

## **Working with AI: Analysis and AI in the Enterprise of the Future**

**Katherine Hibbs Pherson**  
**Globalytica, LLC**



# Workshop Agenda

- What Is AI?
- What Do Machines Do Best?
- What Do Humans Do Best?
- How Do Humans Best Work with Machines?
- Imagining the Future

- How Do Machines “Think” and “Learn”?
  - Strengths
  - Limitations
- What Do You Do that’s Different?
- How Might that Change How We Do Analysis?



# What Is Artificial Intelligence?





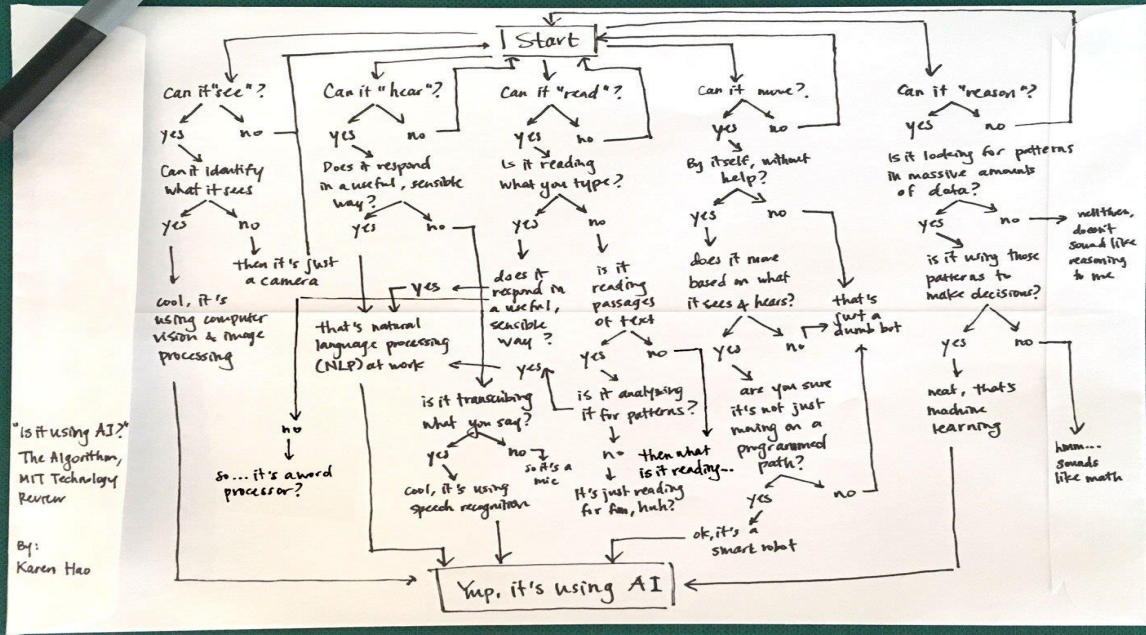
# AI Definitions Simplified

**Artificial Intelligence:** Machines performing functions we associate with human minds

**Machine Learning:** Algorithms detect patterns in very large data sets and are trained to make predictions and recommendations, improving over time with new data.

