

Implications of Artificial Intelligence on Leadership in Complex Organizations: An Exploration of the Near Future



By:

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Abstract

This research paper explores the intersection of artificial intelligence (AI), leadership in complex organizations, and the potential implications of AI on top executive roles. Motivated by the rapid advancements in AI technology, the study aims to understand how AI may impact leadership functions within complex organizational structures.

The primary problem addressed in this research revolves around the transformative influence of AI on leadership roles, particularly Chief Executive Officers (CEOs). The paper delves into the complexities of redesigning or augmenting the role of a CEO with AI and examines implications of such a paradigm shift. Employing a comprehensive methodology that encompasses various approaches, including a literature review, horizon scanning, stakeholder analysis, industry informant interviews, causal layered analysis, and scenario narratives and worldbuilding. The research outputs include insights into the potential impact of AI on leadership in various futures scenarios, implications for organizational structures, and considerations for navigating this transformative landscape for various stakeholder groups.

In conclusion, this paper hopes to contribute to the ongoing discourse on the interplay between AI and leadership in complex organizational settings, emphasizing the importance of navigating the transformative landscape using a balanced approach, providing a foundation for future framework development and considerations in this dynamic field.



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Statement of Contribution

The decision to collaborate on this project was both a strategic alliance and a celebration of our shared journey with the program. Having met in the same Strategic Foresight and Innovation cohort at OCAD University, we became friends and discovered the wealth of complementary skills we brought to the table.

Mike is a senior executive and consultant with a strong project management background. He holds a Bachelor of Arts in Communication from the University of Ottawa, as well as a professional project manager designation. Nélia is an accomplished lawyer and interdisciplinary designer, with an impressive academic and entrepreneurial background. She received her Juris Doctorate from the University of Ottawa's Faculty of Law, and a Bachelor of Arts in International Studies from York University. Mike's business acumen provided a practical lens, while Nelia's legal expertise and academic foundation brought a nuanced and structured dimension to our exploration.

Recognizing the inherent value in our diverse skill sets, we saw an opportunity to collaborate and learn from each other. Our approach was driven by the belief that through working together, we could explore the topic from multiple perspectives, adding layers of depth and richness to our inquiry. By combining our strengths we were able to develop insights and robust research, as well as cultivate a dynamic and supportive collaboration.

Sincerely,
Mike and Nélia

Chapter 1 - Introduction

The notion of artificial intelligence (AI) has captured the imagination of computer scientists, science fiction writers, and futurists since its conception. Recently, advancements made in this emergent technology have ushered us into a brave new paradigm where speculation about the impact AI will have on our lives have shifted from asking 'if' to asking 'when'. There can be little doubt that we are entering into a brave new world where new forms of AI will permeate many facets of our lives. In many ways the AI revolution has already fundamentally changed how organizations collect and process data, as well as transformed business operations across different industries.

Simultaneously, the role of Chief Executive Officers (CEO's), and executive leadership in general, holds multiple contradictory meanings in our society. Often CEOs and executive leaders are all at once lionized and celebrated, or paradoxically vilified and held up as quintessential symbols of greed. Multiple contradictory metaphors shape our notion of the role and personal attributes of senior executives who are responsible for making major corporate decisions, managing overall operations, and setting the company's strategy direction. Our exploratory research on how artificial intelligence may impact leadership in complex organizations seeks to understand socio-technical change using various qualitative research methods and foresight techniques, as well as provide insight and guideposts for managing transformation. Moreover, if management decision making is to be augmented or even replaced by artificial intelligence, it begs the question - how might we redesign a CEO?

1.1 Research Question

The goal of this Major Research Project ("MRP") is to explore the following research question: *"How might artificial intelligence impact leadership in complex organizations in the near future?"*

This research question is exploratory in nature and has three main considerations: (1) the rapidly changing nature of the technology and the spectrum of impact; (2) components of leadership, both tangible and intangible; (3) the power and governance structures of complex organizations. The question is broad in nature to allow for examinations of how these three elements work together as parts of a whole to help inform potential futures.

On November 30, 2022 OpenAI introduced ChatGPT using GPT-3.5 as part of a free research preview. This event spurred a large-scale fascination and speculation by media outlets and the general public about the potential implications of artificial intelligence and how this emergent technology may impact everyday lives. This discourse motivated our own ideation regarding the application of large language models (LLMs) to leadership and decision making within large and complex organizations. Top of mind was the question, “CEOs are hugely expensive. Why not automate them?” (Dunn, 2023) Indeed, if a single role is as expensive as a thousand workers, it is surely the prime candidate for robot-induced redundancy. However the complexity of this question cannot be surmised from a pithy news headline. We formulated our research question around three main considerations that might express the essential features of an AI CEO.

The first such consideration relates to the technology itself. What do we mean by *AI*, and how is this emergent technology rapidly changing the landscape? Even as we write this paper, new developments are announced daily. Moreover, what is meant by *impact*? Our cursory assessment when formulating the question is that impact would fall along a spectrum from augmentation, which is already being done in many instances, to full automation and replacement. This spectrum of impact is a salient element of our exploration, as change and technological diffusion is not evenly distributed.

The second consideration concerns the components of leadership, and virtuous and competent leadership in particular. We explored various frameworks from business management, organizational behavior, and ethics to develop a comprehensive understanding of different facets of leadership and the synergies with AI. For example, trust emerged as an important facet of leadership as “a culture of trust cannot exist with an untrustworthy leader. Trustworthy behavior must start at the top and flow down through every manager in an organization” (Kimmel, 2014). This aspect “presents one of the foremost challenges in getting workers to adopt augmentation” (Barr, 2018), and is a key determinant of widespread adoption.

The third consideration is connected to power and governance structures of complex organizations and the larger systems within which they are nested. When considering the systemic nature of complex organizations we drew upon various systemic design tools and models such as actor-stakeholder mapping, and the viable systems model (VSM) (Beer, 1981), to help us identify interrelated parts of a larger whole and how they work together. By taking a systems thinking approach to the future-oriented research question we were able to accommodate complexity in developing our futures scenarios and implications.

In sum, the exploratory nature of the research question lends itself to a speculative analysis using various qualitative research methods, with the aim of building scenarios and identifying implications of how this emergent technology might transform high-level decision making and leadership capacities across various sectors. The underlying aspiration of our research is to provide guideposts on how best to navigate this transformation.

1.2 Rationale and Personal Interest

The rapid advancement of Artificial Intelligence (AI) is a topical headline in today's mainstream litany and news. It's always been a topic of discussion since the rise of the first computers, but with the recent release and development of tools like ChatGPT it's become an even more popular topic, with academics, governments, and private companies all racing to take advantage or control the impacts of its capabilities.

This topic brought us a lot of personal interest, specifically around the idea that AI will replace or augment certain aspects of life, especially work. Workforce automation and disruption is not a new concept, but has historically focused on physical labour and simple tasks. Given the recent advancements in technology, we wanted to explore the idea of AI disrupting complex tasks and positions not commonly talked about. For example, when one imagines workforce replacement, one may think of an assembly line of robots replacing factory workers, but there has been a rise in different types of jobs becoming replaced, such as knowledge workers and artists. This has profound implications and flips the previously dominant narrative of technology replacement and attacks previously invulnerable and complex jobs and roles.

One role that we wanted to specifically explore was the opposite of the bottom, but the figurative 'top' of organizations, the leadership positions. Leadership positions such as the CEO are also arguably some of the most expensive positions within the organizations. According to a report done by the Canadian Centre for Policy Alternatives, a Canadian political think tank, the top 100 CEOs in Canada average pay in 2021 was \$14.3 million dollars, earning the average workers salary of \$58,000 within the first 43 minutes of the first annual day of the year (CCPA, 2023). The data is supportive of the trend that the pay has only been increasing year over year (MacDonald, 2023). This leads us to the question whether or not AI can replace leadership positions in organizations? Could AI one day replace the role of a CEO? It might, to some companies, make economic sense to the bottom line, but what would the organization, and the world, look like if it was run by AI's making arguably the most important and definitive decisions for some of the largest institutions in the world? The question has expansive implications, spreading into all organizations, not just private institutions with CEOs. What about politicians, or varying levels of governments? Are there specific industries where AI CEOs or leaders would be better or worse, either due to the degree of complexity, or whether the boards had more decision power than the CEOs.

Our research aims to examine what a CEO is, both in terms of skills and competencies, but also in terms of intangible qualities, and metaphors. This background research spans fields of organizational psychology, management theory, leadership, and learning development. We explore different frameworks and metrics used to evaluate performance. As well as contemporary compensation criticism.

Because our research question is exploratory in nature, we opted for a flexible approach using innovation research methods to define the problem area and ideate solutions. We adopted an intuitive approach of using different tools and methods when it felt appropriate. We began our research by exploring core ideas, such as defining AI and leadership, within a literature review structure. And then used systemic design tools to map the system, as well industry informant interviews and foresight methodologies to scan the horizon and develop scenarios. From there we added richness to our analysis by exploring the implications, and finally developing guideposts to help guide transformations related to our research question.

1.3 Hypothesis and Challenging Assumptions

In contemplating this research, our overarching hypothesis was that the adoption of AI taking on a pivotal role in strategic management decision-making within complex organizations was inevitable. We posited that as technological advancements progress, a concurrent escalation in trust and adoption of AI would ensue. This hypothesis serves as a foundational conjecture, guiding our research inquiry into the evolving dynamics of AI within the corporate governance landscape.

In diving in, we recognized the necessity to conscientiously scrutinize the inherent assumptions that may be ingrained within our personal and professional experiences. Our aim was to discern how these assumptions could have influence over our perceptions and the potential conclusions drawn from our research question. Two prevailing assumptions, emblematic of opposing perspectives emerged as focal points in this introspective analysis. These assumptions, constituting a binary way of thinking. The implications of AI would either be unequivocally beneficial or inherently detrimental. This dualistic framework not only permeates public policy and discourse on the subject but also informs our internal expectations.

We tried to challenge these assumptions by purposefully distanced ourselves from the dichotomy of AI as either entirely advantageous or wholly deleterious. In our approach we tried to stay away from the simplicity of black-and-white categorizations, by fostering a nuanced engagement with the inherent ambiguity surrounding technology. We consciously refrained from clinging to preconceived notions throughout our signal research, implications analysis, and scenario development, and committed to allowing insights derived from the research to shape our foresight analysis.

To mitigate the potential bias of our own perspectives, we undertook a multifaceted strategy, involving interviews with a diverse array of industry informants. These experts, reflective of varied attitudes towards technology, contributed to a comprehensive understanding of potential implications associated with the integration of AI into corporate governance frameworks. The intention was to circumvent the confines of binary assumptions, fostering a more inclusive and nuanced perspective grounded in the diverse insights garnered from experts spanning different ideological backgrounds.

1.4 Background Literature Review

Our research began with a comprehensive literature review encompassing diverse domains that were relevant to our research question. This review served as a foundational exploration, providing an overview of issues such as definitions of Large Language Models (LLMs), historical evolution and developments of AI, the role and definitions attributed to Chief Executive Officers (CEOs), distinct organizational models and perspectives, and various corporate governance structures. The intent of this literature review was to establish a robust groundwork for subsequent research methods. This section is divided into two sections:

1. a glossary of terms, which provides clear definitions;
2. areas of investigation, which summarizes key concepts that were used to establish the foundation of understanding for the research topic.

1.4.1 Glossary of Terms

Artificial Intelligence (AI): Refers to the simulation of human intelligence in machines that are programmed to think and learn like humans. The term can also be applied to any machine that exhibits traits associated with a human mind, such as learning and problem-solving.

Chief Executive Officer (CEO): The highest-ranking person in a company or other institution, ultimately responsible for making managerial decisions, and providing strategic vision. Throughout our research we use the term CEO as an exemplar of executive leadership functions, which can be transferred to both private and public sector, not-for-profits, and government institutions.

Complex Organizations: Refers to large-scale entities characterized by a multifaceted structure, diverse functionalities, and intricate operational processes. Complex organizations typically possess key features such as multi-layered hierarchical structures, diverse stakeholder interests, interdependent operations, dynamic external environment, and advanced information and communication systems.

Corporate Governance: Corporate governance is the system of rules, practices, and processes by which a company or organization is directed and controlled. Corporate Governance refers to not only the way in which companies are governed, but also to what purpose. It identifies who has the power, who makes decisions, and who bears ultimate accountability.

Large Language Models (LLMs): LLMs are a class of artificial intelligence systems designed to understand, generate, and manipulate human language. They are based on statistical and machine learning techniques, particularly deep learning, to process and produce text in a way that is coherent and contextually relevant.

Viable System Model (VSM): The VSM is a conceptual framework developed to understand and optimize the structure and functions of organizations. It identifies key components and their interrelationships to ensure an organization's adaptability and viability. We believe that the VSM can be applied to design and manage complex AI systems.

1.4.2 Areas of Investigation

Artificial Intelligence (AI)

Throughout history, technological advancements have revolutionized the way we work, our decision-making and how resources are allocated. The impending digital revolution bolstered by emergent technologies such as AI portends to similar significant change. The prospect of AI-augmented decision-making to corporate governance is both promising and unsettling. Our investigation into the potential for AI to augment or replace management decision-making in complex organizations necessitates that we first provide a brief historical context to the development of AI technologies, as well as an analysis of what is meant by corporate governance and management decision-making functions using various systemic frameworks.

Today, AI encompasses a variety of branches and techniques, including machine learning (ML), where algorithms improve automatically through experience; neural networks, which mimic the human brain's structure and function; and natural language processing (NLP), which enables machines to understand and respond to human language. Moreover, it has a

wide range of applications, including in healthcare for disease diagnosis and personalized medicine, in autonomous vehicles for navigation and safety, in finance for risk assessment and fraud detection, and in customer service through automated chatbots and virtual assistants.

AI raises significant ethical and societal questions, such as the potential for job displacement, privacy concerns, the development of autonomous weapons, and the need for equitable and unbiased AI systems. The field of AI ethics focuses on these challenges, seeking to ensure responsible and beneficial development and deployment. AI continues to evolve, with research focusing on achieving greater generalizability, explainability, and safety in AI systems. The integration of AI with other emerging technologies, such as quantum computing and biotechnology, also presents exciting future possibilities.

Historical Context in the Development of AI

AI is broadly defined as any system that exhibits behavior that could be interpreted as human intelligence. To put it simply, computers are very good at performing specific functions, namely: set rules and possibilities, and pattern matching. However, at this point it is unclear to what extent AI could be used to augment or replace management decision making in complex organizations. Moreover, the concept of AI has undergone significant scientific developments since its inception, and some argue that the characterization of AI as "intelligent" is itself problematic, because there is no one standard for human intelligence. In this section we will try to illuminate some of the salient technological developments, as well as the relevant conceptual framing of AI as it relates to corporate governance and decision making with structures of complex organizations.

During the early years of AI research, the focus was on developing systems that could solve complex mathematical problems. AI was seen as an expert system, posited by the Physical Symbol System Hypothesis (Newell, 1980), a basic hypothesis of classical cognitive science. It posits that symbols were the key to general intelligence. If you could program a computer to connect enough of these symbols, then you could create an intelligent machine. Moreover, symbols are a big part of how we interact with the world, a key part of human reasoning is simply connecting different symbols. However, challenges to the notion of AI were put forward, which intended to show that it is impossible for digital computers to understand language or think. One such argument, known as "The Chinese Room" (Searle, 1980), imagines

one person locked inside a room given a large batch of Chinese writing. The person on the outside of the room thinks they are having a conversation, but the person inside the room can't speak Chinese and doesn't know what's going on. They are simply matching patterns. They don't understand meaning or content, they're just matching. In the Chinese Room argument Searle argues that this behavior, matching symbols, is not sufficient for thought. Moreover, the prevailing approaches at the time struggled with the complexity and ambiguity of real-world problems. This led to what is commonly referred to as the AI winter, a period of reduced funding and interest in AI research.

The landscape of AI research changes dramatically with the advent of machine learning, particularly deep learning. Machine learning algorithms allow computers to learn from large amounts of data and make predictions without being explicitly programmed. Deep learning, a subfield of machine learning, utilized neural networks with multiple layers to extract and learn hierarchical representations from data. More specifically, artificial neural networks are computer programs that try to mimic the structure of the human brain. A biological brain is filled with billions of neurons, these neurons connect to one another and send signals in order to learn and react with the outside world. These neurons communicate through synapses, and these synapses allow the neurons to fire signals to other connected neurons. The neurons will increase the strength of these connections based on experiences. This process of neuroplasticity is articulated by the popular saying "neurons that fire together wire together" (Hebb, 1949). Neurons in an artificial neural net are organized into layers. It can train itself to understand the input, and then recognize that input when looking at massive amounts of data. Deep learning contains many hidden layers, which increases the distance between input and output. DL also uses techniques such as *Back Propagation* and *Clustering* to enable added capacity to match patterns. Back Propagation allows all the nodes to spread their knowledge more quickly, and Clustering helps identify patterns by allowing the network to create categories and then sort new information into these categories. Essentially, pattern matching for patterns. Machine Learning has become increasingly popular because of the increased availability of data and advancements in deep learning architecture.

The availability of massive datasets, increased computing power, and advancements in algorithms has fueled interest in AI. The advent of the participatory web (Blank, 2012) has contributed to an immense increase in the proliferation and availability of big data. Algorithms are now able to access and parasitically use the intelligent behavior of all users to react in a

competent way to requests (Esposito, 2022). Simultaneously, advances in AI have been rapidly increasing. This is primarily because the study of AI was compartmentalized. Disciplines such as computer vision, speech recognition, robotics, image generation, music generation, speech synthesis, used to be separate fields. With the introduction of large language models (LLM) any advance in any one domain became multiplicative across many different fields, and the incremental gains of the many has compounded resulting in advances along an exponential curve. This has enabled the development of generative large language multimodals, also known as generative AI.

The development of generative AI has enlivened the imagination of how the technology might be used in the future. However, the consensus is that generative AI, such as chatGPT, is a powerful form of narrow AI and not strong AI. That is to say, that although it simulates human cognition and is able to automate tasks by analyzing data in ways that humans sometimes can't, it is limited to certain areas and functions similar to a stochastic parrot. In this vein, some argue that the notion of artificial Intelligence as being 'intelligent' is itself misleading, and a more fitting conception would be that of artificial communication. By characterizing artificial intelligence as intelligence we have created a misleading mis-labeling that leads to confusion as to how algorithms actually operate. "The metaphors used in the field of big data and machine learning retain a reference to the human mind and its processes" (Esposito, 2022, p.4). This confusion muddles the interrogative waters of how AI might serve to augment decision-making capacity of leaders, and camouflages nuance that may be useful. Esposito contends that we think of AI as intelligent because the machine has a similar performance to a human being. By default, we think where there is communication there must be intelligence, but that is a misnomer. In contrast, strong AI displays person-like behavior, able to construct thought processes and functions that are impersonated from the human brain.

Recent Developments in Artificial Intelligence

Looking forward, the field of AI continues to evolve rapidly along an exponential curve. An important element in the current discourse is AI governance. Despite rapid technological advancement, a conceptualization of ideal AI governance that values principles, institutional design, and norm building, is yet to be done. "At the present point in history, important aspects of the future remain at least partially hidden behind a veil of ignorance" (Bostrom, 2018). Given this, foresight represents an important tool in exploring possible futures and probing the various

ways in which different scenarios with varying degrees of AI governance may present themselves.

Chief Executive Officer (CEO)

The CEO is typically one of the highest leadership positions of any organization, and often the most public figure. They are both the most enigmatic and yet arguably the most public position of both private and public organizations. The CEO usually represents the top of an organization, the highest or most important leadership position there is. But what exactly do they do? How do they differ from other leadership positions?

According to Peter Drucker, a renowned management scholar and scientist, also referred to as the “father of modern management”, CEO’s had various roles, ranging from setting strategic objectives, resourcing & staffing, motivating & communication, measuring performance, and developing people (Drucker, 1976). While broad and a bit antiquated, these responsibilities generally hold true today. Drucker states that there are three unique traits and responsibilities to a CEO, one that they would employ a ‘broad field of vision’, the capability to ‘link the inside internal environment to the outside external environment, whereas other leaders within the organization would be hyper focused on their exact field of expertise like marketing or engineering (Edersheim, 2007),. Two, would be taking and representing accountability for the organization. This accountability acts as a ‘brand’ where if things do not go well with the company, the ceo takes the punishment and should own the failures, and if things go well, it can support the role and elevate them to be memorable beyond the functions or product of the company. A good contemporary example of this would be Elon Musk, whose personal brand elevated beyond one of his companies, Tesla, and into a demigod like figure in modern business and tech. Lastly, Drucker outlined the role of influence on the people of the organization, and the importance of nurturing a confident culture within the organization, citing that it retains and grows the talent of the organization. In summary, the most important aspects of a CEO according Drucker are having the vision, taking accountability, and building culture. These definitions also align with some of our future research, where we interviewed business leaders about the very question of defining the role of a CEO.

CEO Compensation and Performance Measurement

The introduction of AI and the potential to augmented management decision making functions offers many potential benefits for organizations. It could also present potential cost savings in terms of executive compensation, as it may challenge the justification for CEO salaries, as “compensation policy is one of the most important factors in an organization’s success. Not only does it shape how top executives behave but it also helps determine what kinds of executives an organization attracts” (Edersheim, 2007). However, in the United States CEO compensation has skyrocketed, going up 1322% since 1978, which translates into CEOs being paid 351 times as much as a typical worker in 2020 (Mishel, 2021). Similar executive compensation rates exist in Canada. In some cases there has been significant public outrage over executive compensation (Charlebois, 2023).

When CEO salaries are scrutinized annual changes in executive compensation do not reflect changes in corporate performance. Some argue for a more nuanced view that “the focus on *how much* CEOs are paid diverts public attention from the real problem—*how* CEOs are paid. In most publicly held companies, the compensation of top executives is virtually independent of performance... and that the degree of pay-for-performance sensitivity for cash compensation does not create adequate incentives for executives to maximize corporate value” (Jensen, 1990). Regardless of the long-term effect of a risk-averse orientation to compensation will erode the relation between pay and performance, the prospect of AI augmented management decision making functions raises serious implications.

