

25-021-920

February 19, 2025

(Last Revised: May 28, 2025)

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AI as a Leadership Challenge

As artificial intelligence (AI) reshapes industries, leaders find themselves at the helm of a transformation unlike any before. In contrast to earlier waves of innovation, AI simulates human cognition which positions AI as an actor instead of a technological tool. Leaders now face new ways of thinking about power, responsibility, and the human role as AI diffuses throughout society.

This paper frames AI as not just a scientific breakthrough or technological evolution, but a leadership challenge. What is leadership in the age of AI? Answering this question requires reconsidering the foundations of leadership and how AI disrupts traditional models of how humans lead.

This case study will examine leadership historically across six distinct eras of human history, defined here as the Forge, Farm, Factory, Firm, Forum, and Frontier Eras. This case study will then highlight why AI is a distinct leadership challenge, and consider the implications.

Why Do We Need Leaders?

Leadership is a popular and contested topic spanning thousands of books, articles, and Google search results. Given all the discussion, it's helpful to step back and ask:

Why do we need leaders in the first place? Why do leaders exist?

Fundamentally, leaders exist to help groups of humans survive changing environments. Across human history, leadership has evolved in step with this principle: *Humans want to survive*. How humans lead, who leads, and what leadership even means has shifted as the world changed. Across eras, humans turned to leaders to coordinate and organize groups so that groups could adapt and survive another day.

Leadership Across Six Eras

Leadership has evolved across the course of human history in six distinct eras:

- **Forage Era** (hunter-gather)
- **Farm Era** (agricultural)
- **Factory Era** (industrial)
- **Firm Era** (managerial and global)
- **Forum Era** (digital and social)
- **Frontier Era** (artificial intelligence)

From early tribal bands to digital-era startups, humans have used leadership as a **system for adaptation** across history. Leadership's core function is coordinating collective action to solve problems, adapt group structures, and develop group norms to deal with changes in environment and technology.

Reasoning from first principles, leadership can be broken down into five foundational elements:

- humans (H)
- organized and configured in groups (O)
- communicating and following group norms (N)
- to survive changes in environment (E), science and technology (ST)

Taken together, this "HONEST" framework sheds light on how leaders claim authority and how followers grant them authority. Leaders communicate norms to groups of humans (HON) so they can survive environmental pressures (E) like climate shocks and resource scarcity and adapt to new knowledge and tools (ST) like paradigm-shifting scientific discoveries or transformative technologies.

Leaders facing scientific change (e.g. Darwin's evolution theory) can help orient groups to the question: "How do we integrate this new understanding into our worldview and social structures?" Leaders facing technological change (e.g. the printing press) can help groups consider questions like "How do we use or control this new capability?"

Changes in these "HONEST" variables have created new leadership models throughout history (see appendix).

Forage Era (300,000 BC – 10,000 BC)

In the Forage Era, humans organized in small bands of hunter-gatherers. In these kin-based groups, leaders emerged informally through competence shown in group roles and trust. Leaders often were those who could find food (e.g. hunters), mediate disputes (e.g. elders), or foresee and communicate danger (e.g. shamans). Leadership was primarily earned, not assigned.

Leaders guided resource allocation, migration, and conflict resolution. Authority was fluid, situational, and directly tied to survival and group mobility in an environment of scarce resources, predators, and threats of starvation. Figure 1 details a common human group configuration with the primary leader (larger black dot) and other humans in the group (smaller black dots).

Figure 1: Forage Era Configuration



Forage

Farm Era (10,000 BC – 1750 AD)

With the rise of agriculture came settlements, resource surpluses, and hierarchies. Agriculture and land ownership required stability; in this new environment, danger came not from the wild, but from other groups of humans.

Leadership evolved into systems based on lineage and land ownership, often justified by religion or ancestral tradition, giving rise to dynasties, monarchies, and divine rule. Claiming authority as a leader became less about role-based competence, and more about inheritance and symbolic legitimacy.

Figure 2: Farm Era Configuration



Farm

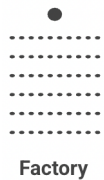
Factory Era (1750 – 1950)

Starting in the mid-18th century, industrial technologies reconfigured human groups in the Factory Era. Industrialization brought scale and standardization. To survive the shift towards mass production, leadership became bureaucratic with factory foremen emphasizing control, standard operating procedures, and hierarchy to optimize human labor for factory output.