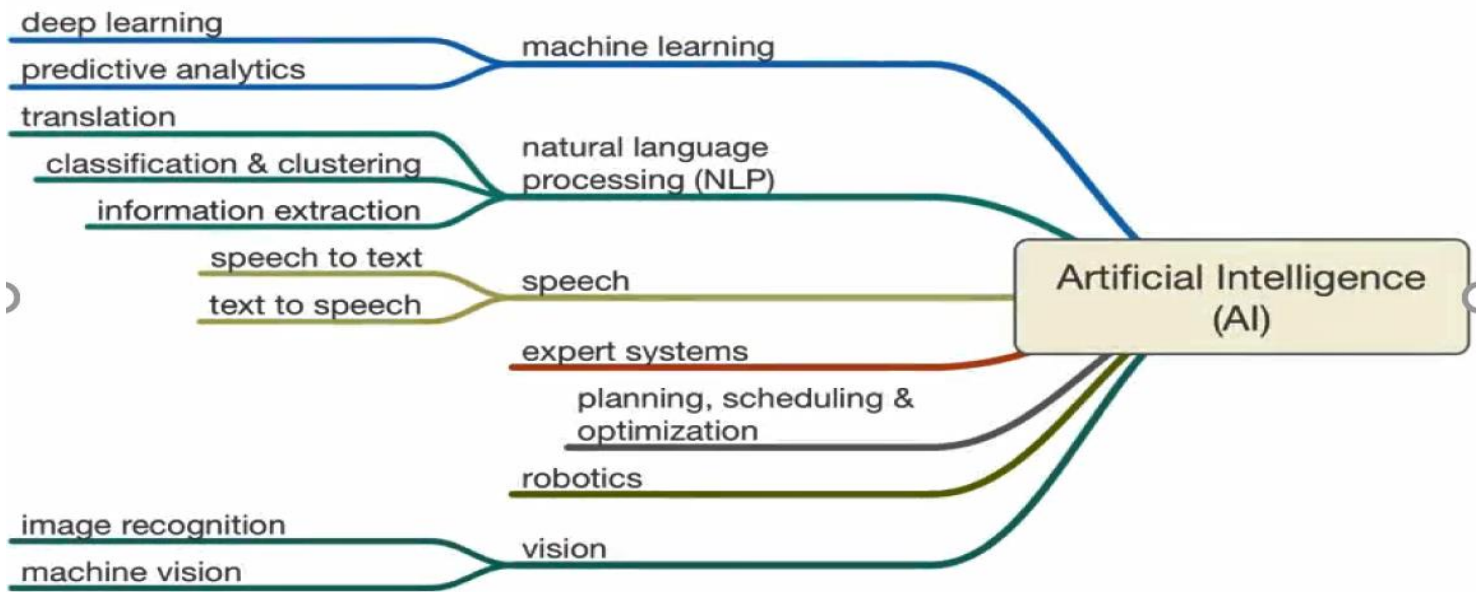
**Deep Learning:** Statistical models based on biological neural networks train the computer to learn on its own by recognizing patterns and using many layers of processing.







# Components of Artificial Intelligence





**Now It's Your Turn...**

At your tables, discuss and list 3-5 actions and applications that answer this question:

**What Do Machines Do Best?**





## What Do Machines Do Best?

- Follow clear, logical rules to search data and options to reach optimal conclusions based on what is presented.
  - Process incoming data, answer phones
- Incorporate statistical models, algorithms to begin process of learning.
  - Translation, Facial Recognition
- Simulate human thinking through neural networks
  - Alternatives, Recommendations



## So What?

- Rapid ingesting, processing, triaging data: freeing analysts to do higher level tradecraft practice.
- Pattern recognition across data sets: identifying new and emerging threats
- Hypothesis and scenario generation: new ways to think about and anticipate evolving threats

## AI IS ANOTHER SMART COLLEAGUE ON THE TEAM

- Production enhanced, not replaced
- Human abilities and skills improved, not supplanted



## Etzioni's Three Rules for AI Systems

1. An AI system must be subject to the full gamut of laws that apply to its human operator.
2. An AI system must clearly disclose that it is not human.
3. An AI system cannot retain or disclose confidential information without explicit approval from the source of that information.

Etzioni, Oren. "How to Regulate AI," New York Times, 1 September 2017.



**Now It's Your Turn...**

At your tables, discuss and list 3-5 actions that answer this question:

**What Do Humans Do Best?**



## What Do Humans Do Best?

- Design the “System of Systems”
- Organize and Oversee the Data
- Ask Analytic Questions to Use the Data
- Check and Audit Systems and Processes
- Provide Context and Insights from Data Pattern & Products
- Decide among Nonobvious Choices
- Anticipate and Mitigate Negative Implications



# AI Technology is Not a Panacea

- Data and Its Quality Are Key Drivers
- Technologies Have Capabilities with Strengths and Weaknesses.
- Machine Algorithms, like Human Judgment, Are Subject to Biases and Design Errors.
- AI Can Be Fooled; Deep Fakes and Neural Net Spoofs Reinforce the Need for Strong Human Attention
- Humans Need to Develop Thinking Skills to Keep Pace with Machines