Complex Organizations

In the realm of organizational studies and management, complex organizations can be defined as large-scale entities characterized by a multifaceted structure, diverse functionalities, and intricate operational processes. These organizations typically exhibit the following features:

Structure Type	Description
Multilayered Hierarchical Structure	Complex organizations often have multiple tiers of management and a vast array of departments, units, or teams. This hierarchical structure supports the organization in managing its extensive scope of operations but also introduces challenges in communication and decision-making.

Structure Type	Description
Diverse Stakeholder Interests	Such organizations engage with a wide range of stakeholders, including employees, customers, shareholders, regulatory bodies, and the broader community. Balancing these varied interests requires nuanced and strategic management.
Interdependent Operations	In complex organizations, different departments and units are often interlinked, meaning that the activities and decisions of one segment can significantly impact others. This interdependence necessitates a coordinated approach to organizational management.
Dynamic External Environment	These organizations operate in environments characterized by rapid technological changes, evolving market conditions, and shifting regulatory landscapes. Adaptability and resilience are crucial traits for their survival and growth.
Advanced Information and Communication Systems	To manage their operations effectively, complex organizations rely on sophisticated information and communication technologies. These systems facilitate the coordination of activities across different parts of the organization and enhance decision-making processes.

In the context of integrating Artificial Intelligence (AI), complex organizations present both unique challenges and opportunities. The nature of these entities means that AI can be leveraged in various ways, from automating routine tasks to aiding in complex decision-making processes. However, the implementation of AI also requires careful consideration of the organization's structure, culture, and the potential impacts on its stakeholders. The goal is to harness AI's capabilities to enhance efficiency, innovation, and competitiveness, while also addressing potential ethical, workforce, and operational implications.

Elliot Jacques, a notable figure in organizational theory, and known for his work on the concept of a *“Requisite Organization”* (Jaques, 1997), provides context to the discussion of complex organizations particularly in how they can be structured and managed effectively. However, Jaques' work predates the widespread advent of AI in organizational contexts, so he did not directly address the integration of AI into complex organizations. Nonetheless, his concepts can be relevant when considering how AI might be implemented in such structures. These ideas may intersect with the discussion of AI in complex organizations by focusing on creating an organizational structure that aligns with the complexity of the work to be done. In the context of AI, this concept could be applied to ensure that the organizational hierarchy and roles are appropriately designed to integrate AI technologies. For instance, decision-making processes and leadership roles might need to be restructured to effectively manage AI-driven operations.

Moreover, the integration of AI into complex organizations could impact (e.g. reduce) the maximum time period within which an employee works before their output is reviewed by a superior, also known as “time span of discretion” (Jaques, 1997). Because AI can automate certain tasks, it will thereby alter the nature and frequency of supervisory reviews. Furthermore, it is crucial to maintain clear lines of accountability when incorporating AI into complex organizations, especially as decision-making processes become more intertwined with AI systems. This is emphasized by the importance of clear managerial accountability and effective leadership in organizational structures. Leaders must be adept not only in traditional management skills but also in understanding and overseeing AI-driven processes.

AI has many implications for work complexity and employee development, which centers on the match between an employee's capability and the complexity of their work. As AI changes the nature of work in complex organizations, there may be a need for re-evaluating employee roles and development paths, ensuring that staff are equipped to work effectively alongside AI technologies, and handle higher-order tasks that AI cannot perform.

In summary, Elliot Jaques' theories on organizational structure, hierarchy, and management provide a useful framework for understanding how AI might be integrated into complex organizations. His emphasis on aligning organizational structure with work complexity is particularly relevant in the context of AI adoption, which can significantly alter both the nature of work and the required organizational structures and roles.

Corporate Governance

Corporate governance is the system of rules, practices, and processes by which a company or organization is directed and controlled. Corporate Governance refers to not only the way in which companies are governed, but also to what purpose. It identifies who has the power, who makes decisions, and who bears ultimate accountability. The basic principles of corporate governance are accountability, transparency, fairness, responsibility, and risk management. Ideally corporate governance seeks to create a system of rules and practices that determine how a company operates and how it aligns with the interests of all its shareholders, and leads to ethical business practices and financial viability.

Corporate governance is a relatively new field, and some critics of current corporate governance models encourage a reconceptualization of what sound corporate governance means, based on a principled approach that focuses on long-term planning and leadership optimization (Lasytė, G, 2019). Such reconceptualization can be gleaned from the evolution of stakeholder management theory. Stakeholders have a significant and extensive influence on corporate governance, and diverse theoretical approaches to stakeholders include the triad of descriptive, instrumental, and normative approaches to stakeholder management (Donaldson, 1995).

The application of AI to stakeholder theory has many ethical implications. We attempt to compare and contrast these three approaches as follows: the normative perspective of the stakeholder embodies the ethical dimension of the concept, the instrumental perspective tends to identify its operational value, while the descriptive approach is aimed at clarifying the actual affairs of the company's practice (Smaguc, 2022). Through a communal sharing relational ethics strategy, the instrumental approach purports to have the potential to create a sustainable competitive advantage (Jones, 2018). However, some argue that there are limitations with the shared-value mindset espoused by Instrumental stakeholder management, it may actually get in the way of progress. And that it may be more advantageous to approach stakeholder management by looking at trade-offs, which can actually be the source of organizational resilience and transformation (Kaplan, 2019). Our analysis revealed that AI may be well positioned to perform the function of analyzing trade-off relationships in multivariable situations described by stakeholder management theorists.

The relationship between corporate governance and artificial intelligence lies in the need for ethical oversight, accountability, and strategic alignment. Corporate governance frameworks provide the structure for decision-making, risk management, and ethical considerations within organizations. As artificial intelligence becomes increasingly integrated into business processes, governance mechanisms must evolve to address the unique challenges posed by AI, such as algorithmic bias, transparency, and data privacy. Effective governance ensures that AI applications align with the organization's values, comply with regulations, and maintain accountability for their actions. Boards and executives play a crucial role in overseeing AI strategies, fostering responsible innovation, and establishing mechanisms to assess and mitigate potential risks associated with AI technologies, thus fostering a harmonious integration of artificial intelligence within the corporate landscape.

Large Language Model (LLM)

As a base understanding of the research it was imperative to understand AI and its current state of development using large language models. LLMs are typically developed using large-scale neural network architectures, such as transformer models. These models are trained on extensive corpora of text data, enabling them to learn the statistical properties of language, including syntax, semantics, and pragmatics. The training process involves adjusting the weights of the neural network to minimize the difference between the model's predictions and the actual text data.

LLMs are used in a variety of applications, including machine translation, text summarization, question answering, chatbots, and content generation. They have significantly advanced the field of natural language processing (NLP) by providing more nuanced and context-aware responses than earlier models.

Despite their capabilities, LLMs face challenges such as bias in training data, lack of understanding of underlying concepts, and difficulties in capturing nuances like sarcasm or cultural context. Ethical considerations include the potential for misuse in generating misleading information, privacy concerns, and the impact on employment in fields related to language and writing.

Viable System Model (VSM)

Taking a different perspective at looking at our research question, we employed Stafford Beer's renowned organizational systems model, the viable system model (1981) as a functional framework. Three key concepts are relevant: viability (keep the organization going and alive), requisite variety (managing the complexity and challenges faced by the organization in its environment), and hierarchical recursion.

System Level	VSM System Description
System 5	The policy-making system that sets the overall direction for the organization
System 4	The strategic planning system that anticipates and prepares for the future.
System 3	The management system that monitors and controls the operational units.
System 2	The coordination activities that stabilize the organization in the face of disturbances.
System 1	The operational units that carry out the primary activities of the organization.

The VSM represents a framework for understanding organizations. There are five essential functions for viability, these are: Implementation, Coordination, Control, Intelligence and Policy (Espejo, n.d.). Beer classified & named these functions as independent and autonomous ‘systems’ and ordered them from System 1 to System 5. Each of them had a unique function for the organization, but created an overall governance or way of existing for the organization’s success.

Stafford Beer defined viability in terms of an organization's ability to maintain its existence and adapt to changes in its environment (Beer, 1981). In the context of the VSM, a viable system is one that is able to survive in a changing environment. This means that it must be able to adapt to changes, respond to disturbances, and evolve over time while maintaining its identity and coherence. Viability, in this sense, is not just about survival in the short term, but also about the ability to sustain and develop over the long term. It involves maintaining a balance between stability and change, between preserving the existing organizational structure and adapting to new circumstances - something a CEO is arguably responsible for.

A key aspect of viability, according to Beer, is the ability to manage complexity. This involves dealing with the complexity of the environment, as well as the internal complexity of the organization itself. The VSM provides a framework for managing this complexity, by identifying the key functions that a viable system must perform and showing how these functions can be organized and coordinated. An AI might be limited in its ability to manage complexity, similar to a CEO, using the Law of Requisite Variety (Ashby, 1956). The organization can only manage complexity in which it is capable of managing within its range of capabilities. If a problem or external complexity occurs in which the organization cannot respond to, or not fast enough, it

will have consequences to the viability of the organization as a whole. This can be seen in many disrupted innovation 'black swan' events, or economic downturns.

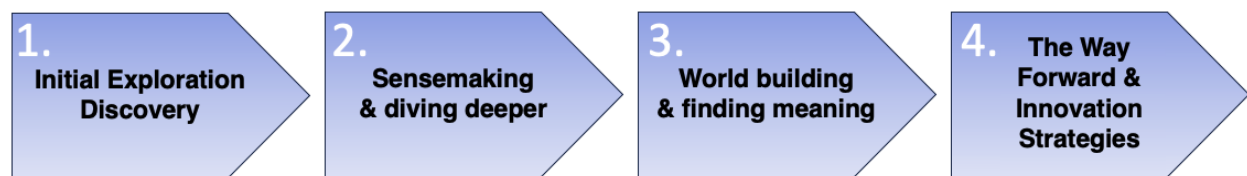
When paired against Drucker's view of the CEO, the VSM can align that it is the role also encompasses the need to manage complexity through requisite variety - in other words, increasing the variety of the organization through various means like culture building and staff capabilities, but also having vision of the external environment to know what's coming. In addition, our research on the VSM provided us with a conceptual framework to understand how AI could be integrated into business processes and governance mechanisms.

Chapter 2: Methods

In this section of the paper, we delve into our Methodology, which is characterized by a comprehensive multimethod qualitative approach, reflecting an exploration of diverse research and design methodologies at different junctures. This chapter is dedicated to a detailed explanation of the methods and approaches employed in our investigation, providing a transparent framework for our study. It articulates the research design, data collection techniques, and analytical strategies, weaving them together to form a coherent narrative of our investigative journey. By outlining our methodological choices, it serves as a guide for future research. The rationale behind each methodological decision is explored, ensuring that the reader gains a comprehensive understanding of how and why these particular methods were pivotal in addressing our research questions.

Philosophically, our overarching approach aligns with the integrated pluralism of metamodernism. We used an interpretive epistemology, which is the analytical lens through which we scrutinized societal events. We engaged in a speculative exercise, cognizant of the perpetual incompleteness of our observations and the existence of multiple potential futures. This process, akin to an art form, involves a creative and intuitive exploration of plausible scenarios.

Our methodological journey unfolds across four distinct stages, inspired by the double diamond design framework commonly employed in the development of digital products' UX and UI design. This framework, characterized by two diamonds representing divergent and convergent thinking, informed our approach, weaving together convergent and divergent thought processes across the various stages. Although our objective did not entail product development, and the final deliverable remained nebulous, we chose to adapt the double diamond design framework to incorporate a foresight story journey narrative, providing a cohesive guide for the reader. The ensuing four stages encapsulate our methodological trajectory:



- **Stage 1: Initial Exploration and Discovery:**
We start by exploring the subject widely, using divergent thinking to gather diverse perspectives and potential areas for deeper analysis. This sets the foundation for our research.
- **Stage 2: Sensemaking and Diving Deeper:**
Building on the exploration, we dive deeper, employing convergent thinking to distill and synthesize information. We systematically examine connections between elements to understand the complexities of the research question.
- **Stage 3: World Building and Finding Meaning:**
Here, we create a conceptual landscape based on insights from earlier stages. Divergent and convergent thinking converge to craft a cohesive narrative that reveals the meaning within the research context.
- **Stage 4: The Way Forward and Innovation Strategies:**
The final stage focuses on a forward-looking perspective and innovative strategies. Drawing on synthesized insights, we engage in foresight and scenario planning to offer recommendations for navigating the evolving landscape.

In summary, our research approach seamlessly integrates qualitative methodologies, and a modified design framework, culminating in a four-stage journey that navigates the complexities of the research question. This methodological roadmap not only underscores the rigor of our research process but also serves as a scaffold for the subsequent narrative, providing a coherent and reader-friendly guide through the intricacies of our exploration.

2.1 Literature Review

We conducted a literature review to thoroughly explore the connection between artificial intelligence, leadership, and governance, and other key concepts. The background literature review is divided into a glossary of terms, for quick reference, and areas of investigation, which

provide greater depth. We used a wide range of academic sources to understand the current landscape and set the stage for further study. The discussion extends to the dynamic nature of AI, its effects on employment and the relationship between humans and AI, as well as various conceptual models to help us understand complex organizations and the potential implications of AI integration. The literature review provides a detailed overview of various topics, including CEO roles, organizational models, and corporate governance structures, alongside the historical context of the development of artificial intelligence, thus providing a strong foundation for further research methodologies.

2.2 Horizon Scanning

Horizon scanning, also known as signal scanning, is a forward-looking methodology that aims to identify emerging developments with the potential to significantly alter or disrupt the focal issue or system. This method is critical in foresight research, as it involves detecting early indicators or 'weak signals' of change. These signals, often manifesting as technological breakthroughs, economic trends, shifts in policy, evolving societal values, or novel ideas, accumulate to suggest that a transformative change might be on the horizon, warranting deeper investigation and analysis.

Signals are typically defined as developments perceived to have a low probability of occurrence but a high potential for disruption if they materialize. They are often subtle, represented by one or two incidents or data points signaling a deviation from the norm, and are generally overlooked or underestimated by most due to their incongruence with established plans or mental models. A signal or horizon scan involves a meticulous collection and analysis of numerous signals from diverse sources, a process crucial for uncovering insights that might otherwise remain hidden. In our comprehensive signal scanning, we consciously sought to minimize bias by stepping outside our usual information echo chambers and exploring unconventional sources.

In this study, horizon scanning served as a foundational method, complementing the literature review, and shaping the trajectory of subsequent methodologies. A notable challenge encountered with horizon scanning was the rapid evolution of the research question and AI technology itself, leading to significant shifts in findings over the course of the study. This

dynamic nature of the topic underscored the importance of adaptability and continuous monitoring in our research approach.

2.2.1 PESTLE Analysis

In our comprehensive analysis of the horizon scanning signals, we employed the PESTLE framework to systematically categorize and interpret these signals. PESTLE, an acronym representing Political, Economic, Social, Technological, Legal, and Environmental factors, served as a multifaceted lens through which we could examine the broad spectrum of changes occurring in various domains. This categorization process, meticulously conducted using an Excel spreadsheet, allowed us to gain a holistic understanding of the evolving landscape from multiple perspectives.

Utilizing the PESTLE framework, we specifically focused on assessing the potential impacts of various factors on our central research question: 'How might AI impact leadership in complex organizations?' This framework proved invaluable not only in classifying our signals across social, technological, economic, environmental, and political dimensions but also in discerning the potential interconnections and interdependencies among these diverse weak signals. Through this nuanced analysis, we gained insights into the key factors that could shape emerging trends and drivers in our field of study.

Moreover, the PESTLE analysis enabled us to identify and understand the external elements that could act as catalysts for change, often referred to as trends and drivers. This comprehensive overview, enriched by the identification of trends and drivers, was instrumental in informing our scenario planning. We leveraged this in-depth understanding to explore various potential futures, particularly how they might unfold in relation to our research question. This exploration was not only about predicting possible outcomes but also about preparing for a range of future scenarios, thereby enhancing the robustness and relevance of our research in the dynamic field of AI and leadership in complex organizations.

2.2.2 Trends & Driver Clustering

We began our trend and driver identification by engaging in various sensemaking activities, such as pulling out signals we had gathered through horizon scanning and readings, and then clustering those signals into organically emerging thematic groups. We were able to label and organize these thematic groups under various headings by manually using a white board and sticky notes during several workshop sessions. We used a short-hand and abbreviations to do the initial sorting, each sticky note corresponding to a data point collected in the horizon scanning process on the excel spreadsheet. Some signals would contribute to multiple themes, although that was rare.

Through these sensemaking exercises the signals that we had gathered through horizon scanning organically fell into thematic groups related to our research question. We identified twelve themes or trends that might have a significant disruptive force that emerged from the scanning. Some signals would contribute to multiple themes, although that was rare. We took the following seven general steps as part of the trend and driver identification process.

Trend Analysis Steps:

1. Pull out signals from Excel sheet
2. Cluster to identify thematic groupings
3. Label and organize under headings
4. Completeness check against previous Themes overview
5. Map against insights gathered from interview data
6. Pull out implications from discussion
7. Check against notes to see if anything is missing

2.3 Actors Mapping

In our research, we strategically chose to employ Actors Mapping as a key methodology, recognizing its profound utility in dissecting and understanding the complex system surrounding

our research question. Actors Mapping, a method rooted in systems thinking, allows for the identification and analysis of various stakeholders or 'actors' within a system, elucidating their roles, influences, and interrelationships. This approach is particularly advantageous in our study as it facilitates a comprehensive understanding of the dynamic interactions and power structures that shape the landscape of our research topic. By mapping out these actors, we gained invaluable insights into how they contribute to, and are affected by, the system, enabling a more nuanced and holistic analysis. This method not only aids in revealing the multifaceted nature of the system but also ensures that our investigation is grounded in a realistic context, enhancing the relevance and applicability of our findings. Through Actors Mapping, we aim to uncover underlying patterns and connections that might otherwise remain obscured, thereby enriching our understanding of the complex ecosystem at play in our research question.

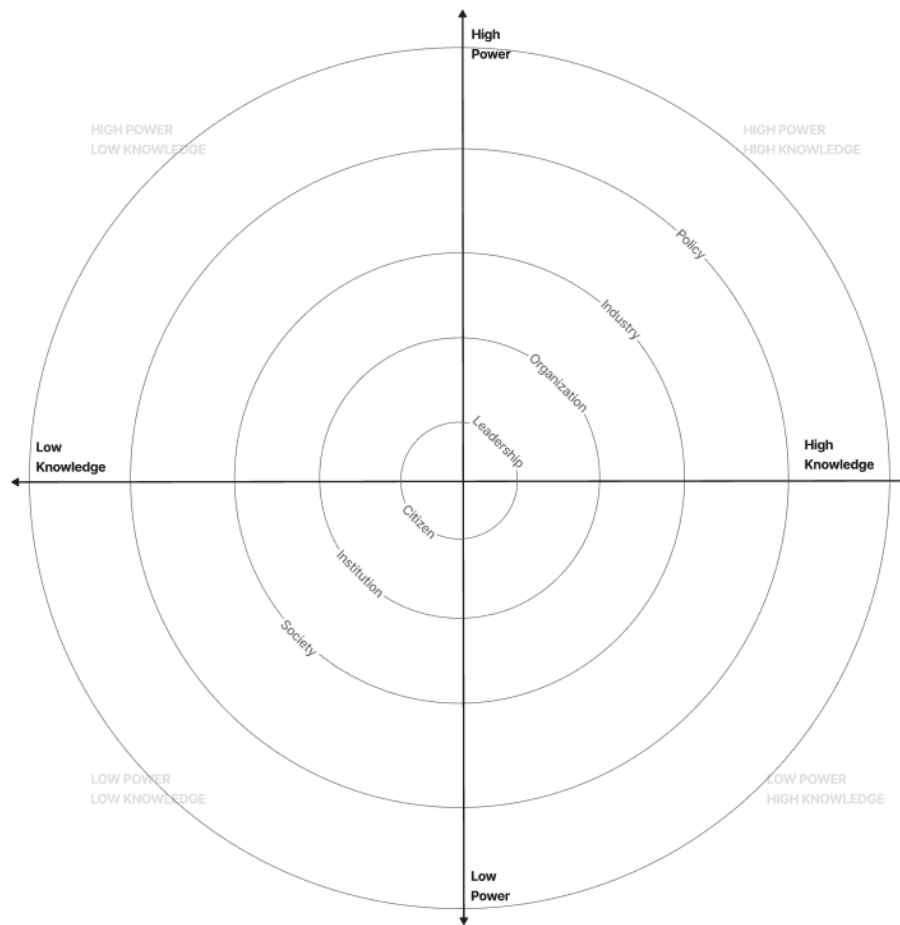
There are various Actors Map models, but we specifically used the structure from *Design Journeys Through Complex Systems* (Jones & Van Ael, 2022), which recommends a Power & Knowledge axis, with the following layers starting from the center outwards into the greater surrounding system:

First Attempt Actors Map Layer Approach:



Map Layer	Description
Centre	Persons, family, friends
Microsystem	Local Community
Mesosystem	Workplaces, School, Religious centers
Exosystem	Companies, Institutions, Organizations
Macrosystem	Culture, Government, Nationality
Biosystem	Bioregions, Watersheds, Ecotones

We initially plotted our actors across this map through brainstorming and insights from our literature review and signal scanning. This challenged our assumptions and started to directionalize our approach by showing relationships and incongruencies. After review with our academic advisor, Peter Jones, we decided to refine the actors map using a new layering system (see below) and with greater detail of sub-actors. This resulted in a simpler map that showed clearer relationships, clusters, and implications.



Refined Actors Map Layer Approach:

Map Layer	Mirrored Map Layer
Citizen	Leadership
Institution	Organization
Society	Industry
Ecosystem	Policy

2.4 Industry Informants Interviews

As a primary and growing method in our research, we chose to conduct discussions with industry informants and specialists on our topic. This approach was selected for its ability to provide in-depth, nuanced insights that are often unattainable through other research methods. Engaging directly with specialists allowed us to tap into a wealth of experiential knowledge and perspectives, offering a rich view of the topic at hand. These discussions are particularly valuable in exploring complex and evolving fields, where firsthand experiences and expert opinions can illuminate trends, challenges, and opportunities that might not be evident in quantitative data or literature. The actors mapping exercise and the trend and driver clustering and analysis served as the foundation for our industry informants interview questions. Research participants were members from various stakeholder groups that were recognized notable experts in their field, who had written about or spoken publicly about the topics we were researching. They included notable academics, AI researchers and entrepreneurs, legal experts, corporate governance advisors, policy advisors, and risk management authorities.