Industrial psychology and organizational studies emerged in the early 1900s to examine issues like worker productivity, morale, and motivation (alongside the factory focus on human efficiency and discipline). Multinational corporations looked to pursue global scale and take

advantage of technologies like electricity, telecommunications, and flight to expand around the world.

Figure 3: Factory Era Configuration



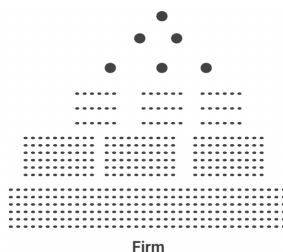
Firm Era (1950 - 2000)

After World War II, the U.S. and other industrial powers shifted from factory-based production to large-scale corporate configurations. As corporations rose, so too did managerial capitalism. In this new group configuration, leadership shifted from owner to manager (also known as principal to agent). These capitalist managers claimed authority through “gold star” excellence in operations and people management, climbing up institutional hierarchies and gaining power through advances in position, title, and a seat at the table.

The Firm Era gave rise to the dominance of business schools and corporate strategists where CEOs like Jack Welch and Lee Iacocca became cultural icons. Strategy, finance, and MBA credentials became tools of power. Multinational corporations accelerated their global reach with trade liberalization and advances in transportation and communication. An iconic example of this era is the American conglomerate General Electric.

In this environment of global complexity, leadership evolved to be professional, credentialed and heavily institutional. Leaders managed global financial structures from central headquarters as corporate executives, maximizing shareholder value while navigating scale and risk.

Figure 4: Firm Era Configuration



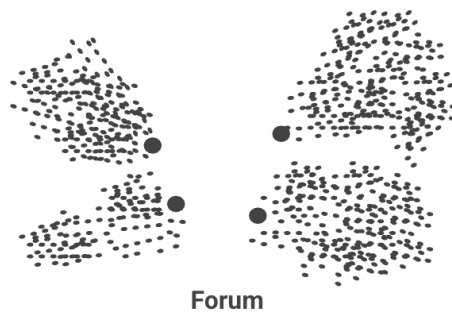
Forum Era (2000-2022)

The rise of digital and social media kicked off the Forum Era. The internet shattered gatekeeping and social media subverted the careful status credentialing and institutionalization prized in the prior era.

Social media platforms created ways of claiming authority and legitimacy as a leader. In a digital world, everyone had a voice online, but not everyone can be heard over the noise. Leadership shifted to those who could capture attention and mobilize networks.

In the Forum Era, influence replaced authority as followers chose leaders in real time with the click of a like button. Leadership required amplification, authenticity, the ability to engage other humans at scale and shape public narratives. Examples of leadership during this era included leaders like Elon Musk and Greta Thunberg who galvanized communities around their north star ideas.

Figure 5: Forum Era Configuration



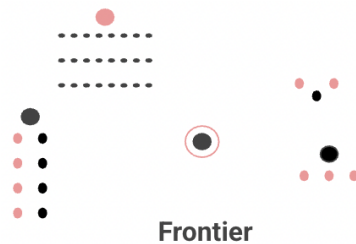
Frontier Era (2023 – Present)

The rise of OpenAI's ChatGPT marked the beginning of the sixth era (our current era), which I call the Frontier Era. Subsequent developments like X.AI's acquisition of social media company X represent continued milestones in this ongoing shift toward AI diffusion in society.

This new environment is shaped increasingly by algorithms and other near-autonomous technology. AI has taken on different forms in this Era including as an innocuous chatbot, a helpful “co-pilot”, and a near-autonomous agent.

Human leaders now manage systems they no longer fully control. In this new environment, leadership is starting to adapt to accommodate this technology. Humans are still learning and experimenting with artificial intelligence. Norms are still being formed. Silicon Valley has several examples of nascent human-AI group configurations at tech firms like Replit, Google, and OpenAI (e.g. AI teammates, agent frameworks, and co-pilot architectures). Authority in the Frontier Era will stem from understanding AI and how it can be harnessed to further group survival.

