

Artificial Intelligence: A Strategic Business And Governance Imperative

By Anastassia Lauterbach and Andrea Bonime-Blanc



Digitization is changing the rules of competition. Traditional companies are at risk of being left behind. Artificial intelligence (AI) is accelerating this trend. Once its capabilities grow and simplify, AI will disappear into the background, embedded everywhere. The government, business community, and society must understand AI's full implications now. The role of leaders could not be more important or momentous.

AI applications have penetrated various industries, from automotive, healthcare, and financial services to software, robotics, and electronics. High-tech front-runners such as Amazon, Apple, Facebook, Google, IBM, Intel, Qualcomm, Tesla, and Twitter already heavily invest in AI, complementing their core technologies and shaping new business models.

To survive and thrive in the coming mega-disruption, boards and C-suites must proactively deal with the AI challenge and opportunity.

AI is not science fiction. Traditional companies—already severely disrupted by cutting-edge technology—underestimate the need to prioritize AI in their strategic and operational road maps. Many of their boards remain blissfully unaware of the coming tempest. Any discussion of AI must begin by defining AI and then differentiating narrow AI from deep AI or artificial general intelligence (AGI). While still incipient, when AGI reaches critical mass it will have a tectonic impact. Traditional businesses need help in thinking and incorporating AI into their strategy and establishing a governance framework.

What Is AI?

AI is the part of computer science focused on machine learning and enabling software to solve problems in a manner akin to human intelligence. There are two kinds of AI: that embedded into systems with specific tasks (narrow AI), and that designed to “think in general” (deep AI or AGI), modeled after the neural networks of the human brain. Some of the common tasks currently carried out by AI include decision making, adaptability, visual perception, and speech recognition.

Since its inception, AI has evolved through stages of euphoria and disappointment. This is partly because AI, like any other new technology, requires the formation of profitable business models around it. It is only in the past five years, with maturing businesses at Apple, Amazon, Facebook, Google, Twitter, and IBM, that AI has regained its status as a potentially decisive tool for gaining a competitive advantage.

Narrow AI. Traditional industrial applications of AI include text and speech recognition, knowledge engineering, heuristic classification systems, expert systems, and gaming technologies. Maturing Watson businesses at IBM, the further evolution of voice interface at Apple (Siri), Google (GoogleVoice), and Microsoft (Cortana), successes in machine learning in recent Google acquisitions (e.g., DeepMind), and advances in data mining algorithms, make AI indispensable to most smart and connected applications.

Deep AI or AGI. AGI is an emerging field focused on building thinking machines with intelligence comparable to that of a human. There are two AGI scenarios: one predicts incrementally better software and hardware; the other envisions a future where AI fully emulates the human brain. While the first is gradual, the

second is more sudden and dramatic, providing little time for adaptation. It is close to what futurist Raymond Kurzweil predicts as the “singularity” when, starting around 2045, the pace of technological change will irreversibly transform human life: most intelligence will be computer based and processing power will be trillions of times more powerful than today. AGI is now more closely linked to the world of research than to scalable practical cases as, for example, the Intelligence Advanced Projects Activity (IARPA) at Harvard University.

Why AI?

AI has reached critical importance for six reasons:

1. Growth of data. AI applications are already helping business analyze vast amounts of data, transforming these into insights. By 2020, there will be 44 zettabytes of data created, according to International Data Corp. (IDC). Company data scientific teams simply cannot keep pace with this growth. The cross section of big data and AI is already helping companies find new sources of revenue.

2. Better algorithms. Digital neural nets were invented in the 1950s, but it took time for computer engineers to learn how to frame relationships between hundreds of millions of neurons. They gradually found ways to exponentially improve their detailed organization, producing better calculations with the eventual rise of deep learning in the early 2000s. Since then, deep learning algorithms have been applied to such tasks as facial recognition at Facebook and personalized recommendations at Netflix.

3. Cloud technology. In less than a decade, the cloud has gone from a tool to improve information technology (IT) economics to a force that is transforming the economy. It delivers on-demand computing to any user who has access to the Internet. AI and machine learning features are an important component in platforms that operate on distributed datasets to develop actionable business intelligence from disparate, asynchronous data sources.

4. Smart networks. When network technologies first came into commercial use, companies were content to have the necessary pipes to send data. Today, AI is being used to automate network management systems. Big challenges associated with the historically

siloes approach to network architecture remain, leading to deficits in security and data mining. Some AI start-ups are focusing on bridging these gaps.