We interviewed six participants, from various stakeholder groups, who were public experts in their field. We selected participants based on their expertise and their identification with a stakeholder group. During the interview we asked broad open-ended questions to gather insights to help us answer our research question regarding the nature of artificial intelligence, leadership and governance within complex organizations, as well as speculative questions regarding possible futures. The following were the base questions used in the discussions:

Open Ended Guiding Discussion Questions
<ol style="list-style-type: none"> 1. What do you think the ROLE of a CEO is? How should a CEO be defined? 2. Do you believe that Artificial Intelligence (AI) is capable of replacing the role of a CEO in our current institutions? Why or why not? 3. What factors do you think will impact whether or not this is possible? <ol style="list-style-type: none"> a. Are there certain factors that make an organization more prone or susceptible to this? E.g. Types of organizations, Industry, Companies, Business Models, Products 4. Are there types of theories or models that can help us understand or perceive whether or not it is possible? <ol style="list-style-type: none"> a. Lenses, model, theories, schools of thought, legal frameworks 5. What do you believe are some implications if this becomes true? Or not true? 6. What are some benefits or opportunities you see AI creating for CEOs? 7. What are some risks or challenges you see AI creating for CEOs?

Open Ended Guiding Discussion Questions

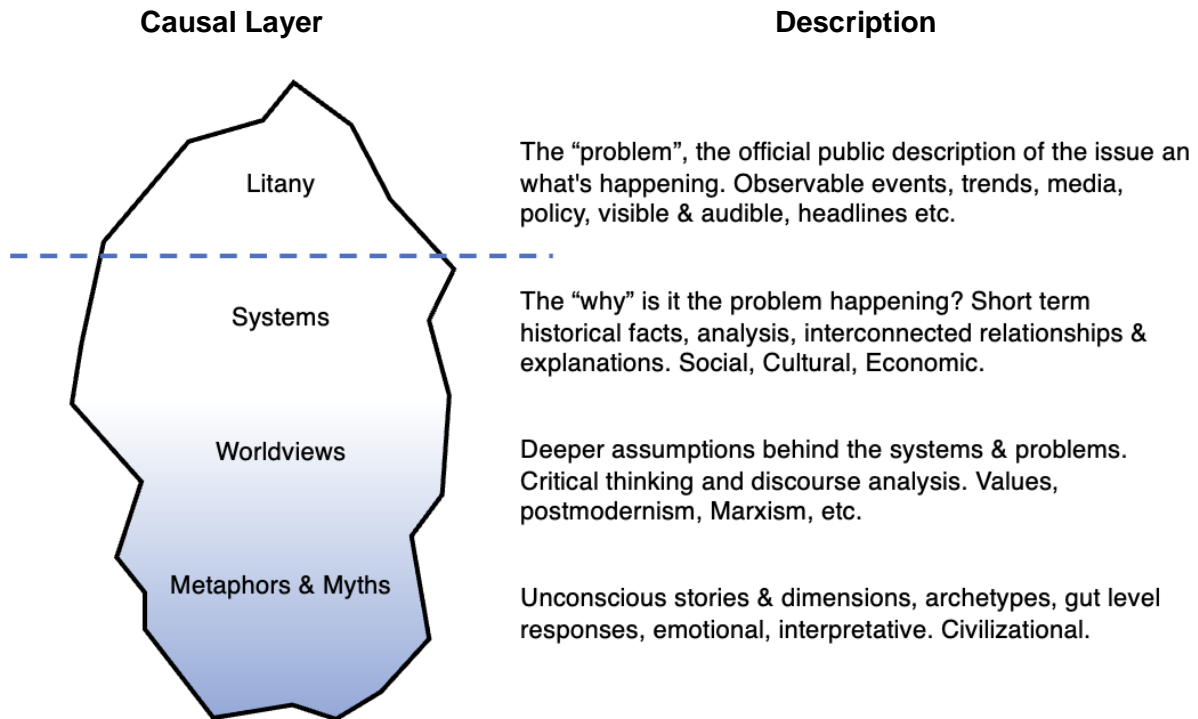
8. When do you think this becomes a problem or not? What timeline do you foresee this coming? How will it play out?
9. Do you see any Trends or Drivers in your space as it relates to our research question? What direction are they going?
10. What might be the best case scenario of an AI CEO? Worst Case?

We used the insights gathered from the interviews to validate our findings from the sensemaking exercises. The trends and drivers identification, and the process elucidated discussion regarding possible implications and underlying forces that may play out in future scenarios.

2.5 Causal Layered Analysis

In our research, we strategically employed Causal Layered Analysis (CLA), a method pioneered by renowned futurist Sohail Inayatullah, to add depth and dimension to our findings. CLA is not just a research method; it's a comprehensive approach that delves into the multiple layers of understanding that underlie any given issue. This method is particularly effective in dissecting complex problems, as it goes beyond surface-level observations to explore underlying structures, worldviews, and metaphors that shape how a phenomenon is perceived and experienced. By adopting CLA, we aimed to uncover not just the immediate causes of the phenomena under study but also the deeper, often hidden, social, cultural, and psychological dimensions. Inayatullah's approach encourages a multidimensional analysis, moving from the litany of observable data and trends to systemic structures and perspectives, then to worldviews or paradigms, and finally to myth and metaphor. This layered exploration is invaluable in providing a more holistic and profound understanding of our research topic, allowing us to identify and challenge the often unexamined beliefs and narratives that shape the field of study. Through CLA, we sought to not only enrich our research findings but also contribute to a more transformative and forward-thinking discourse in our area of inquiry.

These layers are often displayed using an iceberg diagram, which emphasizes that only the litany layer is the only layer visible, please see diagram below:



Causal Layered Analysis iceberg, Adapted from Inayatullah (2019)

The litany layer is described as superficial and visible elements of the problem, or the official description of reality. It can be gleaned from data points, events, trends, media headlines, and observations. The systemic causal layer describes the deeper systemic drivers, such as technological enablers, socio-political and economic factors. The deeper worldview layer speaks to culture and values that inform systemic causation. The myth and metaphor layers relate to the underlying stories and narratives that are underneath the other layers. CLA seeks to create new futures by creating new narratives and stories that support worldviews and systemic enablers, as well as new measurements that ensure the stories are grounded in empirical reality (Inayatullah, 2019).

We used the foresight technique CLA to identify and understand how AI may impact leadership within complex organizations at each of the different layers. And to understand how various stakeholders, that we identified in our systems mapping exercise, might hold different or contrasting perspectives, worldviews, and underpinning myths. Through this creative and generative process we sought to create new coherent futures by posing two foundational questions. As part of the generative process we asked probing questions to our industry

informants to better understand the internal systemic causes, worldviews and metaphors that underlie the perspectives of the various stakeholder groups.

Two key questions used in generating the CLA:

Question	Intention & Connection
What does AI mean to the stakeholders groups?	Exploring the deeper meanings behind the meaning of AI to various stakeholders within the system. E.g How might CEO's perceive AI vs an employee or competitor? Using the CLA as a vehicle to dissect the depth of the answer
What does a CEO mean to the stakeholder groups?	Exploring the deeper meanings behind the meaning of CEO's to various stakeholders within the system. E.g How might CEO's perceive themselves vs an employee or the public media? Using the CLA as a vehicle to dissect the depth of the answer.

2.6 Dator's Four Archetypes of the Future

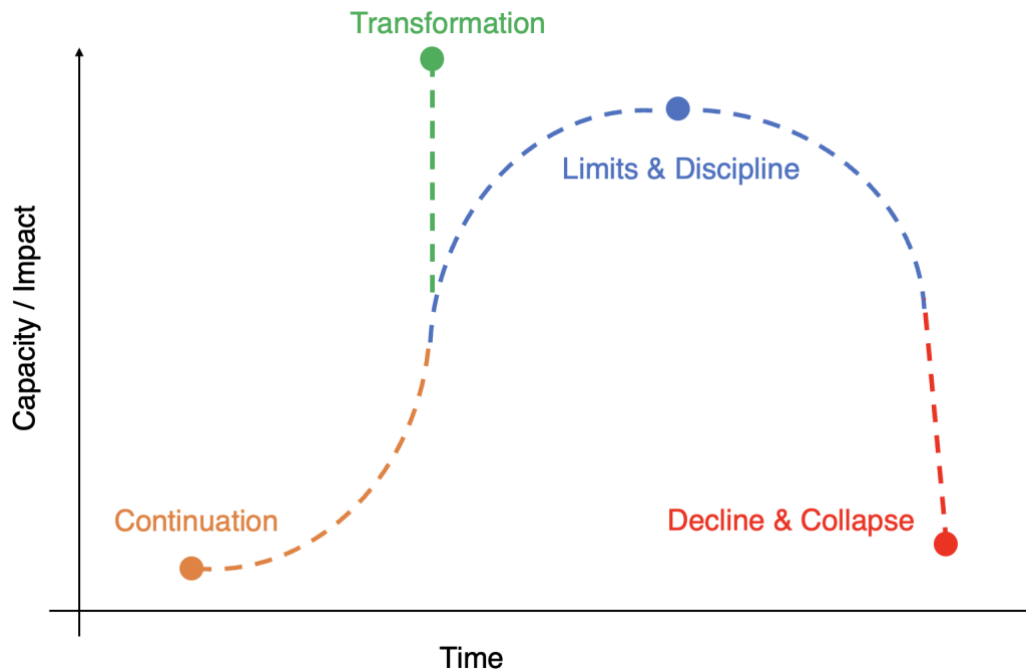
In our research, we adopted Dator's Four Images of the Future, a methodology developed by renowned futurist Jim Dator, as a pivotal tool to enrich our exploration and understanding of future scenarios. This method stands out for its comprehensive framework that encapsulates four archetypal futures: "Continued Growth," "Collapse," "Discipline," and "Transformation." The rationale behind selecting Dator's framework lies in its ability to provide a structured yet flexible approach to envisioning a range of possible futures. By employing these four images, we could systematically examine and challenge our assumptions about the future, encouraging a more nuanced and multidimensional perspective. This approach is particularly effective in deepening our research findings as it pushes beyond conventional forecasting, inviting us to consider not just probable futures, but also possible, preferable, and preventable ones. Dator's method allows us to explore a diverse spectrum of future scenarios, each grounded in different underlying values and worldviews, thus offering a richer, more diverse understanding of what the future might hold in relation to our research topic. By embracing this methodology, our study not only gains in depth and breadth but also aligns with a forward-thinking approach to research, one that is essential in navigating and making sense of the complexities of the future.

The Dator's 4 Generic Futures framework presents four archetypal futures. That of 'Growth', which is a category where the system and ways of being we live inside today continue to develop along their current trajectory. The 'Collapse' future is one where our current trajectory comes to a sudden halt. And that many of our systems and ways of being fall apart. The 'Discipline' category details new forms of restraint and control which are imposed on the present order to prevent collapse. And lastly, the 'Transformation' category envisions entirely new systems and ways of being that transcend the present order.

First, we identify driving forces of change affecting the future. As detailed above, this was done using signal scanning, industry informants interviews, and the PESTLE analysis. Second, we gave a value to each driving force to determine whether it was increasing or decreasing. We took into account all the driving forces which we identified, even if their behavior was counterintuitive in some of the archetypal futures, in order to stretch our imaginations and think in counterintuitive ways. The identification of driving forces was supported by research gathered from previous steps.

Third, then interpreted the behavior of the driving forces with reference to the four predetermined archetypal narratives. Using deductive reasoning, we tried to determine how the driving forces would behave together in this narrative. The four archetypal futures are: Continued Growth, Collapse, Discipline, and Transformation. We were mindful that the scenario archetypes are generic and not necessarily negative or positive, and consistently challenged our assumptions of each driving force throughout the process. Fourth, based on the interpretation we wrote scenario narratives. The narratives were not completely produced by our imagination. Rather, each narrative was supported by references gathered in the previous steps.

Dator's Four Future Archetypes Model for Generic Growth Phases in Human Systems



Redrawn & adopted from: (Dator, 2009)

Description of Dator's Four Future Archetypes:

1. **Continuation:** This future envisions a trajectory where existing trends and patterns continue without significant disruption.
2. **Collapse:** This future explores scenarios where current systems, structures, or trends break down or collapse.
3. **Discipline:** In this future, authorities or dominant forces take control to maintain order and stability.
4. **Transformation:** This future envisions a radical transformation or paradigm shift in the existing systems and structures.

2.7 Scenario Narratives

We chose to employ scenario narratives as a key methodology, recognizing its profound capacity to enrich and deepen our research findings. This approach, rooted in the art of storytelling and strategic foresight, involves constructing detailed and plausible narratives about the future based on a range of variables and uncertainties that could impact our area of study. The decision to use Scenario Narratives was driven by their unique ability to explore a variety of potential futures in a structured yet imaginative way. This method is particularly advantageous for its flexibility and effectiveness in handling the inherent uncertainties and complexities of our research topic. By creating and analyzing these diverse scenarios, we can examine different possible outcomes, understand the driving forces and critical uncertainties, and anticipate challenges and opportunities that lie ahead. This approach not only enhances our ability to think critically and creatively about the future but also provides a robust framework for decision-making and strategy development.

Through Scenario Narratives, we aim to move beyond linear predictions, embracing a more holistic and dynamic exploration of the future, thereby adding a rich, multi-dimensional layer to our research findings. We experimented using ChatGPT in the development of the scenario narratives, working as collaborative partners in an iterative process until we arrived at coherent narratives that added textual dimension to the future worlds. Each individual scenario narrative is an alternative description of how the future may unfold, outlining a different plausible future state of a system.

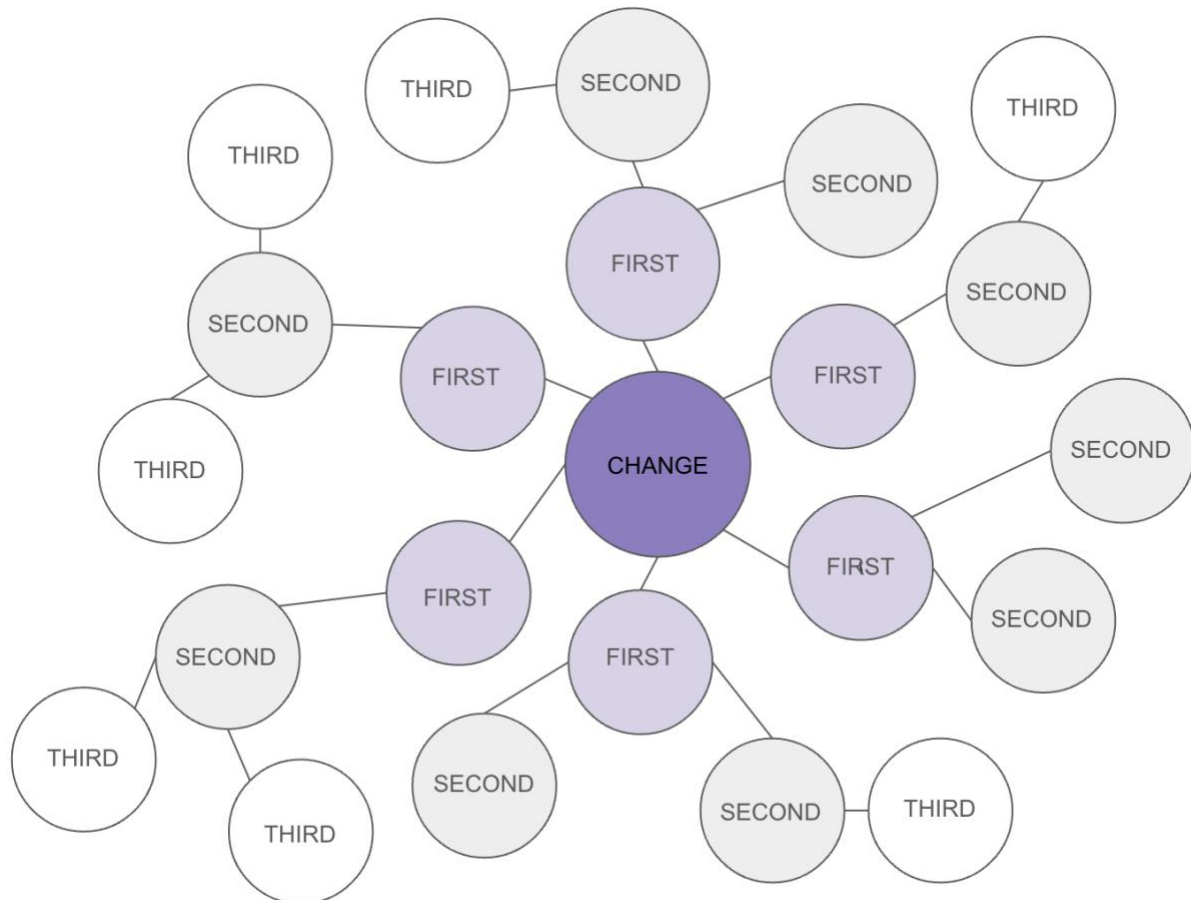
2.8 Implications Wheel

The Implications Wheel is a forward-thinking foresight tool, designed to systematically explore and map out the potential consequences of a specific change or decision. We chose to use this method to explore the ripple effects that might occur for different stakeholder groups that would stem from a central change of AI driven decision making and leadership. The Implications Wheel was used as part of a structured brainstorming exercise that would assist us foresee a wide range of possible cascading impacts. This method was particularly valuable in thoroughly examining not just the immediate effects, but also the second, and third order consequences. By using this method, we aimed to understand the intricate web of outcomes

that could arise for each stakeholder group and identify possible courses of action that would inform our guideposts. It helped us to identify opportunities, and formulate transformation strategies to help navigate the potential based on the specific needs and strengths of each stakeholder group.

Change is at the Centre of the Implications Wheel. (ex: Adoption and use of AI in management decision making in large and complex organizations)

1. First Order of Implications
2. Second Order of Implications
3. Third Order of Implications
4. Fourth Order of Implications... so forth...



2.9 Wind Tunnelling

In concluding our research methodology, we chose to employ wind tunneling, a sophisticated foresight method, to rigorously test and refine our findings. Wind tunneling, a process analogous to its engineering namesake, involves subjecting our research scenarios and hypotheses to various 'winds' of change—different future conditions and variables—to assess their robustness and adaptability. This method was selected as the capstone of our research process for its effectiveness in evaluating how well our conclusions withstand potential future shifts in the socio-economic, technological, and political landscapes. By exposing our findings to a spectrum of future possibilities, **wind tunneling enables us to identify weaknesses, explore contingencies, and strengthen our conclusions.** This approach is particularly valuable as it moves beyond static analysis, embracing the dynamic and often unpredictable nature of real-world scenarios. It ensures that our research is not only relevant under current conditions but also remains applicable and resilient in the face of future uncertainties. Employing wind tunneling as the final step in our methodology underscores our commitment to producing research that is not only comprehensive in its current analysis but also forward-looking and adaptable to the ever-evolving contexts in which it may be applied.

Chapter 3 : Analysis

3.1 Initial Exploration and Discovery

In the initial phase of our research process, we commence with a comprehensive exploration of the subject matter, incorporating insights from a literature review to establish a foundational understanding. Utilizing divergent thinking, we purposefully cast a wide net to capture diverse perspectives and identify potential avenues of inquiry. This stage serves as the genesis of our research, providing the backdrop for subsequent in-depth analyses. Through horizon scanning for signals and actors mapping, we extend our exploration beyond the existing body of knowledge, enriching the foundational insights with emerging trends and key stakeholders within the research landscape.

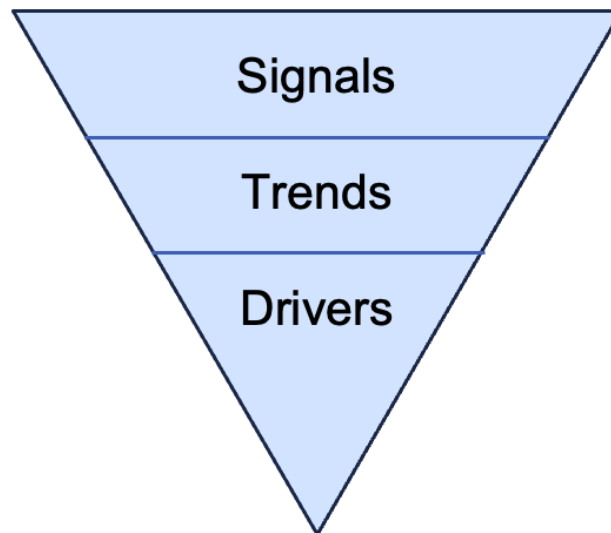
3.1.2 Scanning the Horizon

We framed our Horizon scan to a particular area that was relevant to our research question. We wanted to cast a large net in our research that went beyond more traditional research methodologies. The search for weak signals was broad and we sought to look beyond typical sources, scouring various news articles, research and policy papers, tech publications, as well as real life conversations. At first we did not know what we're looking for and often felt overwhelmed with the sheer volume of information available and the rapid pace of technological change.

We sought to identify signals that could potentially be the trigger for major events in the future. By focusing on low probability developments beyond traditional concerns, we were able to look beyond the expected future and understand interdependencies. In this way we were able to look at the issue from multiple perspectives and glean insights into how these developments could interact and scale. We built upon the initial scan by layering other research methods, such as trend analysis, informants, scenario development and causal layered analysis. Signal

scanning and a robust literature review served as the foundation to ground our foresight research. We used the following definitions to define key terms in our research:

- **Signals** are early signs of change, which have the potential to grow in scale and impact
- **Trends** are a general pattern or direction evident from signals and past events that increase or decrease in strength and frequency
- **Drivers** are significant disruptive forces that underlie trends



We then captured all of the finds in a google spreadsheet, and began categorizing them along a PESTLE analysis framework, making it so that it was easier to find relationships and trends at a later point in our research. Overall we found about 40 signals that gave us a base understanding of the temperature or litany of the subject happening in the world at this time.