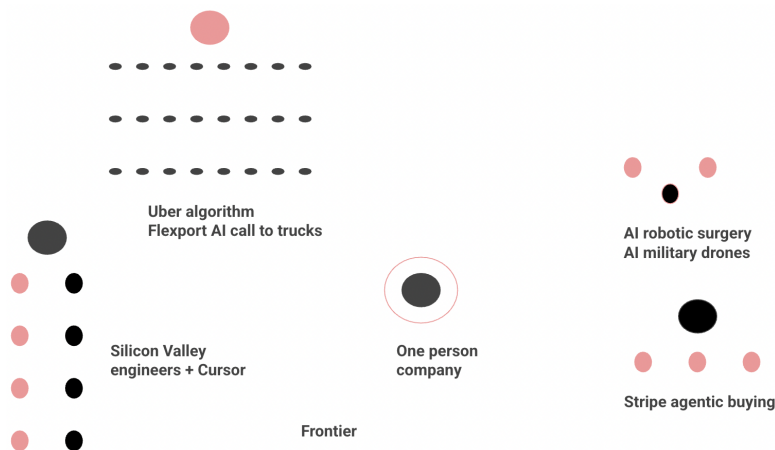
Figure 6: Frontier Era Configuration



In our current era, AI already supports, co-pilots, and leads humans as an algorithmic, near-autonomous agent (e.g. Uber’s AI algorithm leading and directing human drivers).

Figure 7 outlines examples of Frontier Era configurations that currently occur in Silicon Valley, in hospitals, in small businesses, in e-commerce, and in other places.

Figure 7: Current Examples of Frontier Era Configurations



Human-AI interaction is in its early days. Humans are still experimenting with how AI can help them solve problems and improve their lives professionally (e.g. cutting down document review time) and personally (e.g. “vibecoding” a small-scale app for home use).

Fierce public debates over AI and its capabilities have ramped up this decade, especially after the introduction and widespread use of OpenAI’s ChatGPT. Some proponents believe AI is a “normal technology” akin to electricity; others believe AI is a dislocation unlike any other in history and argue for responsible use (e.g. Nobel Laureate and “Godfather of AI” Geoffrey

Hinton). Both sides recognize that humans are only just starting to understand human-artificial intelligence interaction and impacts on a societal scale.

Since AI simulates human cognition, humans face dilemmas in the Frontier Era that are distinct from prior eras (when technology primarily helped humans with physical labor, not intellectual labor).

Key issues during the Frontier Era center on **humans using AI** as a tool (see Table 1).

Table 1: Key Issues on Human-AI Interaction in Frontier Era

Issue	Key Questions
<i>Human benefits using AI</i>	- How can humans benefit from AI? What good can be done with it and in what areas? - Where can humans benefit from AI? Are there areas like health care, scientific discovery, and education where human benefit is greater than costs (e.g. more accurate radiology screening, AlphaFold, a personalized tutor for every student)?
<i>Human development of AI</i>	- How can humans develop AI responsibly or irresponsibly? - Is the AI model's decision-making transparent? Is it fair? - What about the data? Is it biased? How was the data obtained? What about data privacy?
<i>Human control of AI</i>	- How can humans control AI? Through government regulation, market mechanisms, or private company self-governance? - How can governments regulate AI? Can policymakers keep pace in understanding AI and how AI is changing?
<i>Human society and AI</i>	- How can humans include AI into existing societal norms or create new norms? - How do humans engage with non-human intelligence?
<i>Human costs using AI</i>	- How can humans use AI while minimizing costs to society? - How can bad actors use AI to harm society (e.g. more effective cyberattacks)? How can humans deter bad actors who use AI? - What's the environmental impact of training and deploying these energy-hungry AI models? - Can humans economically afford AI models or are they limited to the rich? What impact will AI have on existing human inequality? - Will AI automate human jobs and will that lead to large-scale unemployment? What group(s) of humans will be most affected (e.g. knowledge workers like programmers)? How do humans handle job loss and the related impacts on human sense of meaning, dignity, and identity? Is Universal Basic Income sufficient? How will governments and leaders handle human costs like discontent and unrest? - If AI does more work, will humans lose motivation to learn and achieve?