5. Cyber insecurity. Cyberattackers use AI to outpace their targets’ abilities to support users, optimizing scamming and/or imitating trusted people. However, AI can also bring critical advantage to an organization’s cyber defenses, deployed as part of a defensive system, with real-time intrusion detection systems.

6. Development mistakes. Bad programming costs the U.S. economy approximately \$60 billion annually in lost revenue. AI machine learning capabilities will enable a form of “Darwinian” selection among algorithms, with thriving winners passing on their code and less successful “contenders” dying off. AI may provide an approach to decreasing coding mistakes and better “repair” solutions.

AI Business Opportunities

As Kevin Kelly, founding executive editor of *Wired* magazine, provocatively stated: “The business plans of the next 10,000 start-ups are easy to forecast: Take X and add AI...everything that formerly electrified... will now cognitize.” Surprisingly, many traditional businesses still do not associate AI with business opportunity and competitive advantage. There are several ways that companies should consider incorporating AI into their development opportunities:

Traditional AI-centric business. Google has officially said that it is “AI-centric.” It is a repeat acquirer of machine learning and deep learning start-ups (e.g., DeepMind) to complement its existing and new products. One of the largest machine learning platforms, TensorFlow, was developed by Google as well. It is an open source project used for deploying machine learning for information retrieval, simulations, speech recognition, computer vision, robotics, natural language processing, geographic information extraction, and computational drug discovery.

Financial services and information organizing. There are vast amounts of enterprise and open data available in various data silos, whether on the Web or on-premise. “Finding truth in data” by making these connections (e.g., through Enigma.io) enables a holistic view of a complex problem, from which new insights can be identified and used to make

Examples of AI

Narrow AI

Amazon Alexa

Connected Home

Google, Uber, Drive.ai

Connected Car

Kespry

Drones

Building Robotics,

Fanuc

Robotics

Deep Knowledge’s

VITAL, Neurensic

Financial

Moov wearables

Healthcare

Deep AI/AGI

Vicarious

Curious AI Co.

Deep Mind

Watson

Fanuc

GoodAI

Numenta

Specific uses are indicated in italics.

predictions, monitor markets, manage risks, and more.

Online fraud detection. There are a number of efforts underway to improve fraud and risk detection accuracy, reduce time spent on managing risk, and visualizing data for better case management (e.g., Sift Science, Ravelin).

Customer care natural language processing. DigitalGenius has developed a proprietary AI and natural language processing engine that can automate human-like interactions in real time, helping known brands such as Unilever and BMW engage with their customers in an automated but highly personalized way.

Democratization of machine learning. Today many businesses rely on data mining for forecasting and product development purposes. A range of companies use AI frameworks for feature engineering, parameter optimization, data processing, algorithms, model training, and deployment of a wide variety of commercial challenges. Sentient Technologies has built one of the largest intelligent systems in existence, with the goal of making AI massively scalable.

Data silo-bridging. Eliminating or bridging data silos would remove a major barrier to the advancement of medical technology. Enlitic is a start-up that uses deep learning and image analysis to help doctors make diagnoses and spot abnormalities in medical images, analyzing X-rays, MRIs, and CT scans for data trends or anomalies.

Personal assistants. There are a number of initiatives addressing the repetitive, structured, error-prone, and slow processes of knowledge workers, including Gluru, and personal assistant tools at x.ai/Amy and Eve.AI.

Autonomous and drone transportation. The focus here is to endow robots and autonomous agents with the ability to

sense, learn, and make decisions within a physical environment (e.g., Tesla, Matternet, SkyCatch, AdasWorks).

Internet of Things (IoT). Machine learning and deep learning algorithms are used to provide predictive insights based on IoT data from wearable devices and sensors, including, for example, Moov (a wearable fitness tracker with an AI personal coach) and Tachyus (technology that predicts equipment failure in the oil and gas industry).

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We predict that most smaller AI startups will be pulled into the gravitational fields of the current high-tech “usual suspects,” e.g., Google, Facebook, Microsoft, Amazon, IBM, Apple, and others such as Twitter and Salesforce, as well as semiconductor providers Intel and Qualcomm.

The banking and asset management industries have already been active in the field. With shifting understanding on what makes an insurance company competitive, there may be merger-and-acquisition activities in this field as a way to complement underwriting and risk management capabilities in non-life portfolios.

