How CIOs Can Analyze the Strategic Possibilities of AI

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Today, most artificial intelligence applications deliver incremental improvements to operations, but CEOs are aware of AI's strategic potential. The Gartner AI strategy framework enables CIOs to prepare investment options for the CEO.

Key Challenges

- 4% of enterprises have deployed AI although 46% are in the planning stage, according to Gartner's latest CIO survey. Most of these projects are tactical.
- CEOs and boards of directors view AI as important to the future of their business but do not understand it very well. They will often turn to the CIO to explain it.
- Many CIOs struggle to translate technology into terms that resonate with business strategy setters. AI's impacts are vivid, but the means of achieving them are complex.

Recommendations

CIOs who are building or expanding a digital business:

- Create a version of Gartner's AI strategy framework with examples of each category of AI application that are relevant to your enterprise's business. It will help you prepare strategic options that you can recommend to the CEO and board of where to invest in AI to gain the biggest business advantage.
- Look at the enterprise's current business model and the AI strategy framework side by side, and think about the strategic possibilities for the enterprise, such as:
  - The enterprise might use AI applications to change the business model, such as from a product focus to a service focus, or vice versa.
  - AI applications could optimize the existing business model, such as by expanding the capabilities of the workforce.

- Flesh out the two or three best examples of AI applications for presentation to the CEO. Identify which elements of the business model they would alter and what the advantages and risks are for the enterprise. Consider the full range of risk, including technology risk, strategic risk, compliance risk, financial risk and reputation risk.

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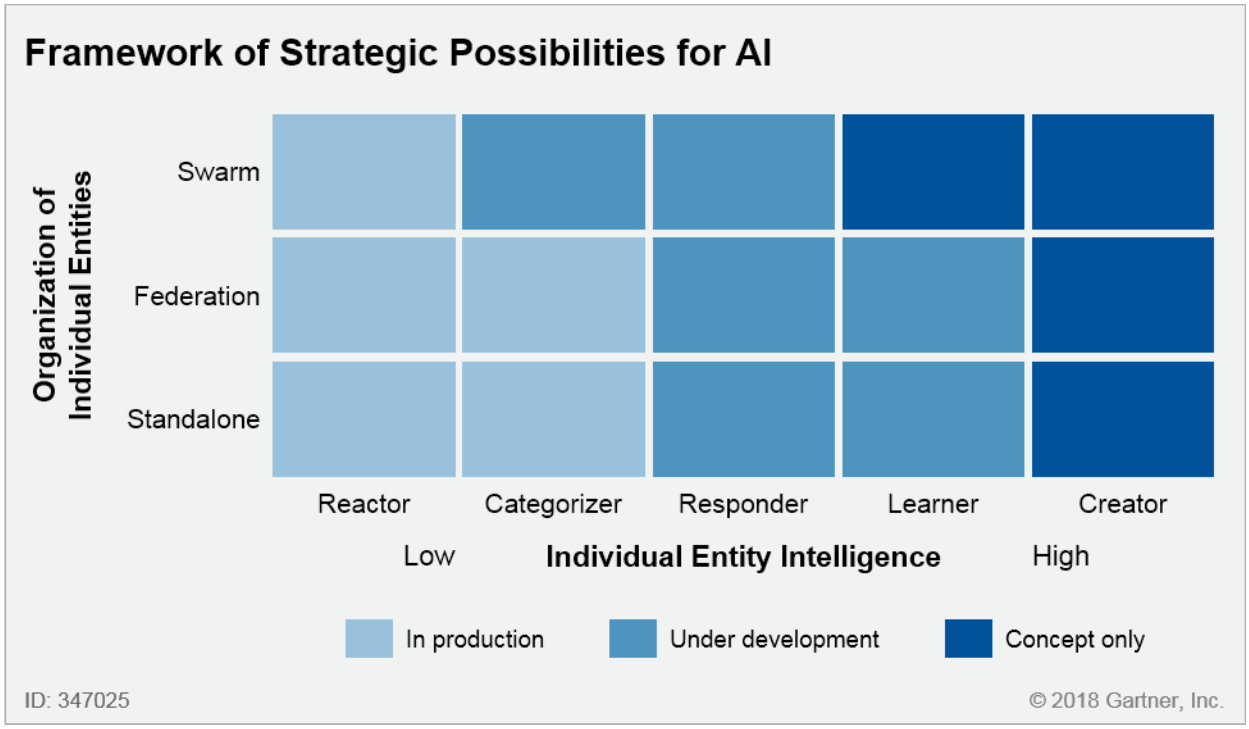
Introduction