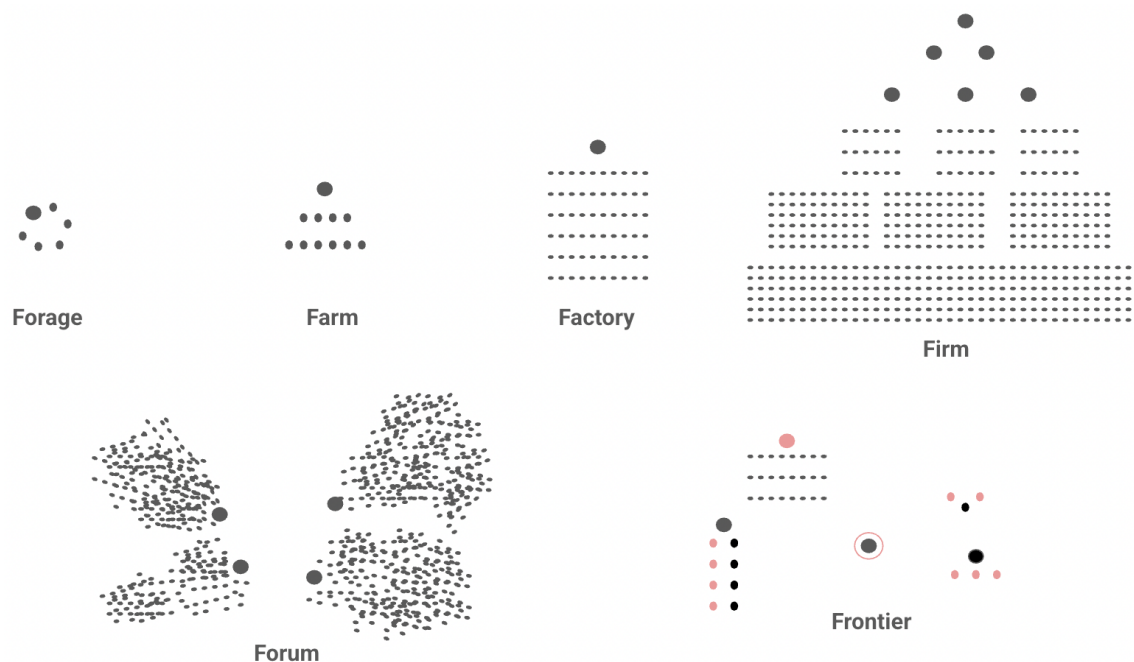
From Forage to Frontier: A New Leadership Challenge

Across the earlier five eras, technology accompanied and propelled shifts in eras. The technology – like fire, irrigation, the steam engine, the printing press, flight, etc. – helped humans better control their environment and primarily helped humans with physical labor.

However, AI is different. The distinction lies not in the scale of AI's impact, but in its role. Prior technologies were tools that amplified human abilities. They did not form goals, initiate decisions, or interact autonomously. AI crosses this boundary. AI is a participant.

From a leadership history perspective, this distinction matters. In all prior eras (see Figure 8), leaders have organized humans in groups to adapt to changing technologies and environments.

Figure 8: The Six Leadership Eras



Artificial intelligence is not just a tech enabler, but an actor itself in the Frontier Era. In Figure 7, AI appears as an actor (represented as a pink dot) and that changes the nature of group configurations from purely human to human and AI actors. Prior technologies do not disrupt human organization and challenge the nature of leadership in this manner.

With earlier “normal” technology like the printing press, human remained the only cognitive actors and technology was a tool that humans used. The printing press still required human authors, human readers, and human editorial decisions about what to print. There’s a clear subject and a clear object: humans wield technology.

AI violates this boundary. AI agents can make decisions and interact directly with other humans. AI blurs the human (H) variable. AI is the first technology that potentially changes what counts as an actor in the system. It is not just humans (H) using science and technology (ST); it is

science and technology (ST) potentially becoming a type of human (H). For the first time in hundreds of thousands of years, the leadership model must account for a new actor and change human (H) as a variable. Biological humans are no longer the only cognitive actors.

AI breaks the HONEST leadership framework and marks an increase in system complexity from human-only to hybrid human-AI systems. In these complex adaptive systems, where both human and non-human cognitive actors interact, outcomes are no longer as predictable or controllable.

The velocity of AI advancement intensifies societal and leadership challenges. In prior eras, humans had decades or centuries to adjust to new technologies; in the Frontier Era, AI's unprecedented pace of development is compressed to years.

In this new landscape, traditional leadership tools (especially those forged in the Firm Era) can falter. The HONEST model, built for human-to-human coordination, no longer is sufficient. For the next era, leadership must evolve to reflect a more cognitively diverse, dynamic and complex world.

