, AI will improve people's lives in many ways. However, its pervasive use also raises concerns about fairness, accountability, explicability, misuse and unintended societal consequences. Helping directors understand and meet their responsibilities in regard to this transformational technology is the purpose of the guidance and tools contained here.

Executive teams are charged with creating the strategies and carrying out the work needed in a world with AI. Boards of directors play a different role: They oversee management's decisions and their results in the interest of shareholders and other stakeholders. Boards have additional responsibilities, too. They judge whether management is putting the organization at risk through unwise strategies, poor execution, violations of the law or damage to its reputation. They stand behind the accuracy of the company's financial reporting to the public. Directors are expected to hold management to the highest ethical standards. They establish the governance structure, the principles and the values of the organization.

AI requires boards' attention because it affects every aspect of their oversight duties. For example:

- Strategy is often influenced and executed by AI technologies. Its impact on strategy will grow as AI shapes lives, customer expectations, markets and the supply chain.
- AI will affect financial reporting as it is put to work to process financial data.
- AI amplifies existing ethical issues and creates new ones that boards should heed.
- The management of the data, algorithms and people involved in AI requires governance mechanisms for decision-making that are consistent with and assist the organization's overall governance.

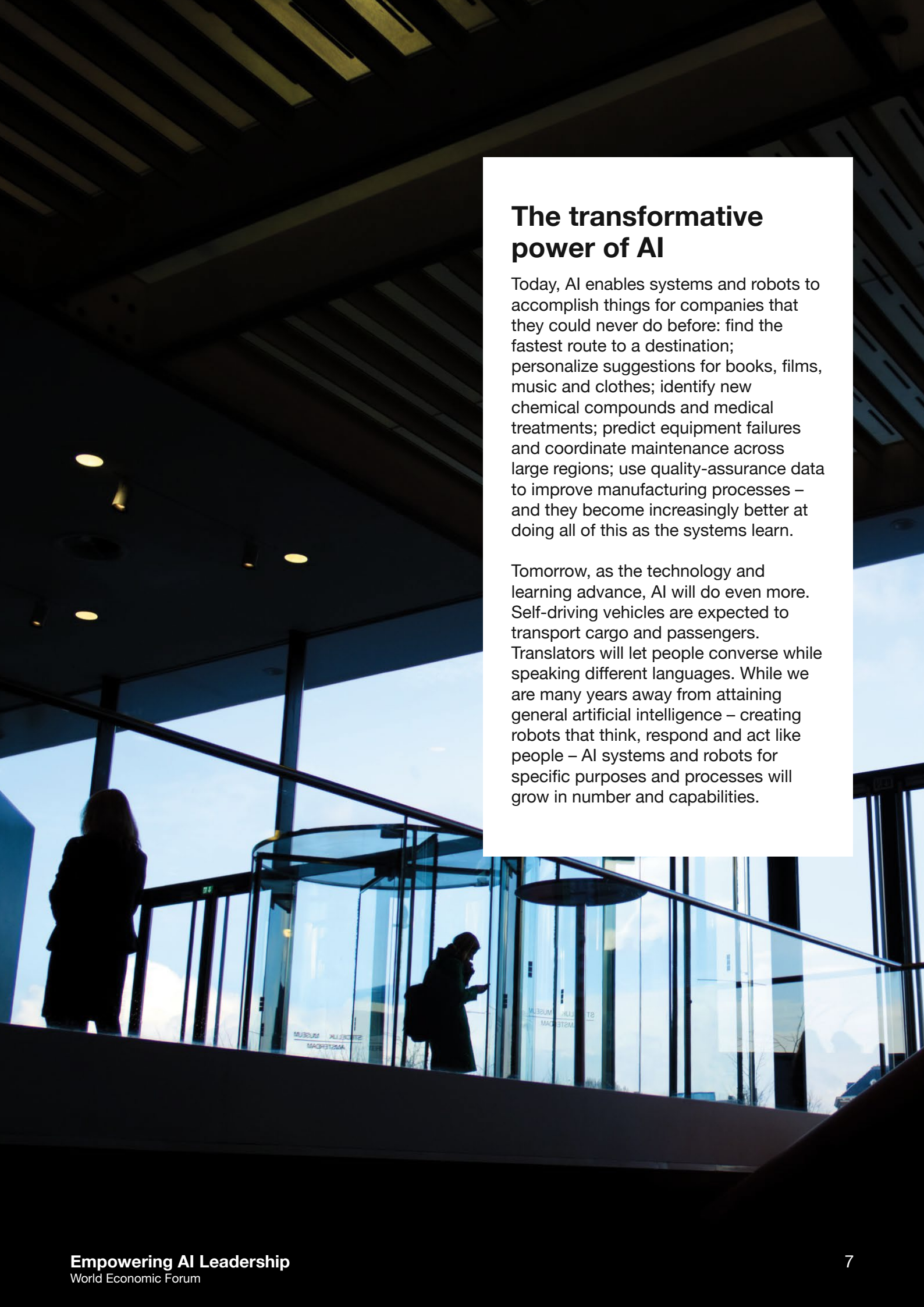
What is artificial intelligence?