One of the difficulties of this approach was the fast moving nature of the topic. During some weeks of our gathering, it felt like the topic was rapidly shifting and developing, with new innovations and headlines coming out often. The idea of the “overton window” was a concept that motivated the next methods to continue forward regardless of the growing anxiety felt during the research.

Tag Analysis of Signals using Pestle Framework

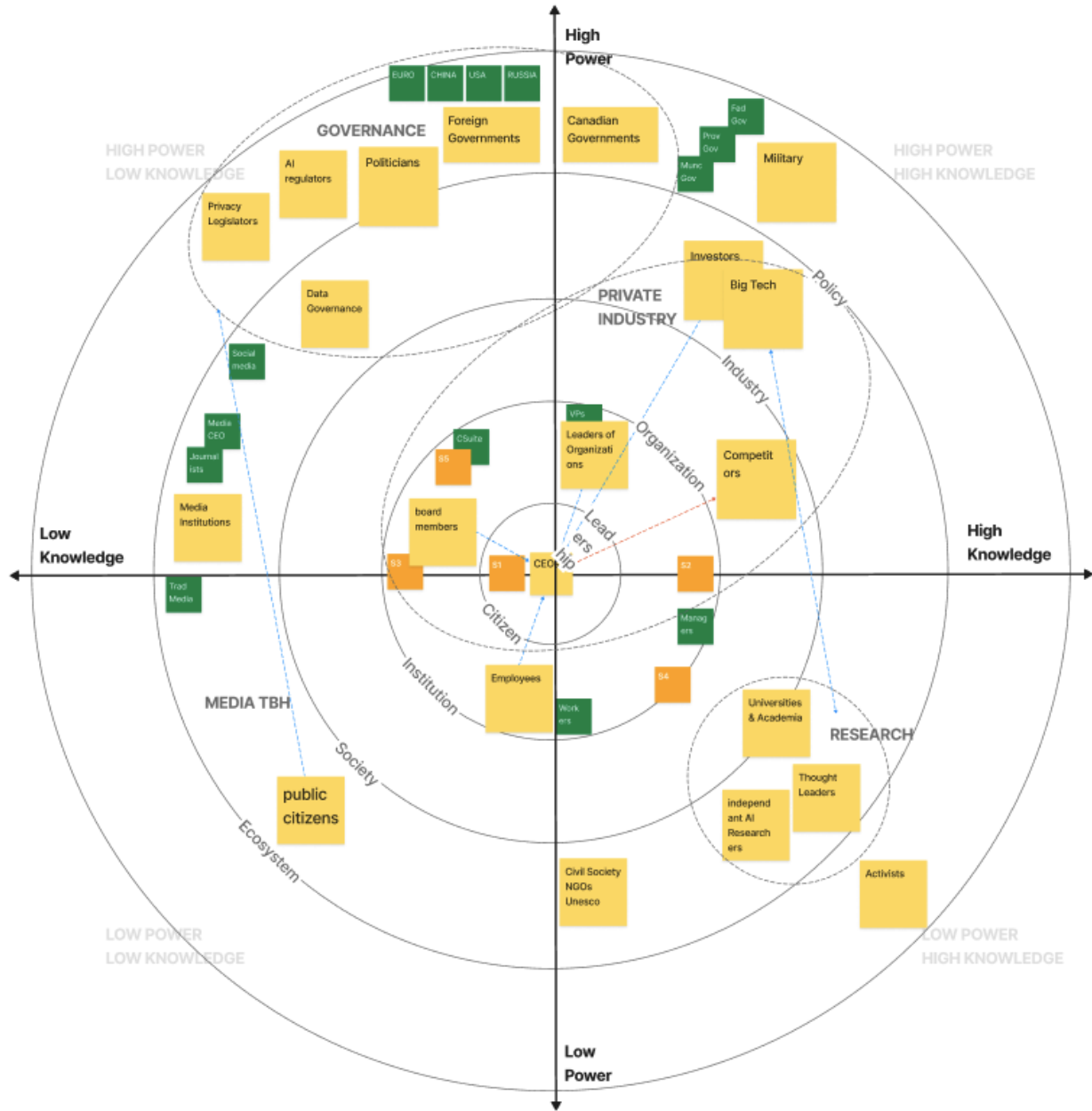
# of Tags using PESTLE on Signals found						
Total	P Political	E Economic	S Social	T Technological	L Legal	E Environmental
37	8	13	7	11	10	1

Most signals were related to economic and technological impacts and stories for AI. We believe this was because of the specific timing of our horizon scans and literature reviews being during the early to mid months of 2023, where AI was making significant announcements in the field with public facing tools becoming accessible (e.g. ChatGPT). The litany at the time was really about how this could impact economies, make money, or disrupt technologies, without the legal or environmental elements having any focus (until later).

3.1.3 Stakeholder Analysis

Actor-Stakeholder Mapping

As a way to make sense of the research collected along the way, and to visualize and contextualize the different people, organizations, and entities within our question, we used an Actors Map diagram to visualize this. We drafted our Actors Map referencing the tool description in *Design Journeys Through Complex Systems* (Jones & Van Ael, 2022). We started with a brainstorm of the different participants, using the CEO or “leader” the center of the map and extrapolating from there.



The CEO was placed in the center as the ‘target’ of our topic, and was used as a starting point for the system of interest. From there, other actors were identified in the various layers, notably the employees, who have lower power and knowledge, and competitive organizations who have higher knowledge and power. Groupings of stakeholder groups began to form, such as those in Research, those in Private Industry, and those involved in Governance. While those

were helpful at finding relationships and context, it felt more accurate to use more detailed groups.

1) AI Researchers, Innovators, and Academics; 2) Labour and Employees; 3) CEO's, Leadership, and Boards; 4) Public Citizens and Media; 5) Government and Regulators.

Stakeholder Group	Description	Power / Knowledge Matrix Location
AI Researchers, Innovators, & Academics	This group comprises individuals and institutions dedicated to advancing AI technology. They focus on developing new AI methodologies, conducting research to understand AI's capabilities and limitations, and exploring innovative applications for AI across various fields.	High Knowledge Low Power
Labour & Employees	These are the workers and professionals who are directly impacted by AI integration in the workplace. Their focus is on how AI affects their job security, skill requirements, working conditions, and overall role within the organization.	Low Knowledge Low Power
CEO's, Leadership & Boards	This group includes the top-level management and decision-makers within organizations. They are responsible for strategizing the adoption and implementation of AI, ensuring it aligns with the organization's goals, and managing its impact on the company's performance and structure.	Mid Knowledge High Power
Public Citizens & Media	Public citizens represent the general populace who may be affected by AI, either directly or indirectly, while the media plays a role in shaping public perception and discourse about AI. Their concerns often revolve around the ethical implications, societal impact, and transparency of AI applications.	Low Knowledge Low Power
Government & Regulators	This group is responsible for creating and enforcing policies and regulations that govern the development and use of AI. Their focus is on ensuring that AI is used safely, ethically, and in a manner that protects public interests and promotes innovation.	Low Knowledge High Power

Actors Knowledge Power Analysis

The Knowledge Power Matrix analysis illuminates system actors enacting or affected by change within this system. It also lets us know about tensions between different parts groups, such as

the dichotomy of AI researchers and Governments, displaying maybe unique relationships that can be formed for each other's benefits. It also drove and informed which industry actors could have unique perspectives on the topic for further information.

As a small conclusion to our initial exploration and discovery, the literature review provided contextual definitions and base understandings that allow the research to lend upon frameworks already studied and utilized. The Horizon Scanning gives a temperature check of the current litany and conversations about the concepts involved in this research question, and the Actors Map defines who might be important to listen to and watch for where change will happen in the system. We dive a bit deeper on these topics in the next section.

3.2 Sensemaking and Diving Deeper

Expanding on the preliminary exploration, this stage marks a shift towards sensemaking and a more profound exploration of the identified themes and patterns, incorporating trend and driver identification. Convergent thinking takes center stage as we meticulously distill and synthesize the information garnered in the initial phase, employing clustering and analysis techniques. This phase is distinguished by a systematic examination of the interconnections between various elements, with a particular focus on industry informant interviews to enrich our understanding. The aim is to unravel the underlying complexities of the research question through a holistic approach that integrates causal layered analysis, thereby providing depth and context to the emerging insights.

3.2.1 Converging Trends and Forces of Change

Through the various sensemaking exercises we identified ten trends and that if amplified would have a significant impact. This was an intuitive process that takes an explicitly non-scientific approach, utilizing abductive reasoning. Through the iterative clustering exercises we were able to spot patterns & trends happening in the industry of the topic.

Trend	Description
Inequality	The potential of AI to exacerbate social and economic inequalities, including access to technology, digital divides, and the concentration of AI benefits among certain groups.
Requisite Variety & Systems Transformation	The adaptation of systems and organizations to the complexity of AI, requiring diverse approaches and transformations in structure and strategy to effectively integrate AI.
AI Regulation & Ethics	The development and implementation of regulations and ethical guidelines for AI, focusing on issues like privacy, bias, transparency, and accountability.
Erosion of Trust	Growing public skepticism and mistrust towards AI, fueled by concerns over privacy, security, decision-making transparency, and the reliability of AI systems.

Drivers of Change

Our drivers of change emerged as part of our trend analysis, as well as the insights we gleaned from our previous research steps, the actors map and horizon scanning. Using similar sensemaking exercises, in which we used paper stickies to manually cluster signals and relationships between signals we arrived at drivers of change that were significant disruptive forces underlying our trends. Using abductive reasoning and creativity we began to think more deeply about the underlying forces that may be contributing to the emergent trends. Through this intuitive process and by focussing on the layer beneath the trends we identified four distinct drivers, which we then labeled as: Unfettered Capitalism, High Stakes Collaboration, AI Consciousness, and Data Wars. We describe these drivers of change in the table below:

Drivers	Description
Unchecked Capitalism	Extreme competitiveness spurred by profit motive and understanding that whoever is
High Stakes Collaboration	Dialogue and working together based on shared interests and values and vision
AI Consciousness	The ability of artificial intelligence to make decisions that are superior to that of human leaders, and that we might not know how those decisions are arrived at.
Data Wars	Whoever has the data has the power, the next evolution of knowledge management and

Trend and Driver Identification Rationale

By identifying trends and drivers we were able to better understand the interwoven and complex cause-and-effect relationships that could help us answer ‘How might AI replace, augment, and Impact leadership leadership in complex organizations in the future?’ Our interdisciplinary approach served us by allowing us to look at the issue from multiple perspectives. Trends are only useful when looked at through multiple lenses. “We must think of trends as signposts that can illuminate the conditions we will likely encounter at some point in the future” (Webb, 2018). The intention of this creative and intuitive process was to form the groundwork for our scenario development exercises.

3.2.2 Informant Interviews and Illustrative Insights

Findings from the Industry informant interviews are displayed in the form of key points and themes for each question, and insights will be drawn to validate findings from the trends and driver identification and clustering exercises, as they relate to the primary research question. In particular, implications and the role of underlying forces may play in the future will be further explored using illustrative quotes organized by theme.

Industry Informant Interview Questions	Key Points and Themes	Summary
What do you think the ROLE of a CEO is? How should a CEO be defined?	Reducing uncertainty, enabling operations, providing vision, interaction with boards, accountability, public face, trust, leadership, strategic decision-making	The CEO's role is primarily about reducing uncertainty, providing clear vision and direction, enabling operations, and maintaining accountability and trust as the public face and strategic leader of the organization.
Do you believe that Artificial Intelligence (AI) is capable of replacing the role of a CEO in our current institutions? Why or why not?	Misunderstanding of AI capabilities, AI as a trend, advanced analytics, lack of legal liability, trust issues, HCI design, fear of misapplication	There is skepticism about AI replacing CEOs due to misunderstandings about AI's capabilities, trust issues, lack of legal frameworks, and fears of misapplication, despite the trending nature of AI discussions.
What factors do you think will impact whether or not this is	Complexity, hierarchy, legal aspects, innovation potential,	Factors like organizational complexity, hierarchy, legal aspects, innovation

Industry Informant Interview Questions	Key Points and Themes	Summary
possible? Are there certain factors that make an organization more prone or susceptible to this?	data quality, scale, specialization	potential, data quality and history, and the scale and specialization of the organization influence the feasibility of AI replacing CEOs.
Are there types of theories or models that can help us understand or perceive whether or not it is possible?	Requisite Variety, HCI, organizational behavior, human leadership, ethical AI frameworks, agency	Theories and models like Requisite Variety, HCI, organizational behavior, human leadership, and ethical AI frameworks provide insights into the feasibility and implications of AI in leadership roles.
What do you believe are some implications if this becomes true? Or not true?	Harm, risk adoption speed, over-automation, devaluation of human roles, bias from past data	Potential implications include various types of harm, risks related to rapid adoption, over-automation, devaluation of human roles, and decision-making biases from reliance on past data.
What are some benefits or opportunities you see AI creating for CEOs?	Efficiency, scalability, competition, clarity, odds improvement, time and cost savings, enhanced information	AI offers CEOs benefits like improved efficiency, scalability, competitive edge, clarity in decision-making, time and cost savings, and access to enhanced information.
What are some risks or challenges you see AI creating for CEOs?	Harm, ethical dilemmas, geopolitical risks, legal challenges, disruption, resource allocation disparities, governance issues	AI poses risks and challenges such as ethical dilemmas, geopolitical and legal risks, potential for disruption, disparities in resource allocation, and governance complexities.
When do you think this becomes a problem or not? What timeline do you foresee this coming? How will it play out?	Imminent issues, sooner for data-mature companies, implementation barriers, initial adoption dip, cultural shifts	The challenges of AI in leadership are imminent, especially for data-mature companies, with barriers in implementation, initial dips in adoption, and significant cultural shifts.
Do you see any Trends or Drivers in your space as it relates to our research question? What direction are they going?	Capitalism's success metrics, data maturity, industry pace, partnerships, legal frameworks, trust, misinformation, open source	Key trends include evolving metrics of success in capitalism, data maturity levels, varying industry paces, the importance of partnerships, evolving legal frameworks, trust issues, misinformation challenges, and open-source movements.
What might be the best case scenario of an AI CEO? Worst Case?	Quick adoption risks, competitive dynamics, IP protection, compliance, data access issues, scaled disruption risks	The best-case scenario involves competitive advantages and compliance efficiency, while the worst case involves risks from rapid adoption, IP challenges, data siloing, and scaled disruptions.

Illustrative Quotes and Themes

1) Role of a CEO, Leadership and Strategic Decision Making

The exploration of leadership and strategic decision-making reveals the intricate facets of a CEO's role, where responsibilities encompass reducing uncertainty, providing clarity, setting visions, engaging with stakeholders, managing operations, and harmonizing strategic decisions with established processes. The depth of these insights comes to light through the quote: "leadership is about clarity, and reducing uncertainty."

"leadership is about clarity, and reducing uncertainty."

Another perspective delves into the CEO's pivotal function in facilitating clarity within decision-making processes. This involves empowering employees with a lucid understanding of goals and determining the approach—whether through rules, intention, or strategy. A culture fostering such clarity becomes integral for the CEO.

An insightful historical perspective emerged in the context of how we might use computers in the future. To paraphrase our informant, the machine is not merely a tool but a "Partner" in the acts of creation and calculation. Strategic employment involves leveraging the machine to generate possibilities and variations through computational design, sparking distinctly human conversations about design and understanding.

Highlighting the essence of a CEO's role, another quote emphasizes, "A CEO is the leader of an organization, sets visions, executes on strategy to deliver on those visions. Inspires subordinates to achieve that vision." Concerns about AI replacing these functions surface, as the human inclination to be led by a machine is questioned.

Transitioning to the theme of decision-making, the discussion contemplates the augmentation of leaders' abilities by AI. "I do see AI being able to augment and enhance the ability of leaders to make and optimize decisions." The importance of consistency in data points and the subsequent metrics for evaluating decision quality are scrutinized: "I think that's important to understand there are two factors. First, are the data points consistent? Second, if

you say it's very consistent, how do you determine that? What are your metrics to determine that it was a good decision?"

2) AI Applications, Evolution of Data Analytics, Knowledge Management

The landscape of AI applications and the evolution of data analytics reveal intriguing insights into the dynamics of decision-making, particularly in industries with a strong reliance on historical decisions. The significance of this dependency is highlighted in the statement: "There are some tasks and industries where they are very dependent on past decisions. So, for example, highly regulated industries like law." The prospect of leveraging accumulated data to unearth optimal solutions becomes apparent, introducing the idea that a comprehensive dataset can be a key asset: "If we were able to accumulate the data on what the kind of decisions have been made in the past, I think it might be possible to find optimal solutions." Moreover, the utility of such data is contingent on its consistency: "If we manage to gather all the data, and there is a certain level of consistency in the data, it will be very useful."

In the realm of AI customization, the concept of bespoke AI takes center stage, emphasizing the tailored nature of AI solutions to suit specific needs. This bespoke approach is underlined by the recognition that corporations have a vested interest in customization: "Because there's much more vested interest by the individual corporation to tailor it, to make it specific, to really specialize."

The conversation extended to the varied impact of AI across industries, emphasizing its rapid and substantial benefits in sectors abundant with data. The strategic deployment of AI is explored: "Where you see AI being hugely beneficial and rolled out quickly is in the industries where there's a lot of data." Specific domains such as fraud detection, credit decisioning, and targeted marketing emerge as arenas where AI finds swift and impactful application: "Things such as fraud detection, credit decisioning, marketing in the sense of, you know, what is Mike's next transaction going to be? That's the part where AI is being used."

"Where you see AI being hugely beneficial and rolled out quickly is in the industries where there's a lot of data."

The evolution of data analytics is positioned as a natural progression rather than a radical upheaval, with AI identified as the next phase in this evolutionary trajectory, to paraphrase our informants, AI enhanced data is the next phase, it's an evolution, not revolution." The seamless integration of AI into the existing landscape of decision-making and strategic direction is underscored: "Decision making, the setting, strategic direction, um, Data analytics has always been a big component of that anyway, in recent decades." The characterization of AI as a mechanism denotes a continuity of technological advancement, portraying it more as an evolution than a revolution: "AI is just a mechanism, it's just kind of that next phase to it. So that is more of an evolution rather than a revolution."

The transformative potential of generative AI is explored, particularly in its role as a catalyst for the adoption of parallel technologies. The impact is illustrated through the lens of accelerated developments in robotics: "The launch of generative AI is also going to accelerate the adoption of other technologies." This interconnected evolution highlights the symbiotic relationship between generative AI and the broader technological landscape, indicating a trajectory of mutual influence and advancement.

3) Implications for Work and Labour

The landscape of work and labor stands on the precipice of transformation, as industry insights underscore the profound impact of AI on the workforce composition. The stark acknowledgment is made that, "at the end of the day, this is a potential threat to the labor markets," prompting a fundamental question about our commitment to investing in people and upskilling, even in scenarios where immediate profitability is uncertain.

"We want humans to be enhanced by machines and augmented by machines, but not replaced."

Within the realm of speculative inquiry, the emergence of Chat GPT is identified as a catalyst intensifying the demand for AI, particularly with a focus on generative capabilities. The urgency of addressing this transformative wave is captured in the sentiment: "We want humans to be enhanced by machines and augmented by machines, but not replaced." This underscores the delicate balance sought between technological augmentation and the preservation of human roles.

The discourse delves into the domain of generative AI's demand, particularly within low code and no code environments, and the potential repercussions for employment. The imperative of workforce adaptability emerges: "How do we enable our people, our workers to use this technology to make their jobs easier, maybe reducing some jobs in the process?" The inherent tension between technological advancement and job preservation becomes palpable.

A critical challenge surfaces in the discussion, centering on the impact on knowledge workers, technology professionals, and legal experts. The focus sharpens on how technology trends are actively shaping various industries: "Addressing the impact on knowledge workers, technology workers, and legal professionals, with a focus on how technology trends are shaping various industries." This underscores the multifaceted nature of the challenge, encompassing diverse sectors and professional domains in the wake of evolving technological landscapes.

4) Challenges of Trust, Accountability and Governance

Navigating the landscape of AI replacement reveals two formidable challenges, one entrenched in the intricacies of liability and the other tethered to the ethereal realm of trust. The complex dance of legal constructs surfaces, posing the poignant question: "Legal liability, you cannot sue a computer program, it's a legal construct, where does the liability go?" This legal quagmire is exemplified in the context of autonomous vehicles, where technology and liability exist on disparate trajectories, hindered by societal constructs and presenting a significant barrier.

"You cannot sue a computer program, it's a legal construct, where does the liability go?"

Trust, a cornerstone in the AI discourse, emerges as a formidable challenge, poised for transformation within the fabric of society. The evolutionary trajectory of trust prompts contemplation: "Trust element will change with society. It certainly will be a generational change that will come through." The juxtaposition of AI-driven decision-making with human-led endeavors raises probing questions about the valuation of companies in the market: "Would RBC have the same share price premium if they were run by a computer?"

In the intricate web of AI deployment, effective coordination stands as a linchpin for success. The multifaceted challenge of orchestrating diverse stakeholders converges on legal considerations and the imperative of dialogue. The call for comprehensive ethical frameworks echoes, with examples like EDGE ("It stands for explainability, um, data governance, uh, governance, governance, uh, in the model government sense and ethics") and the AI Fairness 360 toolkit from Microsoft, emphasizing explainability, data governance, governance, and ethics as focal points.

The regulatory landscape, however, lags behind technological strides, demanding an informed and collaborative approach to public policy. The call for global collaborative rule sets resounds, transcending geopolitical boundaries: "We do need some kind of collaborative rule set that we can start to abide by..." This resonates as a collective endeavor to balance the potential of AI with the imperative of responsible development and usage, steering clear of knee-jerk reactions and policy pitfalls.

5) Societal and Ethical Considerations

In the realm of societal and ethical considerations surrounding AI, the narrative unfolds with a nuanced exploration of risks and rewards. The prospect of embracing the technological revolution emerges as a catalyst for societal enrichment and increased discretionary pay: "If we embrace risk and embrace the new technological revolution, you know, there is a chance that we could have a richer society, more discretionary pay." This optimism extends to the transformative potential, inviting a leapfrog effect rather than incremental progress: "This gives an opportunity to leapfrog rather than just keep on going."