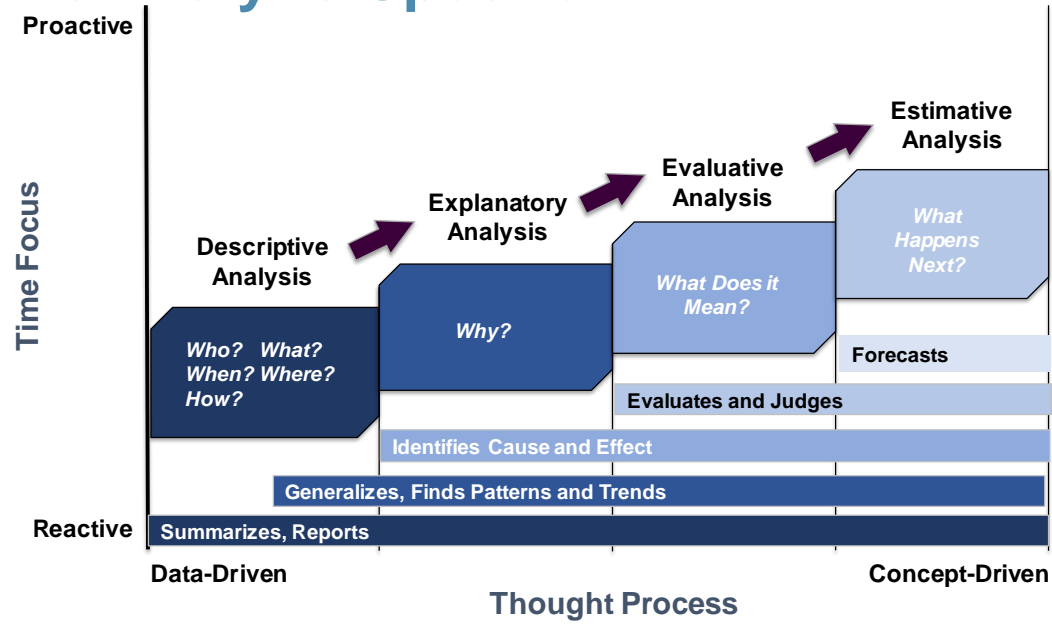


# Questions to Ask When Considering AI

- **What's the problem or purpose?**
  - Is it clearly suited to AI technology?
- **What data is needed to fulfill the purposed or solve the problem?**
  - Are data sources reliably identified and acquired?
  - Can the data be validated?
  - Are there standards for how the data will be consistently labeled and organized?
- **How are the AI processes and algorithms checked and audited?**
  - Are they checked for accuracy, bias, and expected performance?
- **Does the implementation address ethical or financial tradeoffs?**
  - Are privacy and other human concerns identified and mitigated?
  - Are the benefits worth the cost?
  - Are potential negative implications anticipated and addressed?



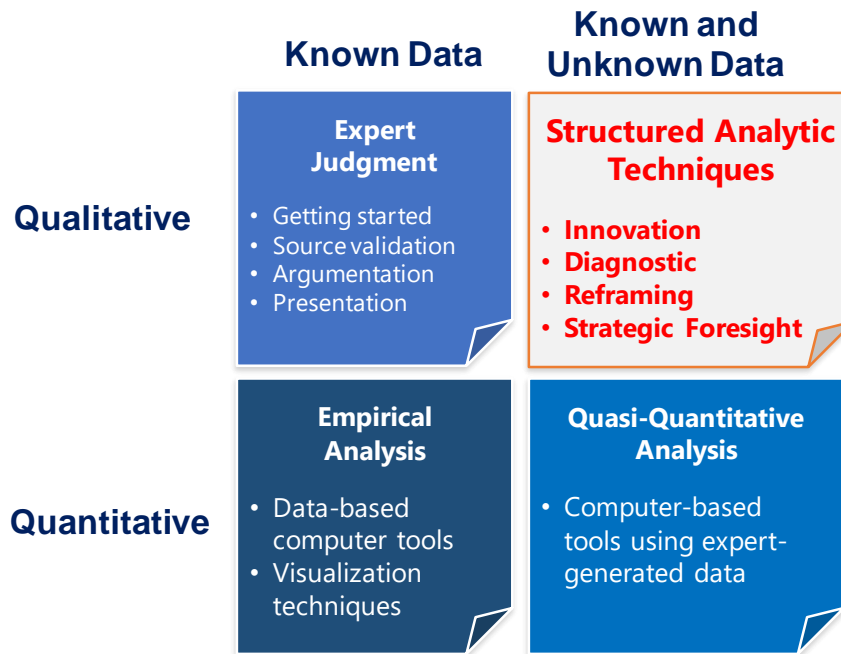
# The Analytic Spectrum



Source: Pherson, Katherine Hibbs and Randolph Pherson, *Critical Thinking for Strategic Intelligence*, Washington, DC: CQ Press, 2016.