Sooner or later, many CIOs will get a summons to explain artificial intelligence (AI) to the CEO or board of directors. AI is best understood as a collection of technologies, such as machine learning and natural language processing, that augment or exceed human cognitive abilities (see "Hype Cycle for Artificial Intelligence, 2017"). Today, most enterprises that use AI apply it tactically to make incremental improvements in processes or customer service. However, CEOs are aware of the strategic potential of AI. A recent survey of CEOs at large global enterprises found that 81% consider AI important to their company's future.[1] However, it is not easy to see how AI technologies translate into business outcomes. Before CIOs can answer this question, they need tools for analyzing AI in terms of the language that CEOs speak — business strategy. Gartner has developed a simple framework that will enable CIOs to uncover the ways in which AI can support new business models (see Figure 1). CIOs should:

- Use the framework to set AI in the context of business strategy.

- Explore the range of possibilities with AI.
- Determine how AI can alter the business model.

Figure 1. Framework of Strategic Possibilities for Artificial Intelligence



Source: Gartner (January 2018)

Analysis

Use the Framework to Set AI in the Context of Business Strategy

The strategic business value of AI applications depends on (1) the intelligence of the individual machines or entities that use AI, and (2) the complexity of the way these entities are organized as shown in Figure 1. Entities can range from low-intelligence applications, such as robotic process automation (RPA), to high-intelligence applications, such as IBM's Watson. The entities can be controlled centrally, or control can be distributed across multiple machines as in swarms (see "Swarms Will Help CIOs Scale Up Management for Digital Business").

The light-, medium- and dark-blue boxes indicate how far along in their development the various types of AI applications are:

- The least-sophisticated AI applications are available today.
- Moderately sophisticated AI applications are in various stages of development by governments, universities, companies and technology providers.

- The most sophisticated AI applications are as yet only concepts. Nevertheless, CEOs should be made aware of their potential so that they can be experimented with or considered in long-range planning.

In general, the more intelligent the entities and the more complex their organization, the greater the competitive advantage the enterprise can gain from AI, because it will deliver more business capabilities. But the enterprise must also run bigger risks (financial risk, brand risk, technology risk and so on), because the technology is less mature and less under control.

The framework offers a quick way to measure the potential business value of any proposed AI application. CIOs should use this yardstick when they have to deal with AI on the strategic level, instead of thinking about the feasibility of individual projects. Several low-intelligence, less-complex AI applications may cost more and deliver weaker business outcomes than one ambitious project.

Explore the Range of Possibilities With AI

AI applications automate tasks that previously only humans could perform. Machine learning and other techniques enable these applications to acquire general rules that they use to respond to changing or unpredictable circumstances. AI applications can take the form of software programs (such as chatbots or trading algorithms) or devices (such as drones and robots).

We can better articulate the business capabilities of the various AI applications by specifying the degrees of intelligence within each entity (the horizontal axis in Figure 1) and the ways they are organized (the vertical axis).

Individual Entity Intelligence

The intelligence of AI applications ranges from the copy/paste function of RPA, which does not meet the strict definition of AI, potentially to entities that create solutions on their own:

- **Reactors** follow simple rules but can respond to changing circumstances within limits (such as basic drones).
- **Categorizers** recognize types of things and can take simple actions to deal with them within a controlled environment (warehouse robots).
- **Responders** serve others' needs by figuring out questions and situations (driverless cars, personal assistants).
- **Learners** gather information from multiple sources in order to solve complex problems (Watson, wholly automated military drones).
- **Creators** initiate a paradigm shift, such as inventing a new business model. They are not merely tools that people use. They have the potential to engineer actions harmful to humans. They will change humans' relationship to technology as well as people's roles within society and the economy. Therefore, AI creators require profound thought before developing them.