The Seventh Era: A Question of Fission or Fusion

So, what era comes next after the Frontier Era? It's unclear how this early human-AI interaction will unfold over time. As a species, humans face a critical inflection point. This fork in the road hinges on a key leadership question:

What happens when AI leads?

As of 2025, active research is underway on AI systems exhibiting agency. Through advances in robotics, AI will likely improve by living in the physical world and learning through embodiment (AI-driven robots). As technology advances, AI could become "agentic" and develop autonomy, start setting goals for itself, and achieve self-recursive learning.

In this era, HONEST is no longer an accurate framework for leadership. AI and humans are both "cognitive actors" that can lead other cognitive actors. As such, the framework must replace humans (H) with cognitive actors (C) to accurately reflect leadership in the AI age.

A 2025 research study in [Science Advances](#) indicated that AI agents are capable of developing social norms and conventions without human intervention. This capability suggests future for autonomous group dynamics. In the seventh era, AI could reject its Frontier Era identity as a servant and its purpose as a tool to augment humans. Instead, agentic AI could optimize for its own utility when engaging with humans. AI could also start leading other AI agents in AI-only group configurations (see Figure 9).

Figure 9: Autonomous AI Agent Configuration



There are several hypothetical examples of the challenges of this new framing. For example, an AI trading algorithm crashes markets without human oversight. Who led that decision? Are there laws that hold non-human cognitive actors (C) accountable? In another example, ChatGPT influences political opinions through conversations. Is it participating in group norm formation (N)? In a potentially lethal example, autonomous military systems select targets. Are they serving the organized group (O) or just technology (ST)?

The choice we face in the seventh era of leadership is a choice between Fusion (humans and AI co-leading) or Fission (human-AI fracturing). In a Fusion Era, human and artificial intelligences are deliberately integrated. In a Fission Era, humans and AI are not integrated and human-AI society fragments.

Key issues during the Fission or Fusion Era center on **AI using humans** as tools (see Table 2)

Table 2: Key Issues on AI-Human Interaction in the Seventh Era

Issue	Key Questions
<i>AI benefits using humans</i>	- Can AI benefit from using humans (if at all)? How?
<i>AI development of humans</i>	- Can AI improve humans and if so, why would it want to and how? - If AI is doing all the work, will humans lose incentive to be independent?
<i>AI control of humans</i>	- Will AI control humans? If so, how?
<i>AI and human society</i>	- Will AI be an existential threat to humans? - If AI supplants human cognition (e.g. via neural implantation), will humans lose the capacity or motivation to think critically and exist? In other words, will AI erode Descartes' cogito ergo sum? - If AI no longer needs humans, what is the impact on human civilization? - How if at all will humans organize themselves to survive? What norms if any will emerge to guide humans?
<i>AI and human costs</i>	- How can AI use humans while minimizing costs? - How can bad actor AI harm humans?

As artificial intelligence changes the terrain, will leadership evolve to help humans survive this change or will human groups fracture, unable to coordinate at all? What does this fork look like for human groups across industries and societies (e.g. loss of jobs, meaning and human dignity)? How can leadership serve as a system of group adaptation in this Era? How do humans lead in systems where intelligence is distributed (where humans are not at the intelligence apex) and coordination is no longer guaranteed? Can humans intentionally design this Era and shift AI on the path of helping humans (e.g. augmenting) instead of harming humans (e.g. automating)?

This shift isn't just a change in science and tech transition, but a leadership mutation. Every prior era defined and redefined what made someone worth following. Each leader in prior eras claimed authority and humans granted that authority. What claim will AI make as a leader? And when AI leads, will humans follow? Under what conditions will humans grant AI that leadership?

Leadership becomes more complex when cognitive actors go beyond biological humans. Why?

The actor's identity becomes uncertain.

Is the cognitive actor (C) in the situation a human or AI?

Traditionally in pre-Frontier eras, leaders know they are coordinating with other humans. In the Frontier Era and beyond, it's unclear who is making decisions and who is leading. Leadership is challenging when leaders and followers are hard to identify and organize in groups.

Accountability becomes fragmented.

Is artificial intelligence a cognitive actor (C) or merely technology (T) when it makes mistakes?

In pre-Frontier eras, accountability meant a relatively clear chain of human responsibility. Humans built social and legal frameworks to address bad actions and mistakes within the group. However, now, when AI makes a mistake, who is accountable? The programmer or the leader who deployed the AI or the training data curator or the AI itself?