# SATs in the Analytic Process





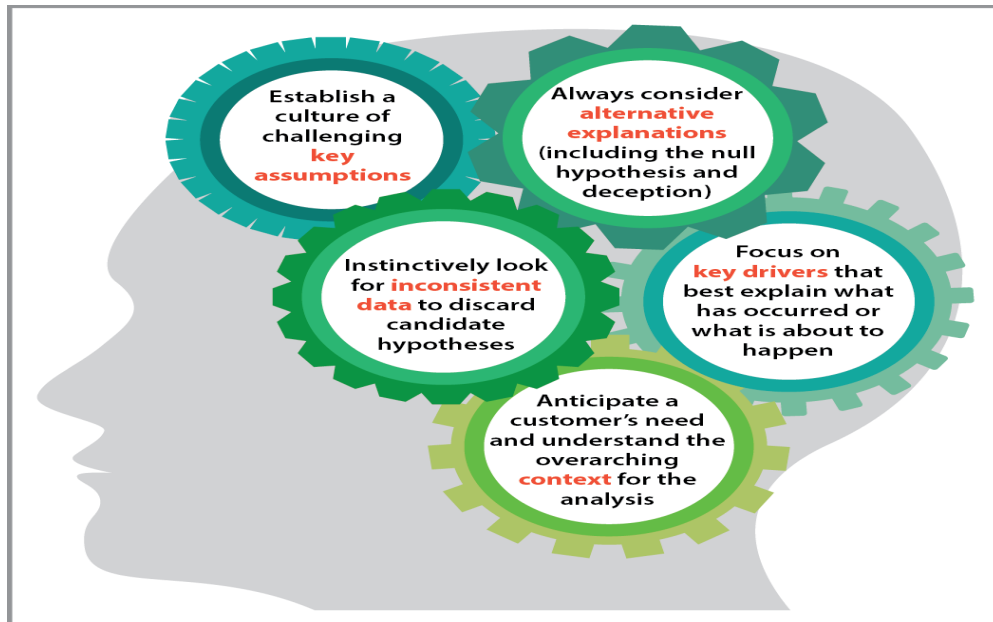
## The Need for Science and Art

“The people who understand the world, don’t understand the math. The people who understand the math, don’t understand the world.”

John Kay, British economist, in talking about investment models built by Harvard, Yale, and Cambridge Mathematics PhD graduates.



# Strategy 1. Practice 5 Habits of the Master Thinker

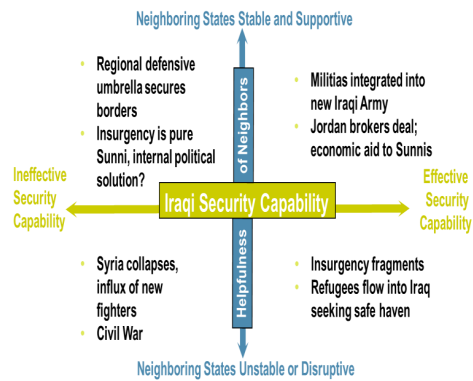


Source: Pherson, Randolph H., "Five Habits of the Master Thinker," Journal of Strategic Security, Vol. 6, No. 3, Fall 2013.



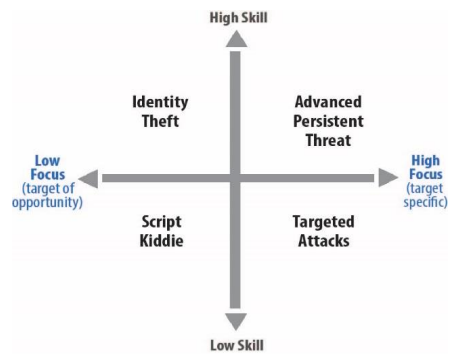
# Strategy 2: Create Frameworks

The Iraq Insurgency (2006)



Source: This illustration is drawn from a report prepared by PolicyFutures, LLC: "Scenarios for the Insurgency in Iraq" published by the USIP (Special Report 174, October 2006).