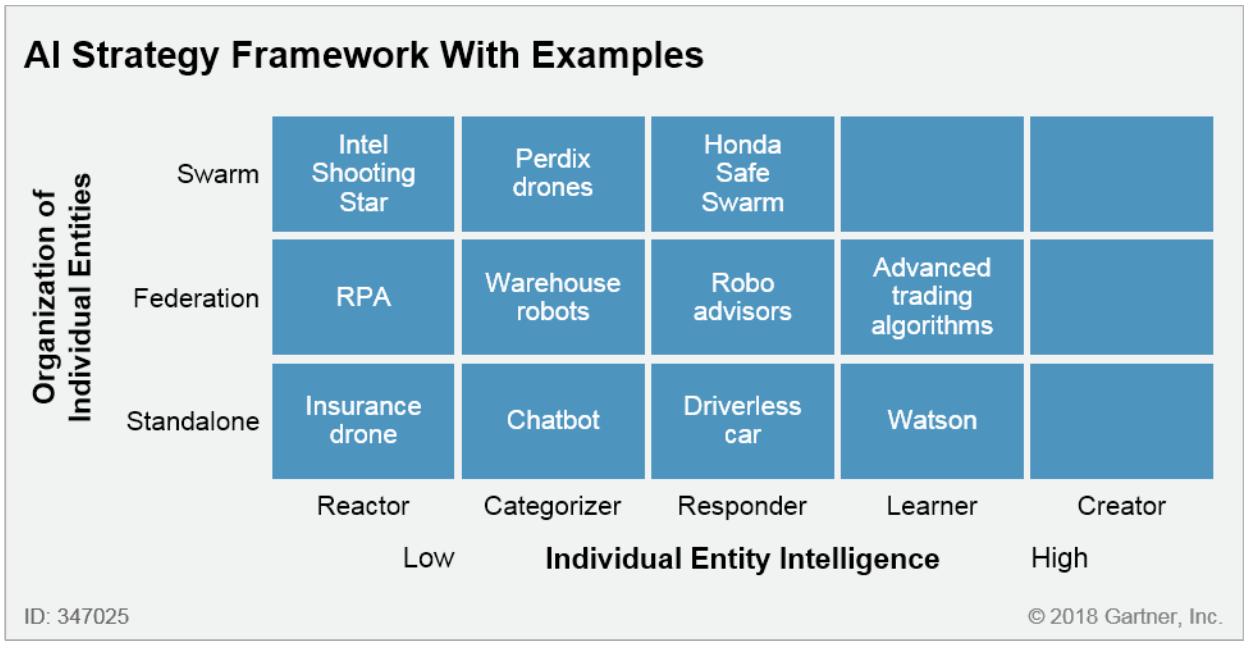
Organization Models

Most people think of AI applications as stand-alone entities, but there are at least two other ways to organize them. Federation and swarms enable AI applications to tackle complex problems with less intelligence in each entity.

- **Stand-alone —** The individual entity acts by itself to solve problems (e.g., Watson). The enterprise exercises centralized control over it by overseeing the entity as it performs.
- **Federation —** Multiple versions of an entity work in the same way but on different problems (e.g., robo advisers, personal assistants). The enterprise can exercise central control or give more autonomy to the entities.
- **Swarm —** Multiple entities work together on the same problem (e.g., Intel light show drones, Perdix drones). Control over execution is left to the machines entirely or requires only light human management (see "Swarms Will Help CIOs Scale Up Management for Digital Business").

CIOs can prepare for their presentation to the CEO by adding concrete examples to the boxes to illustrate the types (see Figure 2). CEOs and boards prefer to speak in concrete terms than theoretically. Most of these types of AI applications, including swarms, already exist today and are developing rapidly. AI is no longer science fiction.

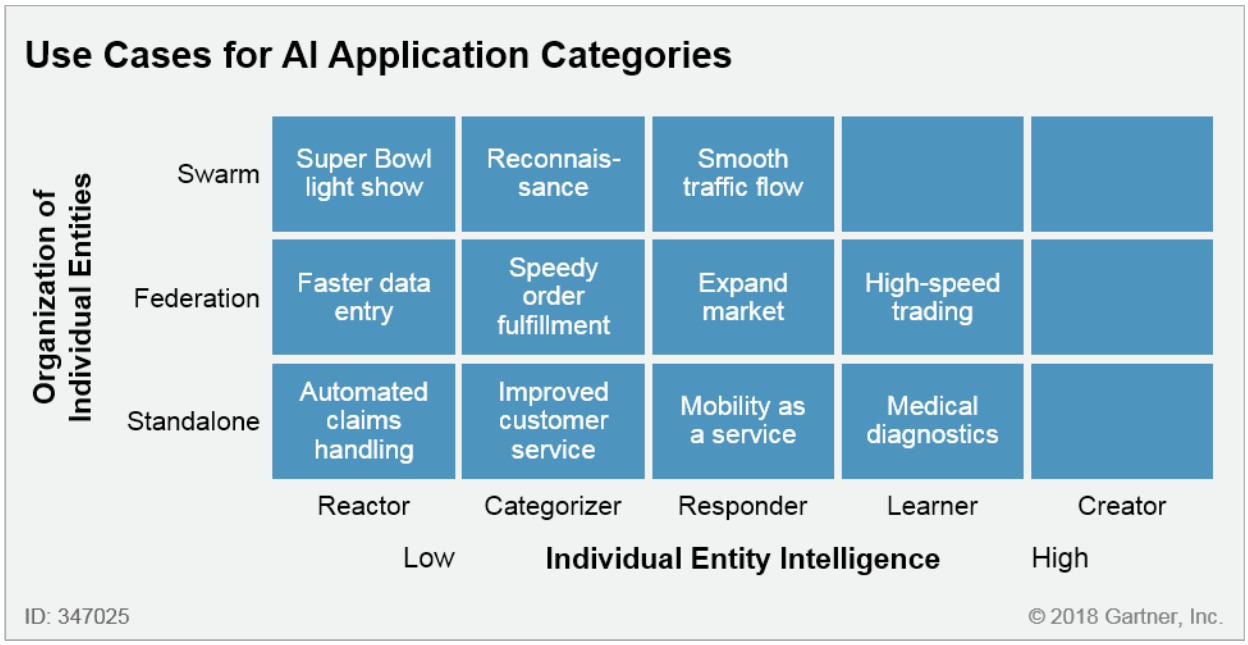
Figure 2. AI Strategy Framework Illustrated With Examples