Within this context, the law takes center stage, underlining its pivotal role in shaping the narrative: "The number one, number one is the, the, um, law side of things." The importance of coordinated efforts across diverse sectors surfaces as a recurring theme, emphasizing the necessity of dialogue and collaboration: "It's the dialogue we're bringing it all together, yeah. And the coordination to work from across different sectors."

"The best case is some version of a human-machine teaming, co-piloting scenario that's kind of bounded by a global set of rules and

frameworks. The worst case is the over-reliance on technology, AI in particular, without the benefit of a global rule set... decisions that have massive societal implications."

A spectrum of possibilities unfolds, from an ideal scenario of human-machine teaming with global frameworks to a cautionary tale of over-reliance on AI absent a rule set. The discourse navigates through the delicate terrain of decisions with profound societal implications: "The best case is some version of a human-machine teaming, co-piloting scenario that's kind of bounded by a global set of rules and frameworks. The worst case is the over-reliance on technology, AI in particular, without the benefit of a global rule set... decisions that have massive societal implications."

Geopolitics, a dynamic interplay between state and private organizations, emerges as a pivotal factor in shaping the trajectory of AI development: "Geopolitics... It really comes down to that. It's not just industry now; it's like, it's such a blend between state and private organizations."

The ethical dimensions of AI leadership come into focus, probing the intersection of trust and technology. The evolving role of AI in political leadership sparks contemplation on the delicate balance between human-centric design, compliance, risk management, and envisioning diverse futures: "Getting that combination of human-centric design, compliance, risk management, and what the various futures are going to look like, that's the secret sauce."

As AI transitions from a niche topic to mainstream adoption, the reflections extend to its societal impacts, envisioning a landscape where it permeates every facet of society: "Now it's like, it's purely mainstream, it's all over society now."

3.2.3 Navigating Causal Layered Analysis

The following charts represent our analysis of the issue using the CLA framework as a tool for meaning excavation:

Question 1: What does Artificial Intelligence mean to different stakeholder groups?

Layer	AI Researchers, Innovators, & Academics	Labour & Employees	CEOs, Leadership, & Boards	Public Citizens	Government & Regulators	<i>Transformation Scenario</i>
Litany	Mixed understanding ; researchers have deeper insight, some see AI as a threat to their value.	Concern about replacement; ongoing labor unrest; adaptation seen as an opportunity.	Uncertainty about AI's role; seen as the next wave of innovation.	Upcoming disruption and uncertainty; erosion of trust in institutions.	AI regulations and control; sense of urgency; potential to solve major social problems.	AI as a solution to world problems; significant improvement potential.
Systems	Habitual opinions without deep understanding ; AI could replace their work.	Wage stagnation, cost of living increases; automation as a market force.	Opportunities for efficiency; challenges in trust and truth; impact on decision-making.	Erosion of trust; technological ubiquity; democratic and geopolitical challenges.	International arms race; data privacy concerns; democratization of data.	Natural flow of improvements; data democratization .
Worldview	Fear of replacement and loss of control; insecurity about the future.	Fear of losing power and control; insecurity; resistance and conflict.	Embracing improvements and innovations; capitalism and survival themes.	Western values vs. eastern; freedom, privacy, democracy, sustainability.	Regulation of AI; technocracy vs. humanism; environmental concerns.	Solidarity and stronger together; part of general technological improvement.
Myth & Metaphor	AI as magic or a 'black box'; seen as a wizard or Skynet.	AI as a monster or a useful pet; a tool for optimization.	AI as a less annoying partner; a co-pilot or wise AI.	AI as a rising sea of capabilities; a tamed or useful entity.	AI as a wise entity or a self-generating improvement system.	AI generates improvements autonomously; significant departure from current reality.

Question 2: What does a CEO mean to different stakeholder groups?

Layer	AI Researchers, Innovators, & Academics	Labour & Employees	CEOs, Leadership, & Boards	Public Citizens	Government & Regulators	<i>Transformation Scenario</i>
Litany	Partnerships and experiments; academics see CEOs through a Marxist lens, while innovators have a practical understanding.	Poor understanding, seen as wealth extractors.	Job creators, innovators, stimulating the economy.	Simplistic governance views, CEOs not well represented in media.	Corruption, collusion, but also job creation and innovation.	CEOs as partners in progress, stimulating economy and innovation.
Systems	CEOs as part of the problem and solution; operationalizing innovations.	Growing inequality, late-stage capitalism, regulatory capture.	Shareholder prioritization, market-driven employment.	CEOs under fire from shareholders, boards; financial success equated with intelligence.	Accountable to stakeholders, long-term thinking, sustainability.	Analysis of performance, transparency in decision-making.
Worldview	Wealth extractors and generators; varying views on CEO types.	Rich get richer, poor get poorer; capitalism critique.	Profit prioritization, risk-taking, moral dimension of government.	Jobs as a positive outcome, economic theories like trickle-down economics.	Holistic perspectives, ethical considerations in business.	Ethical landscape in business, considering multi-variable factors.
Myth & Metaphor	Risk-takers, viewed variably as 'Fat Cat' CEOs or necessary leaders.	CEOs as thieves or problem makers; command and control.	Visionaries, hard workers with integrity.	Market-driven forces, supply and demand, superstar CEOs.	Responsible leadership, accountability, trustworthy CEOs.	Superhuman CEOs, replacing human deficiencies with ethics and KPIs.

Chapter 4 : Findings

4.1 World Building and Finding Meaning

In the third stage, we initiate a voyage into world-building, constructing a conceptual landscape shaped by the insights gleaned in the earlier phases. This pivotal stage integrates Dator's four archetypes of the Future, incorporating scenarios that represent distinct visions of possible futures. Here, we engage in a synthesis of diverse perspectives, intertwining them into cohesive narratives that unveil the nuanced meaning embedded within the research context. The combination of divergent and convergent thinking converges to craft a holistic understanding of the subject matter, weaving together scenario narratives that enrich the exploration of potential trajectories.

4.1.1 Future Worlds Informed by the Four Archetypes

Scenario Development

In order to develop the scenarios for the Dator's 4 archetypes we created a chart that captures elements of the future that we thought may be impacted, such as data access, governance, societal acceptance of AI, technical diffusion and leadership, etc. Through the process of **incasting** we used the trends and drivers identified in previous steps to fill in the chart. We took the ten trends we identified from our clustering exercises and combined them in various ways to help create four scenarios that followed the Dator's archetypal model.

Trends	Drivers	4 World Archetypes
Ai-Free Legal AI Coordination/ Partnership / Collaboration Bespoke Ai Competition Labour Disruption Inequality Requisite Variety/ Systems Transformation Ai Regulation/Ethics Erosion Of Trust	Late Stage / Unfettered Capitalism High Stakes Collaboration AI Consciousness Data Wars	<p>Continuation: This future envisions a trajectory where existing trends and patterns continue without significant disruption.</p> <p>Collapse: This future explores scenarios where current systems, structures, or trends break down or collapse.</p> <p>Discipline: In this future, authorities or dominant forces take control to maintain order and stability.</p> <p>Transformation: This future envisions a radical transformation or paradigm shift in the existing systems and structures.</p>

We began by speculating on how the different trends and drivers may interact and combine with each other given the parameters of each archetype. In order to do this we used world building prompts to envision what that world might look like given a prompting question. For example, trends such as competition and inequality played an important role in shaping the ‘Continued Growth’ scenario, which envisions a future of the continuation of the current trajectory. Moreover, we found that the ‘Transformation’ archetypal future was the most difficult to envision because it represents a radical departure from the status quo, and required significant imaginative and creativity to expose. Another example is by asking “What does the corporate governance structure look like?” and then using the past knowledge and research to speculate on that future.

Speculative Futures using Foresight Prompts & Dator’s 4 Archetypes Framework

Prompts	World 1	World 2	World 3	World 4
Dator’s Future Archetype	Continued Growth	Decline and Collapse	Limits and Discipline	Transformation
Description	A future of continuation and enhancement of the current trajectory of current problems	A future where the system reaches its limits and collapses	A future of restraint and control imposed on the present order	A radical departure from the present due to an event or phenomenon
Trends & Drivers	<p>Continued labor disruption, more strikes, layoffs</p> <p>Winners and losers</p> <p>Economic inequality</p> <p>Technocracy, power concentration to big tech</p> <p>Slow moving regulations</p> <p>AI exploitation, bad actors crime</p> <p>AI lobbying</p> <p>Corporate control, lack of privacy</p>	<p>Runaway AI</p> <p>AI misuse, crime,</p> <p>AI free trends</p> <p>Environmental impacts, electricity supply</p> <p>Global supply chain disruptions, limitations on access.</p> <p>Poor quality data, hallucinations and unintended consequences</p> <p>Geopolitical tensions</p>	<p>Government regulation</p> <p>Solving for liability & accountability, building trust</p> <p>Litigation, clarity in copyright laws and restrictions</p> <p>Preparing for attenuation whiplash</p> <p>AI exploitation for “good”</p> <p>Controlled AI research and experimentation</p> <p>AI government surveillance, used for policy decisions</p>	<p>OpenSource AI</p> <p>High collaboration</p>
A world where...	Business as usual. A few ‘platform’ businesses control access to data infrastructure, setting rules for everyone else including those needing access to data to train algorithms or automate service.	Data deteriorates, giving rise to hallucinations and unintended consequences, further exacerbating the societal decline.	Deliberate effort to establish governance measures that stabilize the disruptive potential of AI adoption.	AI is integral to connecting, monitoring, evaluating and auditing organizations and individuals allowing them to achieve business goals aligned with stakeholder value, which is

<u>Prompts</u>	World 1	World 2	World 3	World 4
				increasingly tied to positive environmental, health and social impacts.
Corporate governance structure	CEO's continue to get paid \$\$\$ Boards gain efficiency and scale, investors win, workers lose on our current path Insourcing of Data. Large monopolies win, smaller players that don't have access to high quality data fall behind because they don't have the AI competitive advantage	AI CEO's & auto decisioning on ethical matters Wealth concentration to haves vs have nots Workers are replaced	Controls over AI use. Tight regulations and risk assessment frameworks in attempt established trust & transparency Corps must play by the rules High government control	Wise AI, but keeping CEOs, Stakeholder capitalism, strength of organized labour movement A wise AI augmented CEO, control
Future of leadership	Tech deity, tech demi-gods, power begets power	AI leaders controlled by those in power, smart faster than everyone else	Leadership is about control, and being able to keep the ship from sinking	Leadership is about clarity, the reduction of uncertainty.
Geopolitical landscape	Tech cold-war, data wars	Annexation of Taiwan, semiconductor industry collapse Supply chain disruptions	protectionism	Collaboration, cooperation, new global governance institutions.
Global economic environment		Nationalistic, protectionist	Nationalistic, protectionist	Integrated systems
Technological diffusion	Bifurcation, concentrated centralisation of have and have nots Insourcing	Technology polarization, those who are overly technocratic and those who are opposed.	Gatekeeping of what is appropriate use of the technology, what is beneficial.	Winners and protecting losers through risk management

<u>Prompts</u>	World 1	World 2	World 3	World 4
Societal acceptance of AI	Multi-sectoral strikes and labour unrest	AI polarization, those with it and those who hate it	Bifurcated world with AI- free zones, and control societies	Mainstream adoption
Regulation of AI	Slow AI lobbying AI whiplash Ai lobbying	Biased regulations and Ai lobbying leads to erosion of trust in institutions. Slow breakdown	a system for using AI-specialized chips to verify compliance with regulations on AI development, without revealing model weights. ¹	Responsible leadership
Data access and governance	Data concentration, privatization and exploitation Myopic digitalization of everything	Data surveillance, Revolt	Data use in policy planning, financial decisions, economic policy, surveillance society	Shared societal benefits, collective governance, data trusts

¹ <https://arxiv.org/pdf/2303.11341.pdf>

4.1.2 Scenes From The Future

Scenario narratives that are useful tools in communicating complex ideas in a simple way. They can bring the various archetypal futures to life with characters and detail, allowing the reader to see and feel the future in a visceral way. Moreover, they can serve as an accessible vehicle to engage the reader in a way that does not require specialized knowledge or training, and can be an effective communication tool in socializing new ideas in a way they break through organizational resistance, as many organizations are wired to protect what is known and reward short-term results. It also bypasses capability gaps, as some of the technological capabilities describes in the narratives do not yet exist, the imaginal quality necessitates a suspension of what is currently possible, and puts forward a hypothesis of what would need to happen in order for this future to be possible, anchoring it in an aspirational future state.

Based on the interpretation of the Dator's Four Generic Futures we wrote scenario synopsis to further explore what these scenarios might look like. This creative exercise served to more fully explore contradictions and implications within each possible future. In our narratives we created context using familiar themes, by beginning with what is here in our collective understanding of AI. The basic premise is 'how might the set of driving forces behave together in this narrative?'. Based on this process we wrote scenario narratives using our imagination. However, in some instances the driving forces can be counter-intuitive, and in some of the archetypal futures, we had to stretch our imaginations and think of counterintuitive behavior. This method is deductive because we pre-impose structures, and draw from deductive inferences. In sum, the scenario archetypes are generic, and they are not exhaustive.

World 1: Continued Growth Scenario Narrative

In the future scenario of 'Continued Growth,' the trajectory of current challenges persists and amplifies, paving the way for a world marked by prolonged labor disruptions, intensified strikes, and increased layoffs. The landscape is defined by winners and losers, accentuating economic inequality on a global scale. The rise of a technocracy becomes evident, with power

consolidating in the hands of dominant tech giants, steering the course of economic and societal dynamics.

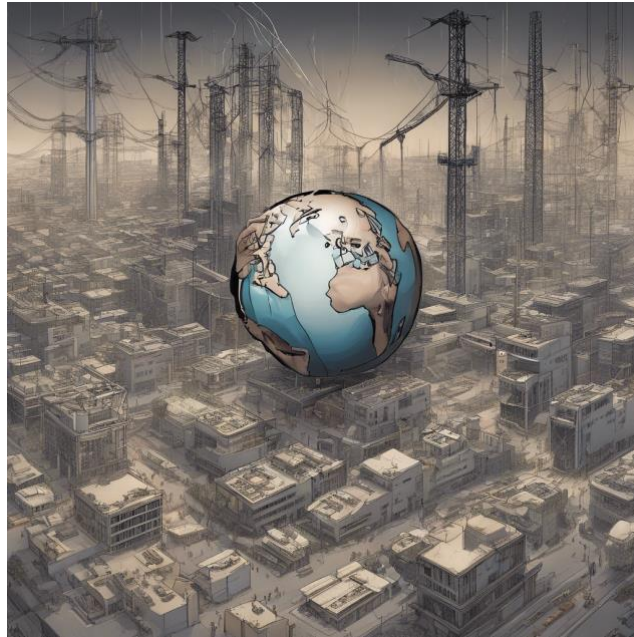


Image created using this chapter text as a prompt for an AI image generator, Midjourney.com

As regulations move at a sluggish pace, the unchecked growth of Artificial Intelligence (AI) results in its exploitation by bad actors, leading to an upsurge in AI-related crimes. Lobbying efforts by the AI industry contribute to the concentration of power and influence, particularly favoring big tech corporations. Corporate control reaches unprecedented levels, eroding privacy and establishing a few 'platform' businesses as gatekeepers of data infrastructure. These entities dictate rules, creating a business-as-usual scenario where access to data becomes a privilege controlled by a select few.

CEO compensation soars to exorbitant levels, while corporate boards gain efficiency and scale, ultimately benefiting investors but leaving workers marginalized in the prevailing labor landscape. The insourcing of data further widens the gap between large monopolies with access to high-quality data and smaller players lacking the AI competitive advantage.

In this tech-centric future, a hierarchy of tech deities and demi-gods emerges,



Image created using this chapter text as a prompt for an AI image generator, Midjourney.com

accentuating the adage that power begets power. The world witnesses a tech cold-war and data wars, underscoring the intensified struggle for control and dominance in the digital realm. Bifurcation becomes a defining feature, as centralization concentrates power among the elite, creating a stark division between the haves and have-nots. Multi-sectoral strikes and labor unrest become commonplace, signaling dissatisfaction with the myopic digitalization of every aspect of life. The world of 'Continued Growth' unfolds as a cautionary tale of unchecked technological advancement, illuminating the dire consequences of inequitable AI adoption and data concentration in the hands of a privileged few.

World 2: Decline and Collapse Scenario Narrative

In the dystopian realm of 'Decline and Collapse,' the future unfolds as a cautionary tale of systemic failure and the unrestrained impact of runaway Artificial Intelligence (AI). The envisioned world is one where the once-promising system reaches its limits and succumbs to an inevitable collapse, overshadowed by the darker consequences of unbridled technological advancement.

AI misuse and criminal activities proliferate, contributing to the unraveling of societal structures. The emergence of AI-free trends gains momentum, reflecting a collective rejection of the once-revered technology. Environmental impacts, coupled with electricity supply challenges, cast a shadow over the sustainability of the digital era. Global supply chain disruptions become a pervasive issue, limiting access to essential resources and disrupting the delicate balance of interconnected economies.

The quality of data deteriorates, giving rise to hallucinations and unintended consequences, further exacerbating the societal decline. Geopolitical tensions escalate, creating an environment fraught with uncertainty and instability. The collapse of the semiconductor industry, catalyzed by the annexation of Taiwan, becomes a pivotal event, unraveling the intricacies of the global supply chain.

In this bleak landscape, AI CEOs and auto decisioning on ethical matters further concentrate wealth among the privileged few. Workers are systematically replaced, amplifying the chasm between the haves and have-nots. AI leaders, controlled by those in power, become instruments of control, outpacing human capabilities and reinforcing the existing power structures.

The world witnesses a surge in nationalistic and protectionist ideologies, leading to technology polarization. The population becomes divided between those overly technocratic and those vehemently opposed to technological advancements. AI polarization intensifies, creating a stark divide between those embracing AI and those vehemently against it.

Biased regulations and relentless AI lobbying erode trust in institutions, contributing to a slow breakdown of societal structures. Data surveillance becomes pervasive, stifling individual freedoms and sparking a revolt against the invasive practices. The world of 'Decline and Collapse' ultimately depicts a stark warning of the perils of unchecked AI development, illustrating the catastrophic consequences that can unfold when ethical considerations and governance mechanisms fail to keep pace with technological progress.

World 3: Limits and Discipline Scenario Narrative

In the envisioned future of 'Limits and Discipline,' society evolves into a realm characterized by deliberate restraint and stringent control imposed on the prevailing order. Governments play a pivotal role in shaping this landscape through comprehensive regulation, aiming to harness the benefits of Artificial Intelligence (AI) while safeguarding against potential risks.

A primary focus lies in solving issues of liability and accountability, emphasizing the imperative of building trust in the deployment of AI technologies. Litigation becomes a tool for maintaining clarity in copyright laws and imposing restrictions on AI usage. Preparing for attenuation whiplash, the society proactively addresses potential negative consequences and seeks to mitigate their impact.

In the pursuit of AI exploitation for "good," controlled research and experimentation frameworks are established, ensuring responsible and ethical development. Government surveillance, powered by AI, is harnessed for policy decisions, maintaining a delicate balance between public safety and individual privacy.

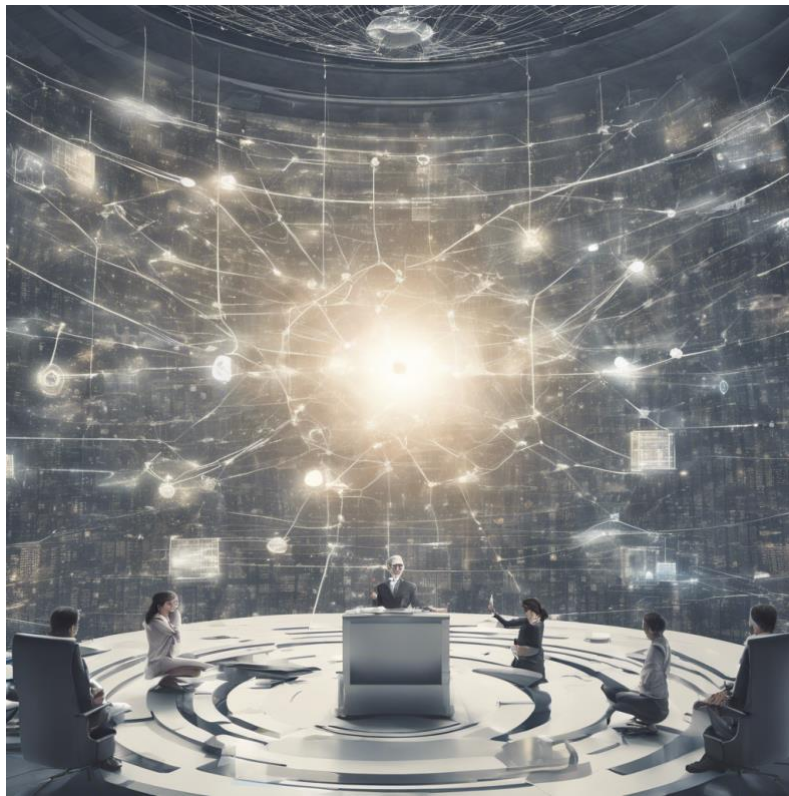


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Controls over AI use are enforced through tight regulations and risk assessment frameworks, aimed at establishing trust and transparency. Corporations are compelled to adhere to these rules, subject to high government control. Leadership is defined by the ability to exercise control and prevent potential disruptions.

es, The society takes a nationalistic and protectionist stance, gatekeeping what is deemed appropriate use of technology and delineating its potential benefits. The world becomes

bifurcated, with AI-free zones coexisting alongside controlled societies where the government oversees AI development and deployment.

Image created using this chapter text as a prompt for an AI image generator, Midjourney.com

A system is implemented using AI-specialized chips to verify compliance with regulations on AI development, without revealing model weights. Data becomes a critical asset for policy planning, financial decisions, and economic policy, shaping a surveillance society that, while fostering stability, raises questions about individual freedoms.