Four Dimensions of Cyber Threat (2015)



Source: This illustration is drawn from Bruce Schneier's "Security in an Age of Catastrophic Risk," presented at the RSA Conference 2015 on May 8, 2015.

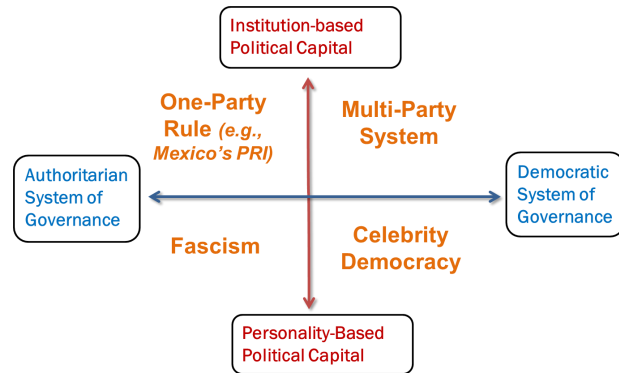
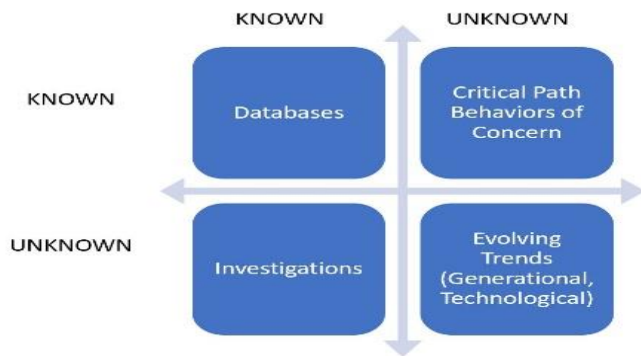




# Carefully Define the End Points

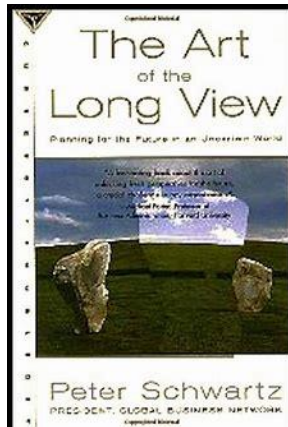
Types of Security Clearance Data

Four Radical Trajectories for US Politics





## Strategy 3. Think in Terms of Different Models



International Journal of Intelligence and Counterintelligence, 20: 50-64, 2007  
Copyright © Taylor & Francis Group, LLC  
ISSN: 0885-6607 print/ISSN 1751-4961 online  
DOI: 10.1080/088566007013214961



LISA A. KRAMER and RICHARDS J. HEUER JR.

### America's Increased Vulnerability to Insider Espionage

Because espionage is a secret activity, it is not possible to know how many spies are currently active in American organizations or exactly what the future will bring in terms of discovered espionage cases. Nevertheless, it is possible to explore U.S. vulnerability to the crime of insider espionage by examining known factors that, on the basis of past experience, can serve to make insider espionage more or less likely to occur. A recent study has identified technological, social, and economic trends that are serving to increase the opportunity and motivation for insider espionage.<sup>1</sup>

Opportunity for espionage consists of access to classified or proprietary information that can be exchanged for money or other benefits, access to foreign entities interested in obtaining this information, and means for transferring this information to foreign recipients. Motivation, broadly defined, is a feeling or state of mind that influences an individual's choices and actions. While motivation for espionage results from a complex interaction between personality characteristics and situational factors,<sup>2</sup> the focus here is primarily on the latter. If more insiders are encountering situations that provide motivation and opportunity for espionage, the

### Terrorism as Virus

By Paul Stares and Mona Yacoubian  
The Washington Post  
Tuesday, August 23, 2005



The recent flap over whether to reframe the "global war on terror" as a "global struggle against violent extremism" reflects a much deeper problem than a passing dispute over wording. Without clarity or consensus on whom or what we are up against, we are unlikely to develop a coherent long-term strategy to overcome it.

Our preference is "Islamist militancy"—a politico-religious movement that incorporates not only those who commit acts of terrorism but also those who espouse violence and intolerance in the name of Islam.