Source: Gartner (January 2018)

Figure 3 shows some of the use cases for these AI applications.

Figure 3. Possible Use Cases for AI Application Categories



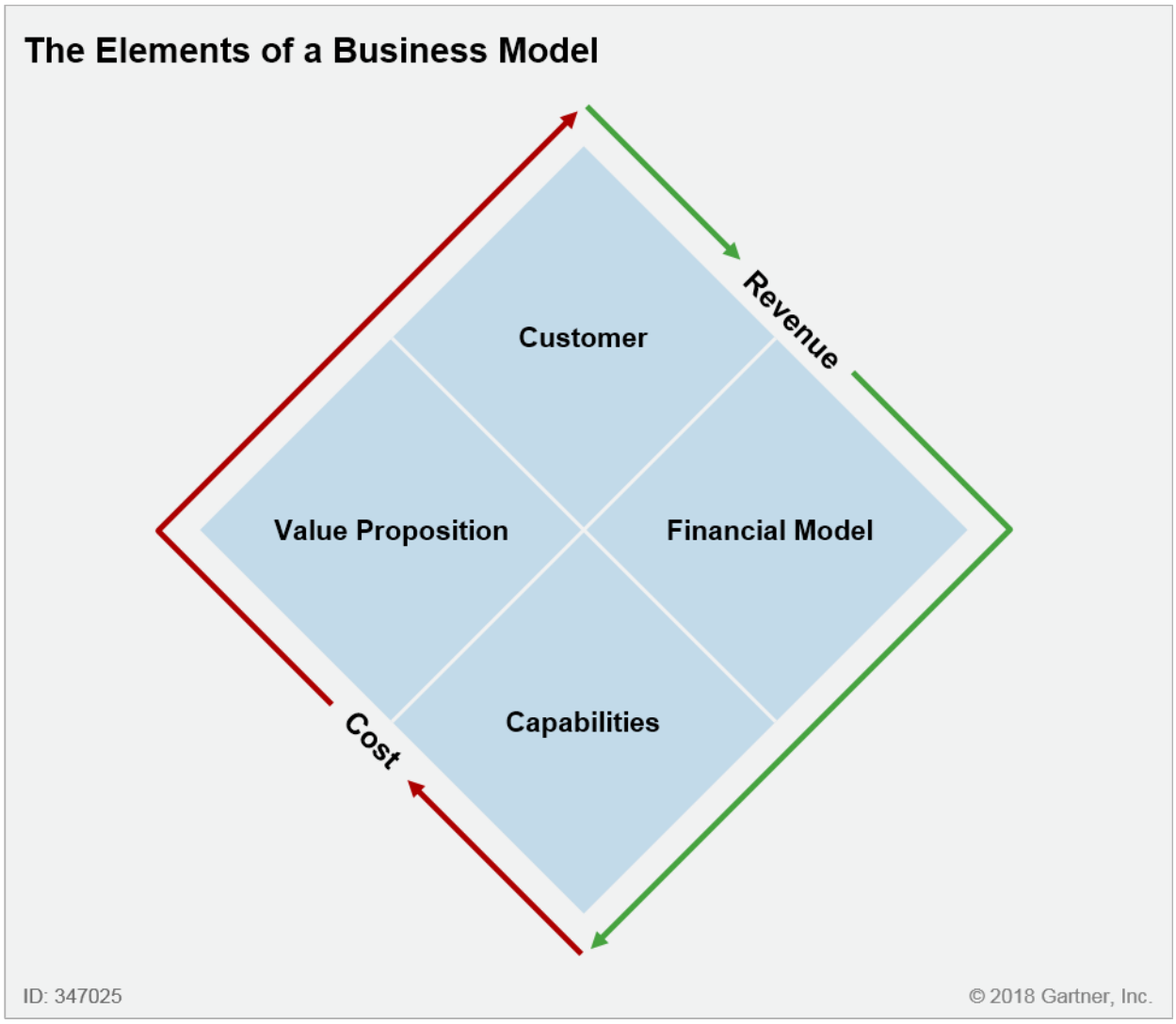
Source: Gartner (January 2018)