Artificial intelligence – systems that act by sensing, interpreting data, learning, reasoning and deciding the best course of action – changed from a limited to a transformative force in business when these systems were taught to learn through huge amounts of data and computing power.

Early versions of AI, such as expert systems and the first systems that turned spoken words into text, depended on computer scientists to anticipate every action or recommendation a system would need to make, and write step-by-step instructions, from receiving input to final output. That, plus other technical limitations, made early AI systems slow and hard to build, and useful only in very controlled environment.

The breakthrough came in recent years, when computer scientists adopted a practical way to build systems that can learn.[3] One way for a machine to learn how to solve a complex and ill-defined problem is to feed it with vast amounts of examples of how the problem can be solved in specific instances, and then let the machine generalize from such examples. With this and other machine-learning approaches, systems make decisions, learn whether their decisions are right or wrong, store the result, and use that data to improve future decisions. Over time, AI systems improve at making decisions. By using these learning techniques, in combination with other technology advances – processors and networks that are able to handle much greater volumes of data at far higher speeds; cloud computing that reduces the cost of fast, high-volume data processing; and new methods for quickly designing systems and putting them to work – AI systems can make complex and accurate decisions. With enough data, computing power and human feedback, an AI system can accurately pick out a person's face in a crowd, translate text between different languages, recognize a melanoma just by looking at the photo of a mole, identify a breast cancer even when humans cannot see it, and translate speech to text with very high accuracy.

Machine-learning technologies and rules-based reasoning are not the only technologies that create AI (see Figure below). They work with other AI techniques such as augmented and virtual reality, image processing, machine vision, optimization and natural language processing, and draw upon enablers such as data analytics, structured and unstructured data, and cybersecurity. These AI technologies exploit other supporting technologies – analytics, sensors, the internet of things (IoT), robotics, smartphones and other mobile tools – along with other devices and systems that people now take for granted.