The 'Limits and Discipline' future world represents a deliberate effort to establish governance measures that stabilize the disruptive potential of AI adoption. While mitigating risks, these controls come at a cost, challenging the delicate balance between technological advancement, societal stability, and individual liberties.

World 4: Transformation Scenario Narrative

In the transformative future world, a radical departure from the present unfolds, driven by the advent of OpenSource AI, symbolizing a paradigm shift in the technological landscape. This era, characterized by high cross-collaboration and pollination, sees AI playing a central role in connecting, monitoring, evaluating, and auditing organizations and individuals. The aim is to align business goals with stakeholder value, emphasizing positive environmental, health, and social impacts.

Wise AI emerges as a cornerstone of this transformation, coexisting with human CEOs who are augmented by intelligent systems. Leadership, in this context, transcends traditional paradigms, focusing on clarity and the reduction of uncertainty. Stakeholder capitalism gains prominence, buoyed by the strength of an organized labor movement that champions the interests of both winners and losers through risk management.

A visionary AI-augmented CEO leads the charge, navigating the intricacies of integrated systems and fostering collaboration. The society witnesses remarkable positive changes, as AI contributes to ending world hunger, solving world peace, alleviating social problems like traffic jams, and generating balanced budgets. The pace of improvement in Large Language Models (LLMs) accelerates, heralding a departure from the current status quo and generating better versions of fundamental concepts.

In this future, Wise AI takes on roles such as co-pilot and wizard, proving to be actually superior to humans in generating improvements, solving problems, creating opportunities, and

fostering altruism. The ethical landscape undergoes a radical transformation, with a shift from individual moral codes to holistic and systems perspectives, embracing concepts like doughnut economics and environmentalism.



Image created using this chapter text as a prompt for an AI image generator, Midjourney.com

Superhuman CEOs, driven by Responsible Leadership principles, replace human deficiencies, ensuring accountability and a commitment to long-term thinking and sustainability. Business practices prioritize transparency and understanding of decisions, while CEOs are benchmarked quantitatively based on improvements and coaching to optimize businesses. The analysis of performance is rooted in comparability, and CEOs are held accountable to stakeholders, transcending personal benefit.

In this progressive landscape, an additional dimension is introduced — profit sharing for the benefit of all of humanity. Rather than profits being confined to the shareholders of AI companies, a novel approach emerges where the gains generated by AI advancements are distributed for the collective benefit of humanity. This inclusive paradigm ensures that the

positive impacts of technological progress are shared equitably, fostering a society where advancements benefit all rather than a privileged few.

4.2 The Way Forward and Innovation Strategies

In the concluding phase of our research journey, we shift our focus towards crafting a forward-looking perspective and innovative strategies, guided by the needs of the diverse actors. Leveraging the synthesized insights, we delve into implications of the various scenarios, recognizing the inherent uncertainties and multiple trajectories that lie ahead. This stage involves identifying key actors within the landscape and tailoring innovation strategies to their roles and impact. It encapsulates a fusion of creative intuition and strategic thinking, culminating in a set of recommendations and tailored strategies for effectively navigating the dynamic and evolving terrain.

4.2.1 Understanding Implications

Implications Wheels

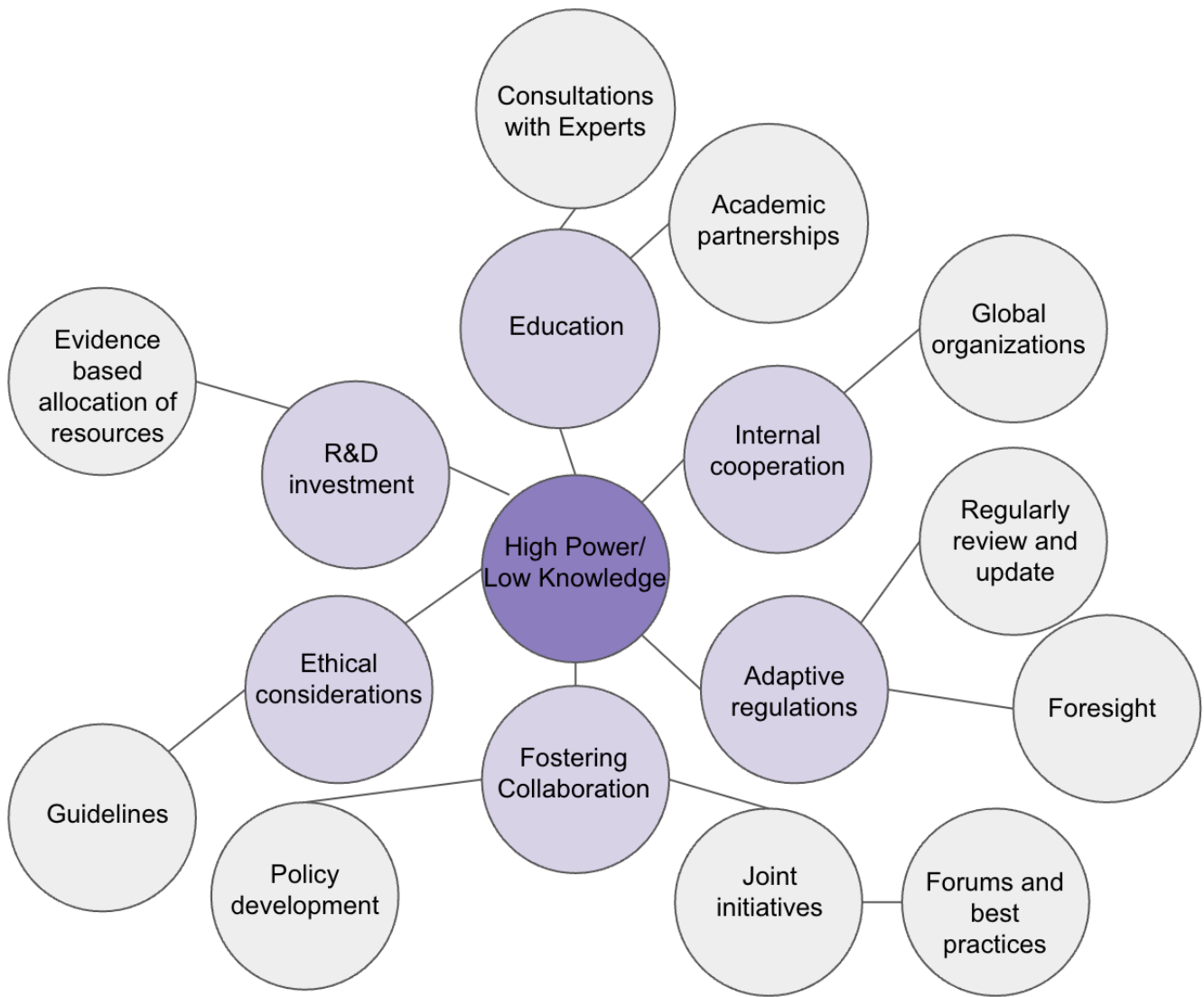
We divided our implications by stakeholder groups we identified in our actors mapping exercise, in which actors were mapped according to their relationship to power and knowledge within different levels of a system. We used the Power Knowledge matrix with a strategy approach framework to devise how the implications will manifest along an implication wheel given the strategic premises.

Stakeholder Group	Power / Knowledge Matrix Location	Proposed Strategy Approach
AI Researchers, Innovators, & Academics	High Knowledge Low Power	Collaborative Strategies
Labour & Employees	Low Knowledge Low Power	Distributed Strategies
CEO's, Leadership & Boards	Mid Knowledge High Power	Control Strategies
Public Citizens & Media	Low Knowledge Low Power	Distributed Strategies

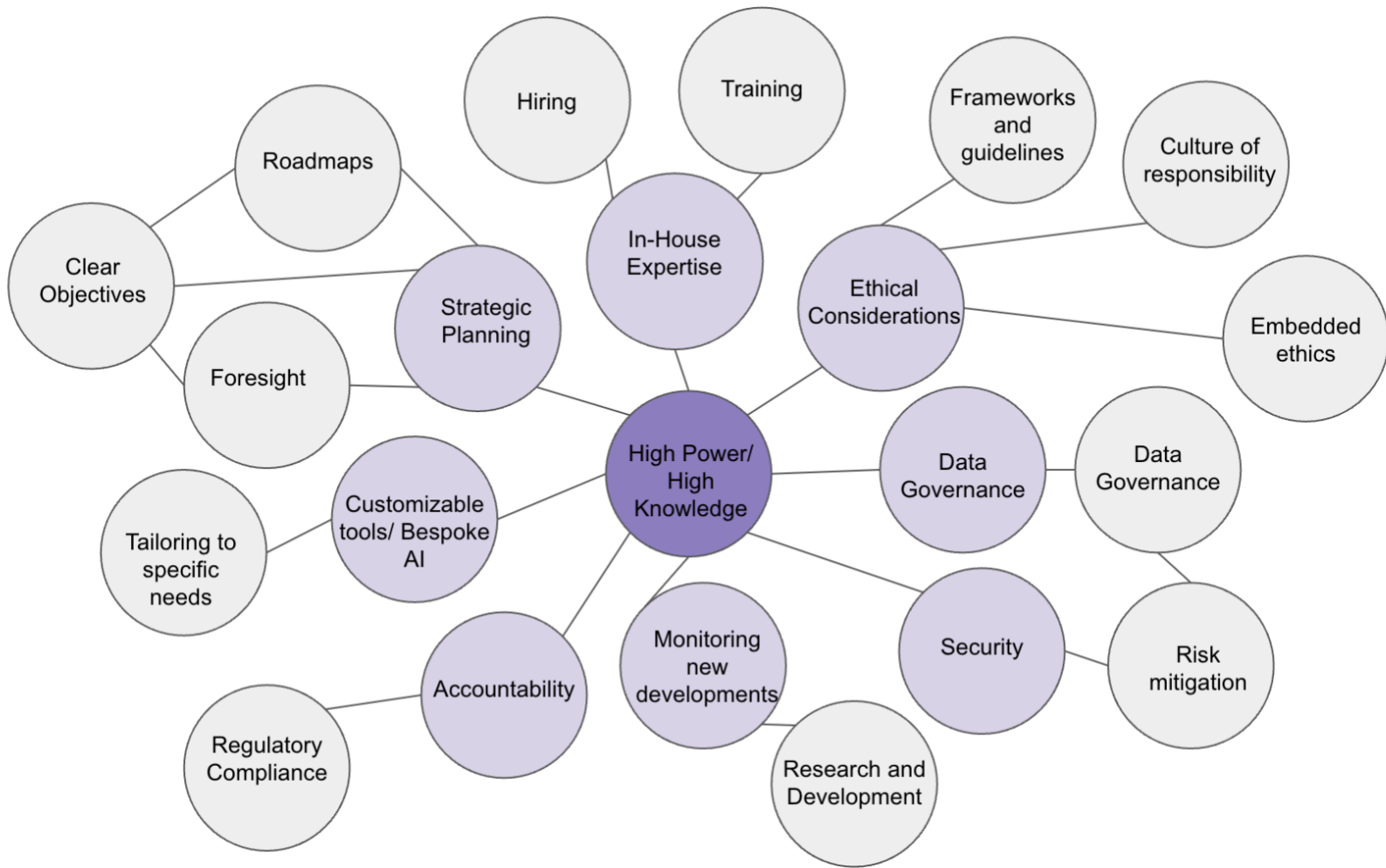
Stakeholder Group	Power / Knowledge Matrix Location	Proposed Strategy Approach
Government & Regulators	Low Knowledge High Power	Emergent Strategy

The areas of implication are based on the analysis of the four archetypal scenarios we developed in the previous section, as well as the CLA and comments from industry informants. We used implications wheels as a tool for structured brainstorming, to organize our thoughts regarding future based consequences for each stakeholder group. Using this tool we mapped out areas of implications such as policy changes, emerging trends, and strategic goals and objectives.

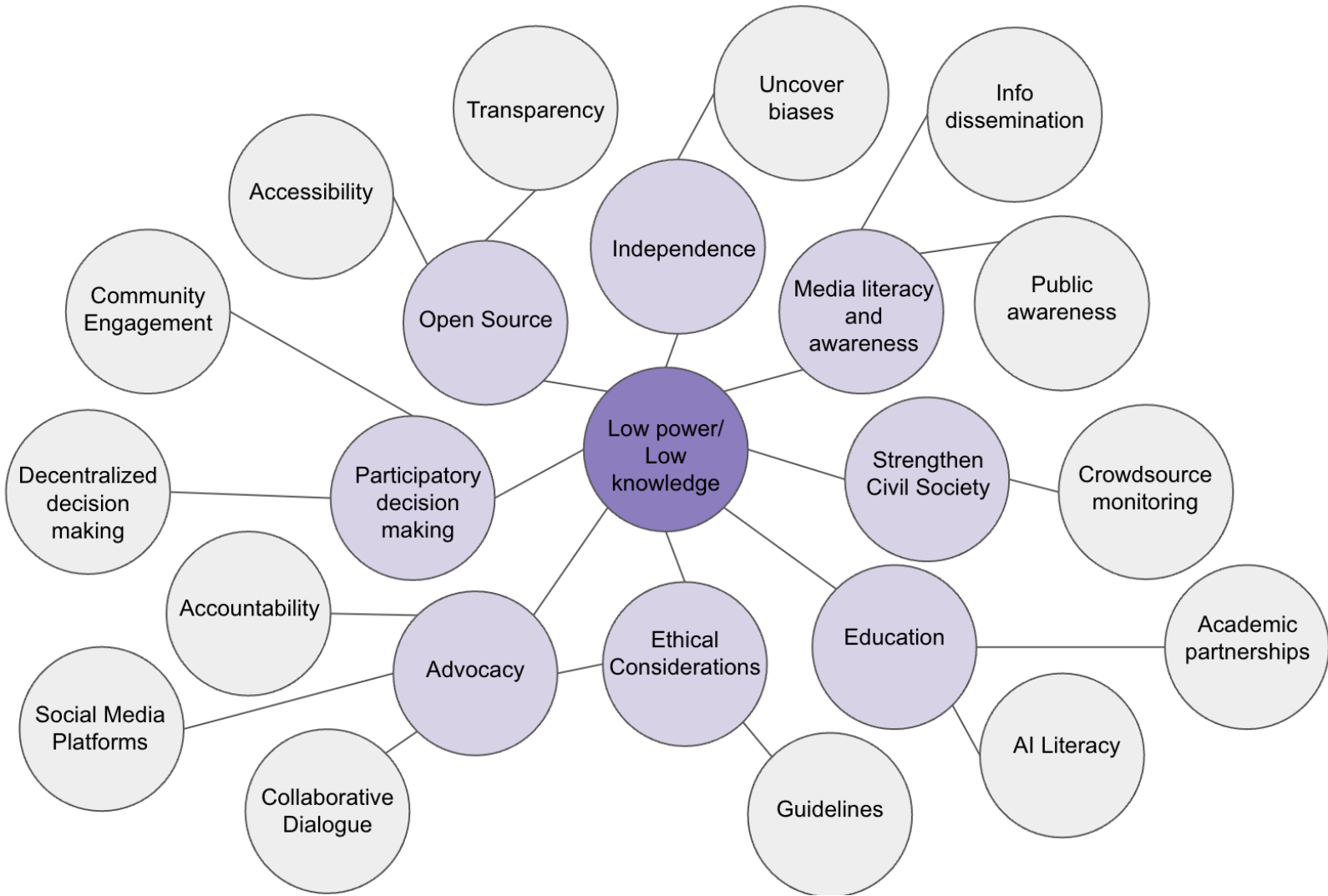
High Power, low knowledge, Governments Regulators → Emergent Strategies



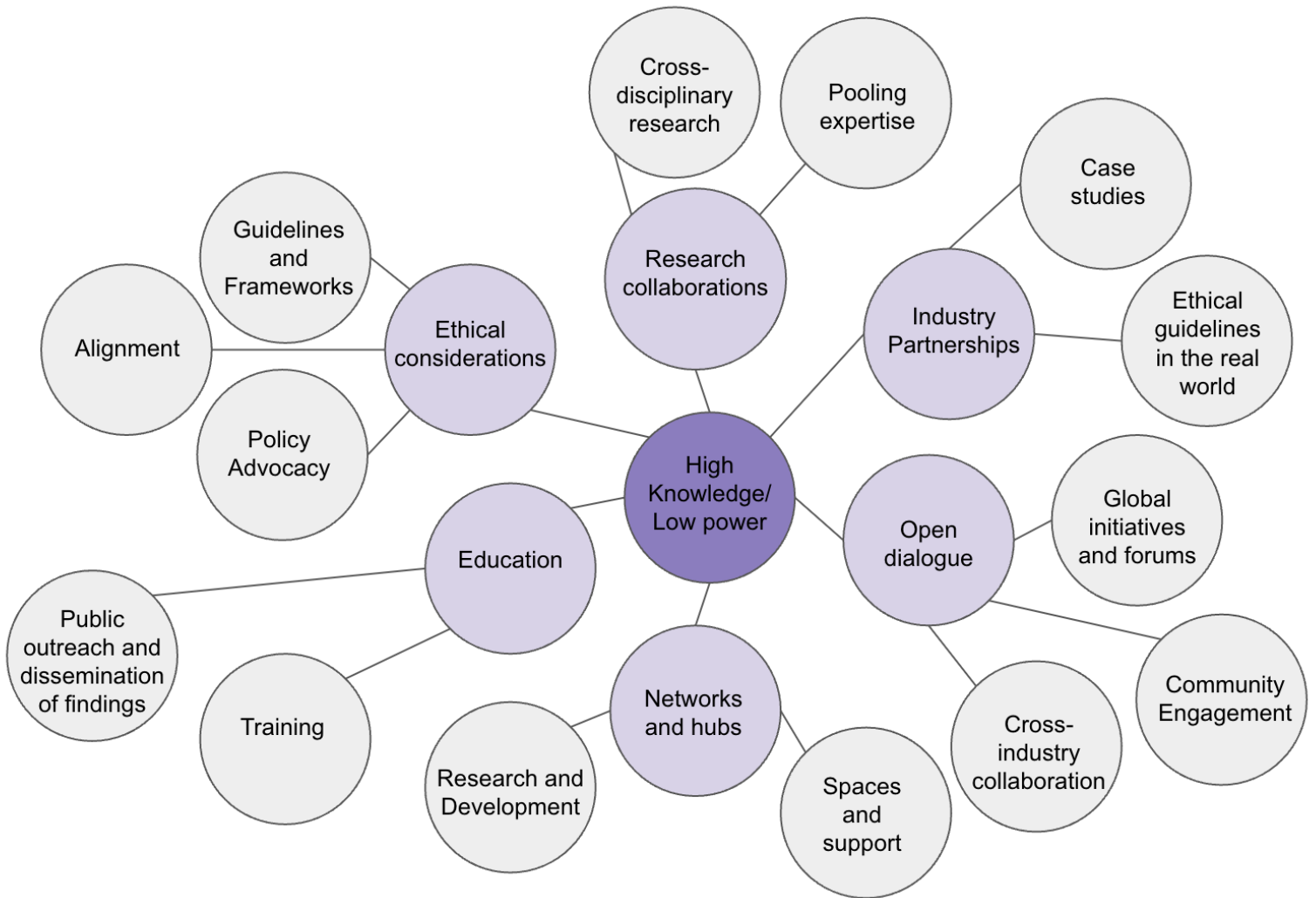
CEO's, Senior leadership and Boards → Control strategies



Media and public citizens → Distributed strategies

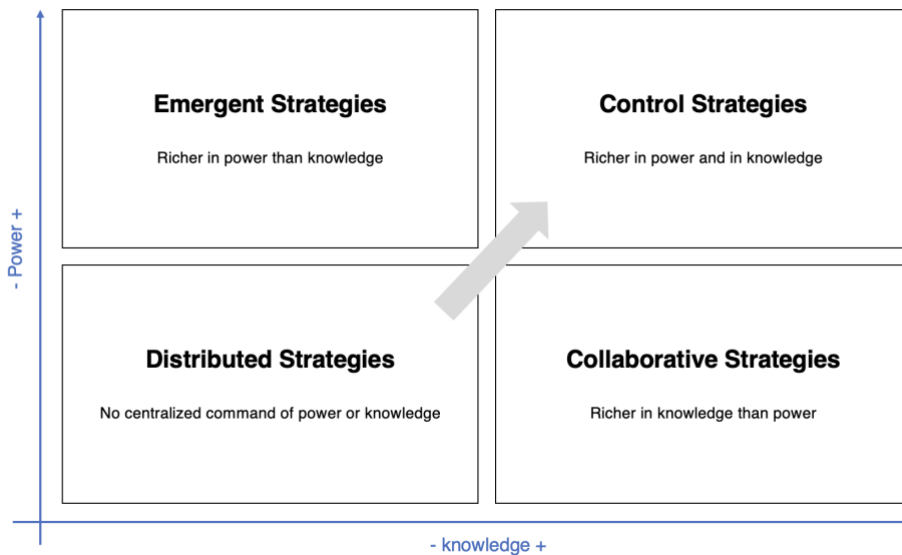


Academics, Innovators and AI Researchers → Collaborative Strategies



4.2.2 Strategic Guideposts

Based on the findings of the implications method we developed four strategies and guideposts as the wind tunneling method that may be useful in helping different stakeholder groups navigate potential implications of AI on leadership functions in complex organizations. The guideposts vary depending on the degree of power and knowledge the individual stakeholder group may have. Some of the guideposts may be counterintuitive to what is actually happening now. The figure below showcases how these strategies correspond to different actors in the system based on where they are located in the power knowledge matrix.



Emergent Strategy

For actors characterized by high power and relatively low knowledge, such as governments and regulators, emergent strategies need to emphasize the importance of a proactive and adaptable approach for navigating the complex landscape of AI's impact on leadership functions. Through education, collaboration, and strategic investments, governments and regulators can play a crucial role in shaping policies that foster responsible and effective use of AI in organizational leadership.