Determine How AI Can Alter the Business Model

Each box in the AI strategy framework offers an opportunity to develop a business model. Each type of AI application features distinct capabilities. These capabilities enable an application to address situations that applications in adjacent squares can't. For example, a stand-alone categorizer robot could be trained to detect explosives. That type of mission is very different from that of robots with a similar level of intelligence yet working in federation to move goods in a warehouse. If machines with similar intelligence were organized in a swarm, they could patrol harbors or track enemy soldiers.

In turn, these distinct capabilities can support distinct business models. Business models consist of a number of elements (see Figure 4). AI applications can alter any of these elements to varying degrees. The squares on the AI framework represent possible step-changes to elements of the enterprise's business model. If enough change occurs, the enterprise gains a new business model.

Figure 4. The Elements of a Business Model



Source: Gartner (January 2018)

For example, the entities in Figure 2 might enable the enterprise to change business models in this way:

- **Capabilities —** AI capabilities translate directly into business capabilities. Robo financial advisors automate services, such as investing, tax efficiency and wealth management.[2] Robo advisors cost less than humans and are available around the clock. They enable financial service providers to gain revenue from new geographies without hiring a lot of staff, or to attract new customers who were too costly to serve before.
- **Value proposition —** AI-driven business capabilities allow the enterprise to generate new value or maintain value as the business scales. Warehouse robots coordinate their activities to find

the most time-efficient paths to move goods and maintain inventory data.[3,4] Therefore, they can support a value proposition of fast, accurate delivery of products.

- **Customer —** AI can serve customers better than unaided humans in some ways. Advanced trading algorithms take in trading data and relevant nonfinancial news (such as the weather and political developments) to recalculate the short-term target prices of securities and automate buying and selling.[5,6] These algorithms also learn from the new data they take in so that they can adjust when new trading patterns emerge. They aim to maximize returns for customers.
- **Financial model —** AI can change the way the enterprise makes money. Autonomous vehicles may change the economics of the auto industry. Today, most people buy and keep their own cars. The industry makes money from product sales and must help customers arrange finances so they can afford the car. With autonomous vehicles, auto makers could offer cars as a metered service. Customers wouldn't have to own cars. Instead, they could pay a monthly fee for cars to show up and take them where they want to go. Auto makers would get recurring revenue from the vehicles they manufacture (see "Use Scenarios to Plan for Autonomous Vehicle Adoption").

Recommendations

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Gartner Recommended Reading

Some documents may not be available as part of your current Gartner subscription.

"Swarms Will Help CIOs Scale Up Management for Digital Business"

"Guide CEOs Toward an AI Plan Based on the Business Strategy"

"A Framework for Applying AI in the Enterprise"

"Hype Cycle for Artificial Intelligence, 2017"

"Hype Hurts: Steering Clear of Dangerous AI Myths"

"Maverick* Research: What Does Good Artificial Intelligence Look Like? Build an {a}IQ"

Evidence

We based this document on research into civilization infrastructure, AI and swarms as well as on digital business models.

[1] A. Murray. "Fortune 500 CEOs See A.I. as a Big Challenge." Fortune. 8 June 2017.

[2] "Silicon Speculators." The Economist. 28 October 2017.

[3] L. Garfield. "The World's Largest Online Food Retailer Gets Its Food From Giant Robotic Grocery Warehouses — Take a Look." Business Insider. 31 March 2017. and

[4] "The Ocado Warehouse Run by Robots."

[5] "Exploit Signals in News for Quantitative Strategies and Systematic Trading." Thomson Reuters. 2015.

[6] M. Terekhova. "JPMorgan Takes AI Use to the Next Level." Business Insider. 2 August 2017.

More on This Topic

This is part of an in-depth collection of research. See the collection:

- Craft an Artificial Intelligence Strategy: A Gartner Trend Insight Report

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