The transformative power of AI

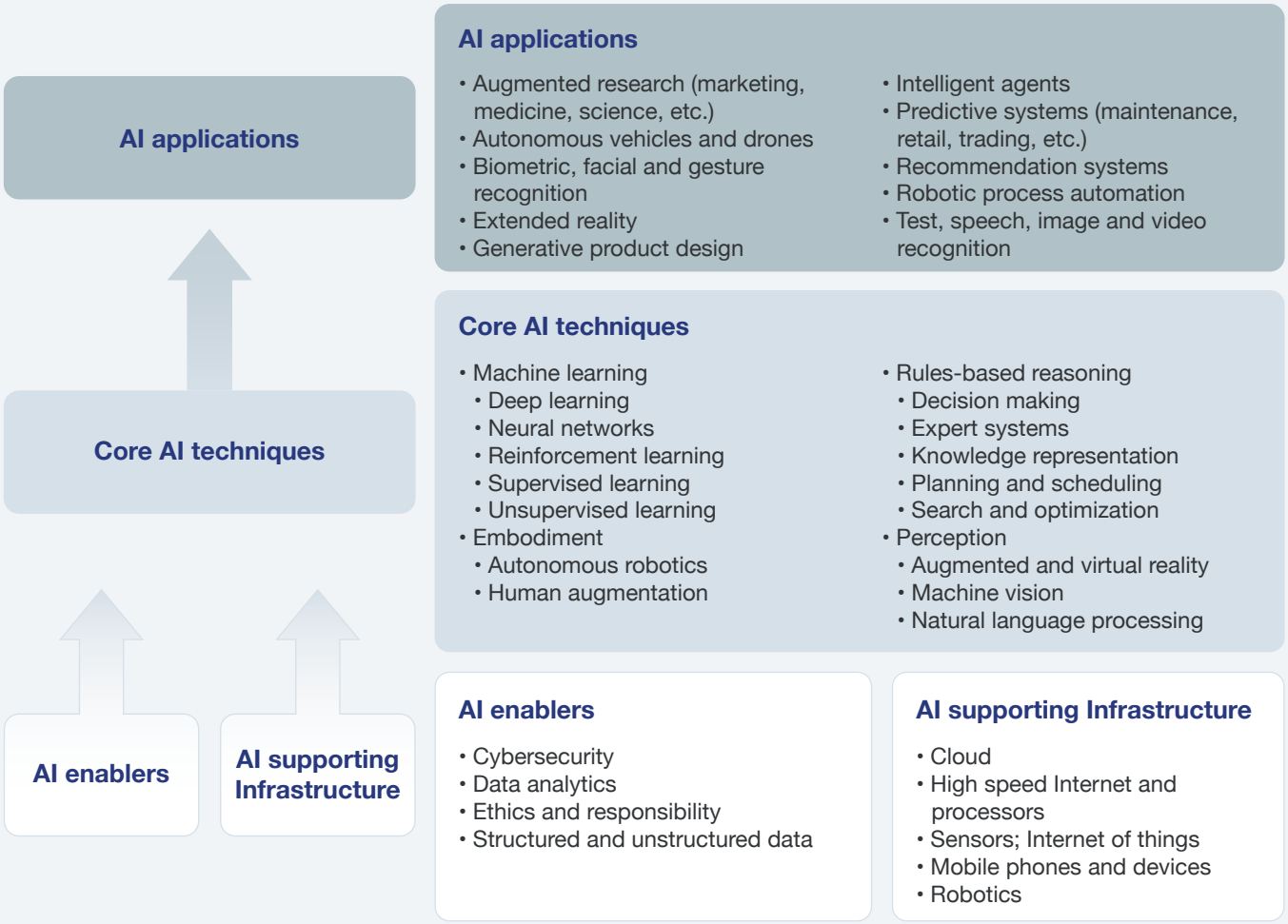
Today, AI enables systems and robots to accomplish things for companies that they could never do before: find the fastest route to a destination; personalize suggestions for books, films, music and clothes; identify new chemical compounds and medical treatments; predict equipment failures and coordinate maintenance across large regions; use quality-assurance data to improve manufacturing processes – and they become increasingly better at doing all of this as the systems learn.

Tomorrow, as the technology and learning advance, AI will do even more. Self-driving vehicles are expected to transport cargo and passengers. Translators will let people converse while speaking different languages. While we are many years away from attaining general artificial intelligence – creating robots that think, respond and act like people – AI systems and robots for specific purposes and processes will grow in number and capabilities.

AI systems excel at automating repetitive work, especially if it involves recognizing patterns in large quantities of data. Robotic process automation is already automating stock trades and quality assurance on manufacturing floors. Chatbots – intelligent agents that respond to questions in text sentences – can answer more complex questions from customers and employees, and they do it more like a person than previous automated systems. But AI systems are often more effective when they work with people rather than replace them. Car makers have found that productivity and flexibility are highest when people and machines collaborate, taking advantage of the strengths of each.

Online retailers are finding new ways to serve customers, and designers are finding they can be more innovative when they curate the designs and suggestions recommended by AI. Companies are also using augmented reality and virtual reality, together with AI, to train people and help them perform maintenance and repair tasks.

Put together, AI stands out as a transformative general-purpose technology. Like steam engines and electricity in the past, and computers and the internet in our lifetimes, AI is changing how humanity works and lives.



Endnotes

(All references as of 9/8/19)

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2. Mark Purdy and Paul Daugherty, “How AI Boosts Industry Profits and Innovation”, Accenture 2017.

3. Dave Gershgorn, “There’s only been one AI breakthrough”, Quartz.com, 10 October 2018.

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