Guidepost	Description
Educational Initiatives	Comprehensive educational programs aimed at enhancing

Guidepost	Description
	understanding of AI technologies and their implications on leadership functions.
Collaborative Frameworks	Foster collaborative partnerships with technology companies, research institutions, and other stakeholders.
Adaptive Regulations	Recognizing the rapid evolution of AI technologies, governments and regulators can adopt a flexible and adaptive regulatory framework.
International Cooperation	International collaborations and knowledge-sharing initiatives
Ethics & Standard Development	Establishing ethical guidelines and industry standards for the responsible use of AI
Investment Research	Funding research projects and studies

Control Strategy

For actors possessing high power and extensive knowledge, such as CEOs, senior executives, and boards, control strategies highlight the proactive measures that organizations with high power and knowledge can employ to navigate the evolving landscape of AI in leadership functions. By fostering a culture of responsible AI use, aligning technology with organizational goals, and staying abreast of ethical considerations, these actors can shape a future where AI augments leadership functions effectively and ethically.

Guidepost	Description
In-House Expertise Development	Invest in cultivating in-house expertise by hiring or training professionals with a deep understanding of AI technologies.
Strategic Planning and Roadmapping	Meticulous development of strategic plans and roadmaps for integrating AI into leadership functions. Defining clear objectives, milestones, and timelines, allowing leadership to exert control over the implementation process and align it with organizational goals.
Ethical Framework Establishment	Establishing robust ethical frameworks that govern AI applications in leadership. This involves defining ethical guidelines, fostering a culture of responsible AI use, and embedding ethical considerations into organizational decision-making processes.
Data Governance and Security Measures	Control is exercised through the implementation of stringent data governance and security measures. Leadership can ensure the responsible handling of data used by AI systems, mitigating risks associated with privacy breaches and unauthorized access.
Customization of AI	Customizing bespoke AI solutions to align with the specific needs and

Guidepost	Description
Solutions	nuances of their leadership functions.
Continuous Monitoring and Evaluation	Establish control mechanisms by implementing robust monitoring and evaluation processes for AI applications. This involves regular assessments of AI performance, identifying potential biases, and ensuring that these technologies align with organizational objectives.
Regulatory Compliance	Proactively engaging with and adhering to existing and emerging AI regulations.
Board Oversight and Accountability	Enhanced oversight mechanisms, creating dedicated committees or appointing individuals responsible for AI governance.
Investment in AI Research and Development	Investing in AI research and development to stay at the forefront of technological advancements, influencing the direction of AI applications.
Employee Training and Engagement	Implement training programs to foster collaboration, and provide employees with the necessary skills and knowledge to work alongside AI technologies.

Distributed Strategy

For actors characterized by a lack of centralized command of power or knowledge, such as the media and public citizens, distributed strategies play an important role in shaping the discourse and influencing the responsible deployment of AI in leadership functions. By leveraging collective intelligence, fostering transparency, and engaging in decentralized advocacy, these actors contribute to a more informed and participatory approach to addressing the challenges and opportunities posed by AI.

Guidepost	Description
Crowdsourced Monitoring	Leveraging the collective intelligence of the public, distributed strategies involve crowdsourced monitoring of AI applications in leadership
Citizen Advocacy Groups	Public citizens can organize into advocacy groups focused on AI governance, ethics, and accountability in leadership functions
Community Engagement Forums	Creating decentralized forums for community engagement allows public citizens to share experiences, concerns, and insights regarding AI in leadership. These distributed discussions foster a sense of collective understanding and enable diverse perspectives to shape the discourse.

Guidepost	Description
Participatory Decision-Making	Encouraging participatory decision-making processes empowers public citizens to contribute to discussions on AI in leadership functions. Organizations can implement decentralized approaches to solicit input, ensuring that diverse voices are considered in decision-making.
Open Source Initiatives	Advocating for and contributing to open-source AI initiatives is a distributed strategy that involves making AI technologies more transparent and accessible
Education and Literacy Programs	Facilitating education and literacy programs on AI empowers public citizens to understand the implications on leadership functions

Collaborative Strategies

For actors characterized by a wealth of knowledge but a relatively lower degree of power collaborative strategies leverage the knowledge-rich position of academics, innovators, and AI researchers to actively contribute to shaping the ethical landscape of AI in leadership functions. By fostering partnerships, engaging in open dialogue, and advocating for responsible policies organizations, and influencing the trajectory of AI adoption in organizational leadership.

Guidepost	Description
Research Collaborations	Engaging in cross-disciplinary research collaborations and pooling collective expertise
Partnerships with Industry	Establishing collaborative partnerships with industry players allows academics and researchers to apply their knowledge in real-world settings
Development of Ethical Guidelines	Develop comprehensive ethical guidelines for the integration of AI in leadership functions. These guidelines can serve as a framework for organizations seeking to align their practices with ethical considerations, leveraging knowledge to shape responsible AI adoption
Educational Initiatives	Collaborative strategies involve academics and researchers actively participating in educational initiatives and disseminating research findings in accessible formats and fostering public understanding
Open Dialogue Platforms	Educational initiatives and dialogue platforms provide a space for collaborative discussions on AI implications, as well as share insights, address concerns, and collaboratively develop best practices
Policy Advocacy	Collaborating on policy advocacy efforts contributes to the development of AI governance frameworks. Engaging with policymakers and other stakeholders to advocate for policies that balance innovation with ethical considerations in leadership functions

Guidepost	Description
International Collaboration Networks	Building collaborative networks on an international scale allows for knowledge sharing globally. Collaborative efforts can include joint research projects, knowledge exchange programs, and the development of global standards for ethical AI

4.2.3 Validation and Wind Tunneling

In the rapidly evolving landscape of Artificial Intelligence (AI), foresight analysis becomes a critical tool for understanding and preparing for a range of potential future scenarios. This study employs a foresight wind tunneling exercise to align various strategic responses with four distinct AI-driven future worlds: Continued Growth, Decline and Collapse, Limits and Discipline, and Transformation. Each scenario presents a unique set of challenges and opportunities shaped by the interplay of AI advancements, societal reactions, and regulatory landscapes. By mapping emergent, control, distributed, and collaborative strategies against these scenarios, this analysis aims to provide a nuanced understanding of how different stakeholders might effectively navigate the complexities of a future increasingly influenced by AI. This approach not only highlights the dynamic nature of AI's impact across various sectors but also underscores the importance of adaptive and forward-thinking strategies in the face of technological uncertainty.

Strategy	World 1: Continued Growth	World 2: Decline and Collapse	World 3: Limits and Discipline	World 4: Transformation
Emergent Strategy	Partially Applicable	Highly Applicable	Highly Applicable	Moderately Applicable
Control Strategy	Highly Applicable	Moderately Applicable	Highly Applicable	Highly Applicable
Distributed Strategy	Moderately Applicable	Highly Applicable	Moderately Applicable	Moderately Applicable
Collaborative Strategy	Highly Applicable	Moderately Applicable	Highly Applicable	Highly Applicable

Emergent Strategy: This is highly applicable in scenarios like 'Decline and Collapse' and 'Limits and Discipline' where proactive and adaptable approaches are crucial due to systemic failures or stringent controls. It's partially applicable in 'Continued Growth' due to the need for navigating complex landscapes, and moderately applicable in 'Transformation' where adaptability is key.

Control Strategy: This strategy is highly applicable across all scenarios, especially in 'Continued Growth' and 'Transformation' where control over AI integration and ethical frameworks is crucial. In 'Decline and Collapse', it's moderately applicable due to the potential breakdown of traditional control mechanisms.

Distributed Strategy: Highly applicable in 'Decline and Collapse' where public advocacy and crowdsourced monitoring are crucial in a dystopian environment. It's moderately applicable in 'Continued Growth' and 'Limits and Discipline' where public engagement can influence the discourse on AI.

Collaborative Strategy: Highly applicable in 'Continued Growth', 'Limits and Discipline', and 'Transformation' where partnerships and ethical guidelines are essential. It's moderately applicable in 'Decline and Collapse' due to the potential challenges in collaboration in a dystopian setting.

Chapter 5: Discussion

5.1 Key Learnings and Leadership Transformation

Key Learnings

The culmination of the first half of the research, encompassing trend analysis, interviews with industry experts, and causal layered analysis (CLA), offered some immediate insights about the evolving roles of Artificial Intelligence (AI) and Chief Executive Officers (CEOs) in the various contexts. This research is particularly intriguing due to its multifaceted approach, combining empirical data with theoretical models to understand the complex dynamics at play in the integration of AI into leadership and organizational structures. What did we learn from this research?

Diverse Perceptions and Applications of AI: The research highlights a spectrum of perceptions about AI, ranging from its role as a disruptive force to a tool for innovation and problem-solving. This diversity is evident in the trends identified, such as the AI-Free movement, bespoke AI solutions, and the rise of AI in legal frameworks. These trends underscore the varied ways AI is being integrated into different sectors and the contrasting attitudes towards its use.

Impact on Leadership and Decision-Making: The role of the CEO is seen as evolving in response to AI advancements. While there is skepticism about AI fully replacing CEOs, there is recognition of AI's potential to enhance decision-making, improve efficiency, and drive innovation. However, this comes with challenges, including ethical dilemmas, trust issues, and the need for new leadership skills to manage AI-driven changes.

Implications for Work and Labor Markets: AI's impact on labor markets is a significant concern, with trends indicating potential job displacement, the creation of new job categories, and the necessity for reskilling. This aligns with the insights from industry experts who emphasize the

need for clarity and strategic decision-making in navigating these changes. It must be decided who will be the winners and who will be the losers.

Societal and Ethical Considerations: The research points to growing concerns about inequality, erosion of trust, and the ethical use of AI. These concerns are reflected in the identified drivers of change, such as unfettered capitalism and data wars, indicating a need for more responsible and equitable approaches to AI development and deployment.

Strategic Implications for Management: For management, these findings suggest a need for adaptive strategies that consider the diverse implications of AI. This includes fostering collaboration, ensuring ethical AI use, managing labor disruptions, and navigating legal and regulatory landscapes. The insights from CLA further emphasize the importance of understanding AI and CEO roles from multiple perspectives, including systemic, worldview, and metaphorical dimensions.

The Evolution of Leadership and the Role of CEO

While the study does not conclusively suggest that CEOs will be entirely replaced by AI, it does indicate a significant transformation in the nature and scope of leadership roles. Some observations on the evolution of leadership and role of CEO are described below:

Augmentation Rather Than Replacement: Our research suggests that AI is more likely to *augment* the capabilities of CEOs rather than replace them. AI's potential to enhance decision-making, improve operational efficiency, and provide strategic insights can empower CEOs to navigate complex business landscapes more effectively. However, this augmentation comes with the need for CEOs to adapt to a new paradigm where AI is an integral part of the decision-making & corporate governing processes. Without this, there is enhanced risk exposure and ethical implications.

Ethical and Strategic Challenges: The integration of AI in leadership roles presents ethical and strategic challenges that CEOs must navigate. This includes addressing issues of trust, privacy, and the ethical use of AI. CEOs will need to develop strategies to integrate AI in a manner that aligns with organizational values and ethical standards.

Skillset Evolution: The advent of AI in leadership necessitates a shift in the skills required for effective CEOs. This includes a deeper understanding of AI technologies, data literacy, and the ability to collaborate with AI systems. The role of the CEO will evolve to include overseeing AI strategies and ensuring that AI implementations align with broader organizational goals.

Navigating Labor Market Changes: As AI transforms the labor market, CEOs will need to manage the implications of these changes within their organizations. This includes overseeing workforce reskilling initiatives, managing the transition of employees into new roles, and addressing the potential societal impacts of AI-induced labor disruptions. This is contentious due to the fiduciary duty to also manage profit driven expectations of their boards and shareholders.

Strategic Decision-Making: CEOs will need to balance AI-driven insights with human judgment, considering the broader implications of AI decisions on stakeholders, including employees, customers, and society at large.

5.2 Challenges and Further Research

Potential Pitfalls

The potential pitfalls for leadership in integrating AI into their decision making process and strategy development are similar to the pitfalls that already exist in the form of cognitive biases and general foolishness. These risks would not disappear by incorporating AI, but may be exacerbated if not properly understood and managed. In considering the implications of this research for leaders and CEOs, several potential pitfalls emerge, particularly in the context of integrating Artificial Intelligence (AI) into organizational leadership. These pitfalls, if not carefully navigated, could increase the propensity for failure. Drawing upon common management theory metaphors, these pitfalls can be better understood and contextualized.

In sum, AI presents significant opportunities for enhancing leadership and decision-making, CEOs & leadership teams must navigate these pitfalls carefully. They should strive for a balanced approach, where AI is integrated as a complementary tool to human judgment,

ensuring ethical, informed, and diverse perspectives in decision-making. This approach aligns with the broader principles of effective leadership and management, emphasizing adaptability, ethical responsibility, and a holistic understanding of technology's role within an organization.

The 'Autopilot' Trap: A significant risk for CEOs is over-reliance on AI, akin to a driver overly dependent on cruise control. This complacency can lead to a lack of critical engagement with AI-driven insights and decisions. Leaders must remember that AI will initially be a tool to augment, and should maybe not replace, human judgment and decision-making.

The 'Icarus Paradox': Just as Icarus fell from the sky due to his overambition, CEOs might become overconfident in the capabilities of AI, pushing the boundaries of ethical AI use or disregarding the importance of human elements in leadership. This overreliance on AI could lead to strategic missteps or ethical lapses.

The 'Sorcerer's Apprentice' Scenario: In this scenario, akin to the narrative where the apprentice loses control of the magic he barely understands, Leadership teams might implement AI without fully comprehending its complexities and limitations. This lack of understanding can lead to unintended consequences, as AI systems operate in ways that may not align with the organization's values or goals.

Misaligned Consensus on AI Adoption: Leadership teams might agree to implement AI solutions not because they all believe in its efficacy or suitability for their specific context, but because they think that's what everyone else in the industry is doing, or what they should be doing to keep up with trends.

Lack of Vocalized Skepticism and the 'Abilene' Paradox: Individual members of the leadership team might have reservations about the feasibility or relevance of AI in their specific organizational context but choose not to express these doubts. They might assume that their concerns are unique to them and not shared by others, leading to a situation where the team collectively decides on a path that is not actually favored by any individual member.

Areas of Future Study

One avenue worth exploring involves conducting a case study with a specific organization, leveraging a three-horizons framework to develop a tactical playbook for seamlessly integrating AI into the fabric of organizational leadership structures and processes. The three-horizons framework could provide specificity with regard to timelines and leverage points for intervention. Within this case study, a deeper dive into the causal layered analysis (CLA) tool could provide valuable insights. This entails delving into the diverse metaphors and organizational images that the CLA tool encompasses.

Our research illuminated the interconnected layers of myth and metaphor within the CLA questions, revealing their alignment with metaphorical expressions that craft persuasive yet potentially misleading narratives. We came to understand that “metaphor uses evocative images to create what may be constructive falsehoods”, and can be incomplete in that any given metaphor may ignore important aspects in a way that can be misleading (Gareth, 1998). When applied to a focused organizational case study, an intriguing exploration would involve unraveling the prevailing myths and metaphors associated with AI. This analysis could serve as a foundation for constructing aspirational metaphors as part of a broader cultural building and transformation initiative. The ultimate goal would be to foster the seamless integration, norm building, and widespread adoption of AI within the organizational framework.

Potential Research Directions

Another potential research direction involves delving into the intricacies of integrating AI and addressing the associated cognitive biases and self-deception. Such an investigation would focus on developing a nuanced understanding of effective strategies to navigate potential pitfalls and strike a balanced approach. This involves exploring how AI can be seamlessly integrated as a complementary tool to human judgment, promoting ethical, informed, and diverse perspectives in decision-making. Such an approach should align with the overarching principles of effective leadership, emphasizing adaptability, ethical responsibility, and a comprehensive comprehension of technology's role within organizational dynamics.

At the core of many pitfalls and cognitive biases lies a Moloch problem - forces that coerce competing individuals to take actions which, although locally optimal, ultimately lead to situations where everyone is worse off. Moreover, no individual is able to unilaterally break out of the dynamic. Further areas of research could delve into how wise leadership can steer clear

of such traps. Exploring methods for effective leaders to avoid these pitfalls and understanding the necessary personal transformation required is essential. Additionally, investigating how leaders can cultivate wisdom and navigate change adeptly amid uncertainty and ambiguity is crucial. Identifying specific design practices that contribute to this transformative leadership approach is a key aspect of future research in this domain.

Chapter 6: Conclusion

This research journey, traversing the realms of Artificial Intelligence (AI) and its interplay with leadership, particularly the role of Chief Executive Officers (CEOs), culminates in a nuanced understanding of the future of organizational dynamics. By employing a multifaceted approach that blends empirical data with theoretical models, we have unearthed a spectrum of possibilities where AI acts as both a disruptor and an enabler within the corporate hierarchy.

Our exploration revealed diverse perceptions and applications of AI, ranging from its role as a tool for innovation to a potential source of disruption. This diversity is mirrored in the trends identified, such as the AI-Free movement, bespoke AI solutions, and AI's integration into legal frameworks. These findings underscore the varied ways AI is being integrated into different sectors and the contrasting attitudes towards its use.

The impact of AI on leadership and decision-making emerged as a central theme. While the notion of AI fully replacing CEOs remains speculative, there is a clear recognition of AI's potential to augment decision-making, enhance efficiency, and drive innovation. This evolution, however, is not without its challenges, including ethical dilemmas, trust issues, and the need for new leadership skills to manage AI-driven changes. The implications for work and labor markets are profound. AI's impact is seen in potential job displacement, the creation of new job categories, and the necessity for reskilling. This aligns with insights from industry experts who emphasize the need for clarity and strategic decision-making in navigating these changes, particularly in determining the winners and losers in this transition. Societal and ethical considerations are paramount. The research points to growing concerns about inequality, erosion of trust, and the ethical use of AI. These concerns are reflected in the identified drivers of change, such as unfettered capitalism and data wars, indicating a need for more responsible and equitable approaches to AI development and deployment.

The implications of this research extend far beyond academic discourse. The integration of AI into organizational structures is not merely a technological upgrade but a paradigm shift in how leadership and decision-making processes are conceptualized and executed. For CEOs and leadership teams, this research serves as a call to reevaluate their roles in an AI-

augmented future. It is not about replacement but augmentation, where AI's capabilities are harnessed to complement and enhance human decision-making. This necessitates a new skill set, including AI literacy, ethical decision-making, and an ability to manage the transformative impact of AI on the workforce.

Furthermore, this study offers strategic guideposts for various stakeholders, including governments, regulators, CEOs, and the public. It emphasizes the need for collaborative, distributed, emergent, and control strategies to navigate the multifaceted implications of AI. This is crucial for shaping policies, fostering responsible AI use, and ensuring that the benefits of AI are equitably distributed.

In essence, this research provides a roadmap for navigating the uncharted territories of AI in leadership. It calls for a proactive, informed, and ethical approach to integrating AI into organizational structures, ensuring that its deployment is aligned with broader societal values and goals. The future of leadership in the age of AI is not just about technological prowess but about the **wisdom** to harness this technology for the greater good, balancing innovation with ethical responsibility and human insight.

References

1. Almada, M. (2023). Regulation by design and the governance of technological futures. *European Journal of Risk Regulation*. <https://doi.org/10.1017/err.2023.37>
2. Armstrong, K. (2023, May 27). ChatGPT: US lawyer admits using AI for case research. *BBC*. <https://www.bbc.com/news/world-us-canada-65735769>
3. Barr, N., & Peters, K. (2018, January 8). Resistance is futile: Embracing the era of the augmented worker. *Behavioral Scientist*. <https://behavioralscientist.org/resistance-futile-embracing-era-augmented-worker/>
4. Bivens, J., & Kandra, J. (2022, October 4). CEO pay has skyrocketed 1,460% since 1978. *Economic Policy Institute*. <https://www.epi.org/publication/ceo-pay-in-2021/>
5. Beer, S. (1981). *Brain of the firm* (2nd ed.). John Wiley.
6. Benchetrit, J. (2023, January 3). By 9:43 a.m., Canada's richest CEOs have already earned the average workers's annual salary. *CBC*. <https://www.cbc.ca/news/business/canada-richest-ceo-average-salary-1.6701407>
7. Bender, E. M., Gebru, T., McMillan-Major, A., & Shmitchell, S. (2021). On the dangers of stochastic parrots. *Proceedings of the 2021 ACM Conference on Fairness, Accountability, and Transparency*. <https://doi.org/10.1145/3442188.3445922>
8. Bengston, D. N., Dator, J., Dockry, M. J., & Yee, A. (2016). Alternative futures for forest-based nanomaterials: An application of the Manoa School's alternative futures method. *World Future Review*, 8(4), 197-221. <https://doi.org/10.1177/1946756716659650>
9. Bezold, C. (2009). Jim Dator's alternative futures and the path to IAF's aspirational futures. *Journal of Future Studies*, 14(2), 123-134. <https://jfsdigital.org/articles-and-essays/2009-2/vol-14-no-2-november/essays/jim-dators-alternative-futures-and-the-path-to-iafs-aspirational-futures/>
10. Bhaimiya, S. (2023, June 21). Portugal plans to trial answering emergency calls using an AI chatbot based off ChatGPT, and it could be rolled out by 2025, government official says. *Insider*. <https://www.businessinsider.com/chatgpt-ai-take-emergency-calls-portugal-2025-report-2023-6>
11. Blank, G., & Reisdorf, B. (2012). The participatory web. *Information*, 15. https://www.researchgate.net/publication/263266131_The_Participatory_Web
12. Bostrom, N., Dafoe, A., & Flynn, C. (2018). Public policy and superintelligent AI: A vector field approach. *Future of Humanity Institute*. <https://www.fhi.ox.ac.uk/wp-content/uploads/Policy-Desiderata-in-the-Development-of-Machine-Superintelligence.pdf>
13. Brooks, L., & Selley, D. (2012). *Ethics & governance: Developing and maintaining an ethical corporate culture* (4th ed.). Canadian Centre for Ethics and Corporate Policy.
14. Buxton, B. (2008, January 2). The long nose of innovation. *Newsweek*. <https://www.billbuxton.com/01%20The%20Long%20Nose%20of%20Innovation%20Revised.pdf>
15. Cairns, G., & Wright, G. (2017). *Scenario thinking: Preparing your organization for the future in an unpredictable world*. Palgrave Macmillan Cham. <https://doi.org/10.1007/978-3-319-49067-0>
16. The Canadian Press. (2023, May 25). Ontario urgently needs 'guardrails' on public sector use of AI, say privacy, rights commissions. *CBC*. <https://www.cbc.ca/news/canada/toronto/ontario-human-rights-commission-public-sector-ai-1.6855014>
17. Charlebois, S. (2023, April 10). Public outrage and grocery CEO compensation: What Loblaw should have