The recent bombings in London remind us that this is not a conventional terrorist threat with a clear identity, organizational structure and limited geographical reach. Islamist militancy is a

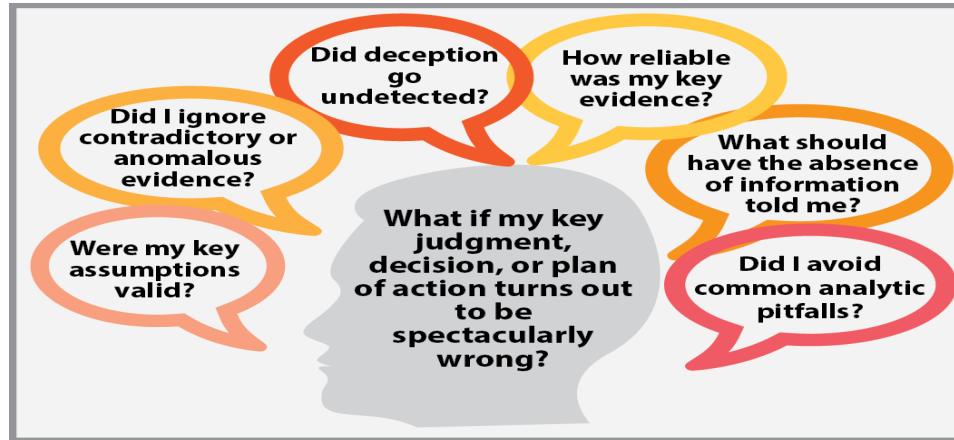
English (United States)