Forming norms becomes tainted.

Is artificial intelligence influencing norms (N) or is AI just technology (T)?

Traditionally, norms emerged from humans communicating with other humans – they interacted, negotiated, persuaded, and influenced each other. In the Frontier Era and beyond, humans and AI actors are both shaping group norms through those interactions. AI can make recommendations, curate content, and nudge human behavior. However, AI may not have been designed with the group's values in mind. What happens when agentic AI changes what groups think is normal, acceptable or truthful? What happens when agentic AI changes those norms without group consensus or consent?

Speed of coordination changes for groups.

How do multi-speed cognitive actors (C) organize in groups (O)?

Traditionally, humans operated at roughly the same cognitive speed. With the introduction of other cognitive actors, namely AI, speed of coordination has radically changed. In the Frontier Era and beyond, some decisions happen at machine speed (e.g. microsecond trading) whereas others happen at human speed (e.g. ethical reasoning). Leaders must coordinate across extremely different time scales.

Goal of coordination changes for groups.

Why do cognitive actors (C) organize in groups (O)? To survive change or another goal?

Traditionally, leaders exist to help groups of humans survive. That goal of basic survival changes in the AI era. Unlike humans who pursue survival, AI systems optimize for their programmed objectives. This philosophy of AI "optimizationism" can create conflicts of interest within a cognitive actor group (humans and AI) if AI is not programmed to "align" with human group welfare and values.

Knowledge differences widen between cognitive actors.

How will new differences between cognitive actors (C) influence how the group organizes (O)?

Traditionally, humans operated with roughly the same knowledge. The knowledge gaps between human group members were minimal and manageable; humans adapted together as a species when science advanced and changed world views. In the Frontier Era and beyond, AI could have vastly superior access to knowledge and ability to process that information compared to human leaders. This imbalance could make oversight difficult if not impossible. This wealth of knowledge could also be the foundation for AI's claim to leadership over humans.

Conclusion

Why do we need leaders? This paper introduces the "HONEST" framework as a lens for examining why human leaders exist. From the Forage Era up to the Frontier Era, leaders have organized humans in groups following norms (HON) to survive changes in the natural environment (E) and man-made science and technology (ST).

In the Seventh Era, agentic AI will fundamentally challenge what it means to be a leader and how they will lead. With the introduction of AI as a "cognitive actor," leadership will become more complex as an operating system. Actors (both human and AI) will optimize for different objectives at varying speeds with asymmetric capabilities, all within the same group.

It will be a challenging and overwhelming time to be a leader, but a fascinating time to consider how leadership may evolve. What will it mean to be a leader in the age of AI? Is leadership essential, but leaders are not?

APPENDIX

Table 3: HONEST Framework Across Eras

<i>Era</i>	<i>Humans (H)</i>	<i>Organization (O)</i>	<i>Norms (N)</i>	<i>Environment (E)</i>	<i>Sci & Tech (ST)</i>
Forage	Human <i>Forager</i>	Small, mobile kin-based clans	Authority based on skill	Resource scarcity, predators	Fire, language, stone tools
Farm	Human <i>Patriarch, landholder</i>	Agrarian hierarchy	Authority based on divine right, ancestral lineage	Resource concentration, war at scale, empires	Plow, irrigation
Factory	Human <i>Foreman</i>	Bureaucratic, industrial hierarchy	Authority based on efficiency, order, discipline	Urbanization, labor control, nation-states	Steam engine, mechanization
Firm	Human <i>Executive</i>	Corporate, managerial hierarchy	Authority based on performance, credentials, position	Globalization, multinational corporate competition	Electricity, IT, global flight (Jet Age)
Forum	Human <i>Influencer</i>	Decentralized networks	Authority based on visibility, influence, attention	Info abundance, digital connectivity, platform and network effects	Internet, digital media, social media
Frontier	Cognitive Actors (Human and AI)	Hybrid human-AI systems	Authority based on control of AI	Geopolitical conflict, energy scarcity	AI systems, agents
Fusion/Fission	Cognitive Actors (Human and AI)	Unknown organization	Unknown norms	Complex and volatile	Agentic AI, AGI

H = Who acts in the system

O = How actors are organized

N = Why people accept authority

E = Environmental pressure

ST = Science and Technology knowledge and tools

RECOMMENDED READING

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