There are myriad business opportunities associated with AI in support of data mining and software and hardware development, including:

- Big data pattern analysis.
- Big data providing context-awareness capabilities.
- Advancements in sensors in the business intelligence field.
- Predictive analysis and real-time access to AI on mobile devices.
- Global technological parity and integration of AI research and development (R&D) efforts into practical applications.
- Content creation and personalization.

The AI Governance Challenge

Military AI. AI presents some alarming governance challenges. The most troubling perhaps has to do with the uncontrolled growth of deep AI or AGI in military robotics—at least 56 countries are currently developing battlefield robots. Gates, Musk, and Hawking are among those who have warned that proper governance must be placed around AI and military robotics integration or face the risk of military AI gone wild with potentially catastrophic consequences for humans.

AI and the environment. A key AI governance challenge is the fact that big data—and AI-centric businesses—require exponential growth in data center facilities with serious potential environmental impacts. Non-governmental organizations (NGOs) such as Greenpeace have become increasingly focused on this issue.

AI ethics. AI ethics is another critical new governance issue. Computational ethics is an emerging discipline that seeks to provide machines not with “right” or “wrong” choices but with acceptable behavioral parameters within society.

Too few people know that there is a need for an ongoing international conversation about AI comparable to those we have about nuclear weapons or climate change. Though conversations on AI have become part of The World Economic Forum’s annual meeting in Davos, Switzerland, too

many people don't understand why Hawking, Musk, Gates, and others warn about AI and call for research on the societal impacts of AI.

There is no overall transparency of AI progress, even though synthetic intellect might touch every sphere of human life. There is no common understanding how to embed safety mechanisms to ensure AI friendliness toward humans. Successful application of these principles and consensus around them are still academic subjects. While this needs to change, a conversation focused on both business opportunity and governance can and should start at the microcosmic level at every company.

Critical Questions

Much like they did with cyber risk and security, C-suites and boards of traditional companies have either ignored or taken AI for granted as their chief technology or information officers have worked on these issues without further consideration for their competitive and governance impacts. The time to pay closer attention is now.

Embedding AI into corporate strategy and governance does not need to be overwhelming. As with other technological developments, a company needs to understand the competitive landscape, evaluate the risks, identify the controls, and build organizational talent and resilience to deploy the proper strategy and governance around this new element.

There are three critical questions a traditional sector company should be asking about AI:

- How mature is our use of big data analytics? How pervasive is our use? Are we not using big data analytics at all?

- How developed is our company's fusion of voice and/or natural language interface with our software applications, especially for customer care (i.e., point of sale)?

- How proactive is our intelligence gathering and analysis of our traditional competitors and suppliers, as well as non-traditional disruptors using AI?

These three tenets should be closely observed:

- The board is proactively engaged in AI oversight.

- The C-suite is proactively developing AI risk and opportunity strategy.

- Functional and operational executives implement AI strategy collaboratively and in an integrated manner.

Additionally, several key elements should be present:

- **Expertise.** Have internal and/or external experts engaged to evaluate the intersection of AI with the company's core products and services.

- **Strategy formulation.** Achieve an understanding of how AI currently integrates or could integrate with business strategy through R&D, M&A, or otherwise, and with risk, via risk identification and brainstorming exercises and/or the company's enterprise risk management program.

- **Board engagement.** Deploy a board committee to oversee technological issues generally and the AI issue in particular. If there is no technology or innovation committee, consider creating one; if there is no tech/AI-savvy board member, consider adding someone with the appropriate expertise to your board.

Traditional industry lacks the ability to fully comprehend big data and AI, while start-ups lack experience in dealing with larger businesses. This paradox—and lack of associated progress—will continue so long as there is an absence of openness, trust, and a better understanding of what AI might bring to the traditional sector. It is incumbent on traditional industry and C-suites and boards to jump-start both an AI business and governance discussion as soon as possible. ■

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Key Elements of An AI Evaluation, Strategy, and Governance Formulation

Competitive landscape: traditional and disruptive

Current products and services interface

Big data and AI interface

Labor force impact

Corporate culture impact

M&A opportunities

R&D opportunities

Investor impact/needs

Customer impact/needs

Other stakeholder impact

Sustainability, environment, climate impact

Reputational impact

Legal and regulatory assessment

Supply chain/third-party implications