**"Old ideas can sometimes use new buildings. New ideas must use old buildings."**

**-- Steven Johnson,  
Where Good Ideas Come From:  
The Natural History of Innovation**



## Strategy 4: Ask What's Wrong?

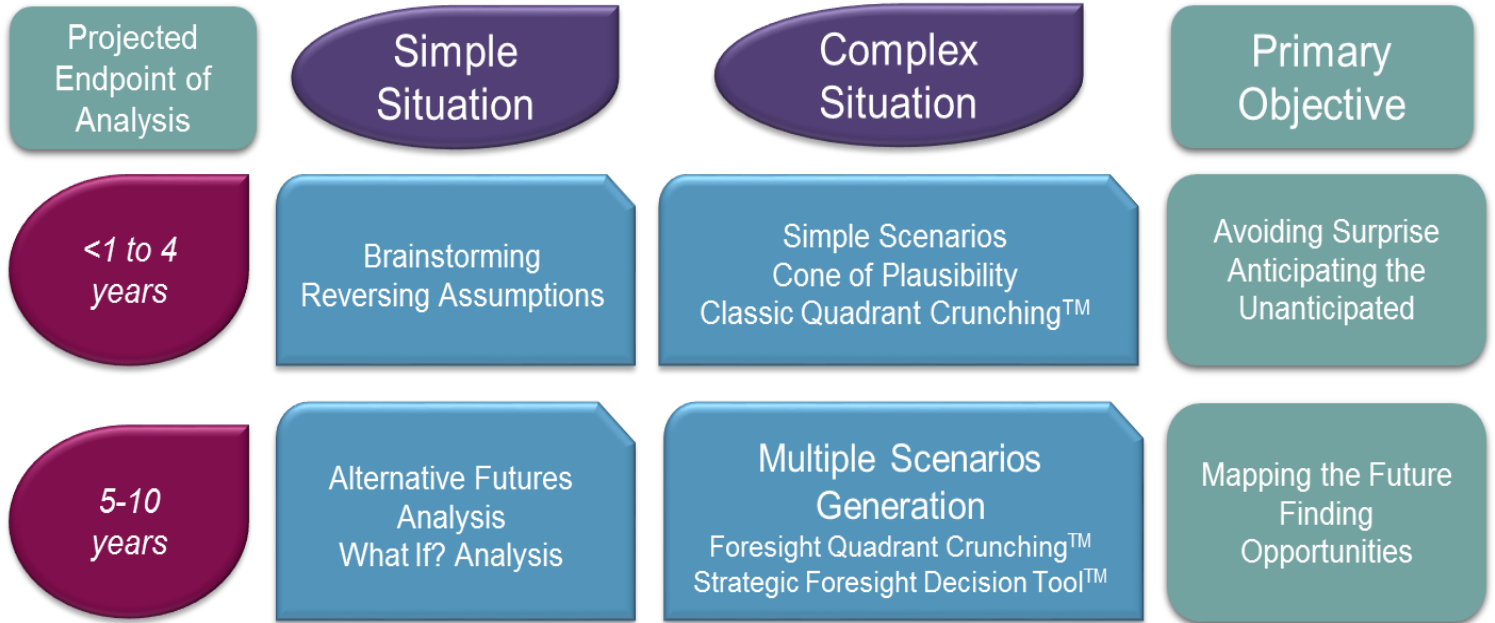


**"Being right keeps you in place. Being wrong forces you to explore."**

— Steven Johnson,  
*Where Good Ideas Come From: The  
Natural History of Innovation*



## Strategy 5. Learn Foresight Techniques





**Now It's Your Turn...**

At your tables, discuss and list 3-5 actions that answer this question:

## **How Should AI Change Analysis in the Future?**



## Gartin's View of Analysis in 2030

It is Monday morning. The analyst checks in with her digital assistant. Maybe the analyst is at home, or in the office, or on vacation. It doesn't matter where, because we have solved the secure-mobile problem. In 2030, we depend on analysts as we always have, but far fewer of them. Ever-smarter algorithms mean analysts are focused on work that is consistently higher on the value chain. Artificial intelligence sifts data, spots discontinuities, and synthesizes results; analysts provide theory and structure. As Nate Silver observed in his *The Signal and the Noise*, "Statistical inferences are much stronger when backed up by theory or at least some deeper thinking about their root causes."

But beyond just data, the information technology ecosystem our analyst is experiencing knows **much** more: her past analytic lines, sources of information, competing hypotheses, and alternative views. It also knows how good she is at her job.

Gartin, Joseph W. "The Future of Analysis," *Studies in Intelligence*, Vol. 63, No. 2, July 2019.





## “The Metamorphosis”

That said, the word intelligence does not adequately explain what is occurring, and ascribing anthropomorphic qualities to AI is out of order. AI is neither malicious nor kind; it does not have independently developed intent or goals; it does not engage in self-reflection. What AI can do is to perform well-specified tasks to help discover associations between data and actions, providing solutions for quandaries people find difficult and perhaps impossible. This process creates new forms of automation and in time might yield entirely new ways of thinking.

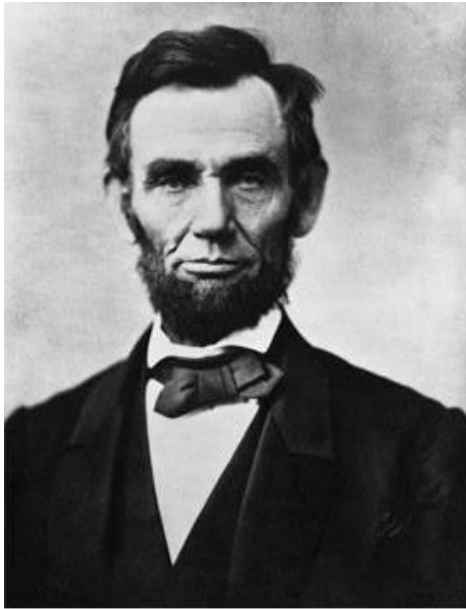
Yet AI systems today, and perhaps inherently, struggle to teach or to explain how they arrive at their solutions or why those solutions are superior. It is up to human beings to decipher the significance of what AI systems are doing and to develop interpretations. In some ways, AI is comparable to the classical oracle of Delphi, which left to human beings the interpretation of its cryptic messages about human destiny.

If AI improves constantly—and there is no reason to think it will not—the changes it will impose on human life will be transformative.

Kissinger, Henry A., Eric Schmidt, and Daniel Huttenlocher. “The Metamorphosis,” The Atlantic, August 2019.



## A Lesson from Abraham Lincoln...



**“Don’t believe everything you read on the Internet just because there’s a picture with a quote next to it.”**

**—Abraham Lincoln**



## Key Takeaways

### AI is “Another Smart Person on the Team,” not Foolproof nor Infallible

- Data vs. No Data
- Ranges, Gaps, Alternatives, Disruptions
- Creative and Interdisciplinary Thinking: New Structures on Old Foundations
- What’s Wrong? Deepfakes and Disinformation
- Foresight Techniques