- done. *Retail Insider*. <https://retail-insider.com/retail-insider/2023/04/public-outrage-and-grocery-ceo-compensation-what-loblaw-should-have-done-op-ed/>
18. Chermack, T. J. (2011). *Scenario planning in organizations: How to create, use, and assess scenarios*. Berrett-Koehler Publishers.
 19. CCPA. (2023, January 3). Canadian CEO pay soars to a new all-time high due to inflation: report. *Canadian Centre for Policy Alternatives*. <https://policyalternatives.ca/newsroom/news-releases/canadian-ceo-pay-soars-new-all-time-high-due-inflation-report>
 20. Conway, M. (2009). Strategic thinking: What it is and how to do it. *Thinking Futures*. https://www.researchgate.net/profile/Maree-Conway/publication/253238955_Strategic_Thinking_what_it_is_and_how_to_do_it/links/0c96051f72ae67e9e7000000/Strategic-Thinking-what-it-is-and-how-to-do-it.pdf
 21. Conway, M. (2016). Foresight infused strategy: A how-to guide for using foresight in practice. *Thinking Futures*. https://www.researchgate.net/profile/Maree-Conway/publication/253238955_Strategic_Thinking_what_it_is_and_how_to_do_it/links/0c96051f72ae67e9e7000000/Strategic-Thinking-what-it-is-and-how-to-do-it.pdf
 22. Crutchfield, K. (2023, January 31). The brave new world of AI: Is AI the answer or just part of the equation? *Above The Law*. <https://abovethelaw.com/2023/01/the-brave-new-world-of-ai-is-ai-the-answer-or-just-part-of-the-equation/>
 23. Cuhls, K. E. (2019). Horizon scanning in foresight – Why horizon scanning is only a part of the game. *Futures & Foresight Science*, 2(1), e23. <https://doi.org/10.1002/ffo2.23>
 24. Curry, A., & Hodgson, A. (2008). Seeing in multiple horizons: Connecting futures to strategy. *Journal of Futures Studies*, 13(1), 1-20. https://www.researchgate.net/publication/253444667_Seeing_in_Multiple_Horizons_Connecting_Futures_to_Strategy
 25. Curry, A., & Schultz, W. (2009). Roads less traveled: Different methods, different futures. *Journal of Futures Studies*, 13(4), 35-60. <https://ifsdigital.org/wp-content/uploads/2014/01/134-AE03.pdf>
 26. Dator, J. (2009). Alternative futures at the Manoa School. *Journal of Futures Studies*, 14(2), 1-18. https://www.researchgate.net/publication/228380947_Alternative_futures_at_the_Manoa_School
 27. Dator, J. (2018). Emerging issues analysis: Because of Graham Molitor. *World Future Review*, 10(1), 5-10. <https://doi.org/10.1177/1946756718754895>
 28. Dator, J. (2014). “New beginnings” within a new normal for the four futures. *Foresight*, 16(6), 496-511. <https://doi.org/10.1108/FS-09-2013-0046>
 29. Day, G., & Schoemaker, J. H. (2005). Scanning the periphery. *Harvard Business Review*. <https://hbr.org/2005/11/scanning-the-periphery>
 30. De Dios Gonzalez, S. (2022, November 8). Jim Dator’s four futures. *Exploring your mind*. <https://exploringyourmind.com/jim-dators-four-futures/>
 31. Delaney, K., & Osborne, L. (2013). Public sector horizon scanning – stocktake of the Australasian Joint Agencies Scanning Network. *Journal of Futures Studies*, 17(4), 55-70. <https://doi.org/10.6531/JFS>
 32. Del Pino, J. S. (1998). The challenge of teaching futures studies. *American Behavioral Scientist*, 42(3), 484-492. <https://doi.org/10.1177/0002764298042003020>
 33. Department for Science, Innovation and Technology & Donelan, M. (2023, March 29). UK unveils world leading approach to innovation in first artificial intelligence white paper to turbocharge growth. *GOV.UK*. <https://www.gov.uk/government/news/uk-unveils-world-leading-approach-to-innovation-in-first-artificial-intelligence-white-paper-to-turbocharge-growth>
 34. Deutsche Welle. (2023, May 11). EU lawmakers take first steps towards tougher AI rules. <https://www.dw.com/en/eu-lawmakers-take-first-steps-toward-tougher-ai-rules/a-65585731>

35. Diaz, M. (2023, June 16). Even Google is warning its employees about AI chatbot use. *ZDNET*. <https://www.zdnet.com/article/even-google-is-warning-its-employees-about-ai-chatbot-use/>
36. Doctorow, C. (2023, January 23). The 'Enshittification' of TikTok. *WIRED*. <https://www.wired.com/story/tiktok-platforms-cory-doctorow/>
37. Donaldson, T., & Preston, L. (1995, January). The stakeholder theory of the corporation: Concepts, evidence, and implications. *The Academy of Management Review*, 20(1). <https://www.jstor.org/stable/258887?origin=crossref>
38. Drucker, P. (1976). *The effective executive: The definitive guide to getting the right things done*. Harper and Row Publishers.
39. Dunn, W. (2023). CEOs are hugely expensive. Why not automate them? *New Statesman*. <https://www.newstatesman.com/business/companies/2023/05/ceos-salaries-expensive-automate-robots#:~:text=are%20hugely%20expensive.,Why%20not%20automate%20them%3F,candidate%20for%20robot%2Dinduced%20redundancy>
40. Economist. (2010, April 21). The third industrial revolution. *The Economist*. <https://www.economist.com/leaders/2012/04/21/the-third-industrial-revolution>
41. Edelman, G. (n.d.). We're entering the AI twilight zone between narrow and general AI. *VentureBeat*. <https://venturebeat.com/ai/were-entering-the-ai-twilight-zone-between-narrow-and-general-ai/>
42. Edersheim, E. (2007). Peter Drucker's 'unfinished chapter:' The role of the CEO. *Leader to Leader*, 45, 40–46.
43. Egan, M. (2023, June 14). Exclusive: 42% of CEOs say AI could destroy humanity in five to ten years. *CNN Business*. <https://www.cnn.com/2023/06/14/business/artificial-intelligence-ceos-warning/index.html>
44. Elias, J. (2023, July 11). Google quietly ditched plans for an A.I.-powered chatbot app for Gen Z. *CNBC*. https://www.cnbc.com/2023/07/11/google-quietly-ditched-plans-for-an-ai-powered-chatbot-app-for-gen-z.html?utm_source=substack&utm_medium=email
45. Espejo, R., & Gill, A. (n.d.). The viable system model. *The Viable System Model as a Framework for Understanding Organizations*. Modern Times Workplace. http://www.moderntimesworkplace.com/good_reading/GRRespSelf/TheViableSystemModel.pdf
46. Esposito, E. (2022, May 24). Artificial communication: How algorithms produce social intelligence. *The MIT Press*. <https://mitpress.mit.edu/9780262046664/artificial-communication/>
47. Fouda, M., & Wang, Q. (2023, April 20). The convergence of AI and Web 3: Opportunities and challenges. *Medium*. <https://medium.com/alliancedao/the-convergence-of-ai-and-web-3-opportunities-and-challenges-45c28105e513>
48. Freinacht, Hanzi. (2017). *The Listening Society: A Metamodernist Guide to Politics (Book One)*. Metamoderna.
49. Future of Life Institute. (2023, March 22). Pause giant AI experiments: An open letter. *Future of Life Institute*. <https://futureoflife.org/open-letter/pause-giant-ai-experiments/>
50. Gareth, M. (1998). *Images of organization, the executive edition*. Berrett-Koehler Publishers, Inc.
51. Global Governance Advisors. (2022, July 4). How much are Canada's top CEOs paid? Here's the full breakdown. *Globe & Mail*. <https://www.theglobeandmail.com/business/careers/management/executive-compensation/article-how-much-are-canadas-top-ceos-paid-heres-the-full-breakdown-4/>
52. Goddard, V. (2023, June 15). Who benefits from AI art? Is big tech stealing our democracy? *Medium*. <https://valentinegoddard.medium.com/who-benefits-from-ai-art-is-big-tech-stealing-our-democracy-6cbb1728ac1c>
53. Goltz, N., & Dowdeswell, T. (2023, April 13). Real world AI ethics for data scientists: Practical case studies. *Chapman & Hall*.
54. GreatGameIndia. (2023, June 24). Did a German newspaper replace editors with AI. *GreatGameIndia*:

- Journal of Geopolitics and International Relations*. <https://greatgameindia.com/did-german-newspaper-replace-editors-with-ai/>
55. Greenwood, D., Katz, D., Bommarito, M., Riehl, D., Han, J., & Nay, J. (2023, May 15). Generative AI legislative hearing. *MIT Computational Law Report*. <https://law.mit.edu/pub/wyoming-legislative-hearing/release/1>
56. Groysberg, B., Abbott, S., Marino, M. R., & Aksoy, M. (2021). Compensation packages that actually drive performance. *Harvard Business Review*. <https://hbr.org/2021/01/compensation-packages-that-actually-drive-performance>
57. Gupta, D. (2023, June 20). 'Unchecked corporate greed:' NDP leader Jagmeet Singh targets excessive CEO pay with plan for special tax. *Toronto Star*. <https://www.thestar.com/business/2023/06/20/ndp-leader-jagmeet-singh-brings-forth-motion-to-tackle-rising-costs-unchecked-corporate-greed.html>
58. Gustavus Adolphus College. (n.d.). Introduction to the implications wheel. <https://orgs.gustavus.edu/ric/pdfs/Introduction%20to%20the%20Implications%20Wheel.pdf>
59. Hansen, A. L., & Kazinnik, S. (2023). Can ChatGPT decipher FedSpeak? *SSRN*. <https://doi.org/10.2139/ssrn.4399406>
60. Harshini. (2023, March 17). Chinese game company appointed an AI to be the CEO. *Analytic Insight*. <https://www.analyticsinsight.net/chinese-game-company-appointed-an-ai-to-be-the-ceo/>
61. Heaven, W. D. (2023, July 11). Bill Gates isn't too scared about AI. *MIT Technology Review*. <https://www.technologyreview.com/2023/07/11/1076094/bill-gates-isnt-scared-about-ai-existential-risk/>
62. Hebb, D. (1949). *The organization of behavior; a neuropsychological theory*. Wiley. <https://psycnet.apa.org/record/1950-02200-000>
63. Heydari, A. (2023, October 1). Canada's voluntary AI code of conduct is coming – not everyone is enthused. *CBC*. <https://www.cbc.ca/news/business/ai-code-of-conduct-stopgap-1.6983064>
64. Hines, A., Bengston, D. N., Dockry, M. J., & Cowart, A. (2018). Setting up a horizon scanning system: A U.S. federal agency example. *World Future Review*, 10(2), 136-151. <https://doi.org/10.1177/1946756717749613>
65. Ibañez, D. (2023, December 18). Artificial neural networks – The Rosenblatt perceptron. *Neuroelectrics Blog*. <https://www.neuroelectrics.com/blog/2016/08/02/artificial-neural-networks-the-rosenblatt-perceptron/>
66. Inayatullah, S. (2019). Causal layered analysis a four-level approach to alternative futures: Relevance and use in foresight. *Futuribles*. https://www.researchgate.net/publication/332706079_Causal_Layered_Analysis_A_Four-Level_Approach_to_Alternative_Futures_RELEVANCE_AND_USE_IN_FORESIGHT
67. International Training Centre. (n.d.). Three horizons framework. *International Training Centre*. <https://training.itcilo.org/delta/Foresight/3-Horizons.pdf>
68. Ivanova, I. (2023, May 5). As inflation chews up worker pay, top CEOs got 7.7% raise last year. *CBS News*. <https://www.cbsnews.com/news/ceo-pay-compensation-increase-7-7-inflation-equilar/>
69. Jaques, E. (1997, January 28). *Requisite organization: A total system for effective managerial organization and managerial leadership for the 21st century*. Routledge.
70. Jensen, M., & Murphy, K. (1990). CEO incentives—It's not how much you pay, but how. *Harvard Business Review*. <https://hbr.org/1990/05/ceo-incentives-its-not-how-much-you-pay-but-how>
71. Jones, C. (1992). The Manoa school of futures studies. *Futures Research Quarterly*, 8(4), 19-25.
72. Jones, P., & Van Ael, K. (2022). *Design journeys through complex systems: Practical tools for systemic design*. Amsterdam: Bis Publisher.
73. Jones, P. (n.d.). Systemic design toolkit. Available at: <https://mcusercontent.com/3e9407ac18e3aafb2b87d6e8c/files/dfd2f9f7-2981-0c1a-7e25->

[edf44030cb7f/Design_Journeys_through_Complex_Systems_Tools_Posters.pdf](#)

74. Jones, T., Harrison, J., & Felps, W. (2018, July 3). How applying instrumental stakeholder theory can provide sustainable competitive advantage. *Academy of Management Review*, 43(3).
<https://journals.aom.org/doi/10.5465/amr.2016.0111>
75. Kaplan, S. (2019). The 360° corporation: From stakeholder trade-offs to transformation. *Stanford Business Books*.
76. Kimmel, B. (2014). Trust Inc. Strategies for building your company's most valuable asset. *Next Decade Inc.*
77. Lasytè, G. (2019, May). The role of stakeholders in corporate governance: Theoretical approach. *Contemporary Research on Organization Management and Administration*.
<https://cris.mruni.eu/server/api/core/bitstreams/e4f65a59-8bbe-4018-b76e-ae4613bab758/content>
78. Lee, J. (2023, April 17). ChatGPT can decode Fed speak, predict stock moves from headlines. *Bloomberg*.
<https://www.bloomberg.com/news/articles/2023-04-17/chatgpt-can-decode-fed-speak-predict-stock-moves-from-headlines?embedded-checkout=true>
79. Lee, T. B. (2023, April 3). Stable diffusion copyright lawsuits could be a legal earthquake for AI. *Ars Technica*. <https://arstechnica.com/tech-policy/2023/04/stable-diffusion-copyright-lawsuits-could-be-a-legal-earthquake-for-ai/>
80. Li, R. (2023, May 8). The environmental impact of AI. *Global Research and Consulting Group Insights*.
<https://insights.grcglobalgroup.com/the-environmental-impact-of-ai/>
81. Lopez-Lira, A., & Tang, Y. (2023). Can ChatGPT forecast stock price movements? Return predictability and large language models. *SSRN*. <http://doi.org/10.2139/ssrn.4412788>
82. Loveridge, D. (2008). Foresight: The art and science of anticipating the future. *Routledge*.
83. Lum, R. (2016). Trend vs emerging issues: What is the difference. <https://www.linkedin.com/pulse/trends-vs-emerging-issues-what-difference-richard-lum/>
84. Macanaya, C. (2023, April 6). Two hands reaching for a flying object in the sky photo – Free render image on Unsplash. *Unsplash*. <https://unsplash.com/photos/two-hands-reaching-for-a-flying-object-in-the-sky-X9Cemmq4Yj>
85. MacDonald, D. (2023, January 3). Breakfast of champions: CEO pay in 2021 hits new all-time high. *The Monitor*. <https://monitormag.ca/reports/breakfast-of-champions-ceo-pay-in-2021-hits-new-all-time-high/>
86. Martin, N. (2023, April 22). ChatGPT sparks AI investment bonanza. *Deutsche Welle*.
<https://www.dw.com/en/chatgpt-sparks-ai-investment-bonanza/a-65368393>
87. Mattin, D. (2020, June 15). The four futures framework can help you plan for what's next. *LinkedIn*.
<https://www.linkedin.com/pulse/four-futures-framework-can-help-you-plan-whats-next-david-mattin/>
88. Miles, I., & Saritas, O. (2012). The depth of the horizon: Searching, scanning and widening horizons. *Foresight*, 14(6), 530-545. <https://doi.org/10.1108/14636681211284953>
89. Miles, I., Saritas, O., & Sokolov, A. (2016). Foresight for science, technology and innovation. *Springer Cham*. <https://doi.org/10.1007/978-3-319-32574-3>
90. Mishel, L., & Kandra, J. (2021, August 10). CEO pay has skyrocketed 1,322% since 1978. *Economic Policy Institute*. <https://www.epi.org/publication/ceo-pay-in-2020/>
91. Molitor, G. T. T. (2010). Timeline 22-step model for tracking and forecasting public policy change. *Journal of Futures Studies*, 14(3), 1-12.
92. Molitor, G. T. T. (2017). The Molitor model of change. *World Futures Review*, 10(1), 13-21.
<https://doi.org/10.1177/1946756717747636>
93. Morgan, C. S., Langlois, F., Adessky, J. J., Lan, J., & Gallagher, M. M. (2022, July 11). The dawn of AI law: The Canadian government introduces legislation to regulate artificial intelligence in Canada. *McCarthy Tétrault*. <https://www.mccarthy.ca/en/insights/blogs/techlex/dawn-ai-law-canadian-government-introduces-legislation-regulate-artificial-intelligence-canada>

94. Morgan, G. (1998). Images of organization, The executive edition. *Berrett-Koehler Publishers, Inc.*
95. Newell, A. (1980). Physical symbol systems. *Cognitive Science*, 4(2).
<https://www.sciencedirect.com/science/article/abs/pii/S0364021380800152>
96. Padbury, P. (2020). An overview of the horizons foresight method: Using the “inner game” of foresight to build system-based scenarios. *World Future Review*, 12(2), 249-258.
<https://doi.org/10.1177/1946756719896007>
97. Pluralistic. (2023, January 21). Tiktok’s enshittification. *Pluralistic*.
<https://pluralistic.net/2023/01/21/potemkin-ai/#hey-guys>
98. Renieris, E. M., Kiron, D., & Mills, S. (2022, May 24). Should organizations link responsible AI and corporate social responsibility? It’s complicated. *MITSloan Management Review*.
<https://sloanreview.mit.edu/article/should-organizations-link-responsible-ai-and-corporate-social-responsibility-its-complicated/>
99. Rowe, E., Wright, G., & Derbyshire, J. (2017). Enhancing horizon scanning by utilizing pre-developed scenarios: Analysis of current practice and specification of a process improvement to aid the identification of important ‘weak signals’. *Technological Forecasting and Social Change*, 125, 224-235.
<https://doi.org/10.1016/j.techfore.2017.08.001>
100. Sardar, Z. (2014). Future: All that matters. *McGraw-Hill Education*.
101. Sarits, O., & Smith, J. E. (2011). The big picture – trends, drivers, wild cards, discontinuities and weak signals. *Futures*, 43(3), 292-312. <https://doi.org/10.1016/j.futures.2010.11.007>
102. Saunders, M., Lewis, P., & Thornhill, A. (2012). Research methods for business students (6th ed.). *Pearson Education Limited*.
103. Scoblic, J. P. (2020). Learning from the future: How to make robust strategy in times of deep uncertainty. *Harvard Business Review*. Retrieved from <https://hbr.org/2020/07/learning-from-the-future>
104. Searle, J. (1980). The Chinese Room. *Minds, Brains, and Program*. University of Colorado Boulder. Retrieved from <https://rintintin.colorado.edu/~vancecd/phil201/Searle.pdf>
105. Sharpe, B., & Hodgson, T. (2006). Intelligent infrastructure futures: Technology forward look. *Foresight Directorate, UK Dept of Trade & Industry, London, UK*. Retrieved from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/300337/06-520-intelligent-infrastructure-technology.pdf
106. Sharpe, B. (2015). Three horizons: The patterning of hope. *Journal of Holistic Healthcare*, 12(1), 4-6.
107. Shavit, Y. (2023). What does it take to catch a chinchilla? Verifying rules on large-scale neural network training via compute monitoring. Retrieved from <https://doi.org/10.48550/arXiv.2303.11341>
108. Shin, R. (2023, June 21). Billionaire VC Masayoshi Son says ChatGPT moves him to tears as A.I. pushes him to ask, ‘What is mankind?’ *Fortune*. Retrieved from <https://fortune.com/2023/06/21/billionaire-vc-masayoshi-son-ai-what-is-mankind-superhuman-softbank/>
109. Siocon, G. (2023, June 22). Ways AI is changing HR departments. *Business News Daily*. Retrieved from <https://www.businessnewsdaily.com/how-ai-is-changing-hr>
110. Slavsquat, E. (2023, July 22). The future will be artificial & full of intelligence. *Edward Slavsquat*. Retrieved from https://edwardslavsquat.substack.com/p/the-future-will-be-artificial-and?utm_source=post-email-title&publication_id=520963&post_id=135301637&isFreemail=true&utm_medium=email
111. Smart, J. M. (2019). *The foresight guide: Predicting, creating, and leading in the 21st century*. Foresight University. Retrieved from <https://foresightguide.com/dator-four-futures/>
112. Smaguc, T. (2022, December). Comparison of normative, instrumental and descriptive approaches to stakeholder theory. *RSEP International Conference on Economics, Finance & Business*. Retrieved from https://rsepconferences.com/wp-content/uploads/2022/11/10_TAMARA.pdf
113. SOIF. (2014, March 3). Introduction to Dator and the Manoa School. *School of International Futures*.

- Retrieved from <https://soif.org.uk/blog/introduction-dator-manoa-school/>
114. Subramanian, G. (2015, March). Corporate governance 2.0. *Harvard Business Review*. Retrieved from <https://hbr.org/2015/03/corporate-governance-2-0>
 115. Tewari, G. (2023, October 2). Progress, not peril: Putting alarmist fears over AI into context. *Forbes*. Retrieved from <https://www.forbes.com/sites/forbesbusinesscouncil/2023/10/02/progress-not-peril-putting-alarmist-fears-over-ai-into-context/?sh=95271061c9a5>
 116. Thubron, R. (2023, July 11). Fears over AI and job layoffs are driving tech execs to drugs and drinking. *Techspot*. Retrieved from <https://www.techspot.com/news/99353-fears-over-ai-job-layoffs-driving-tech-execs.html>
 117. Trinh, M. (2021, April 27). AI and corporate social responsibility. *LinkedIn*. Retrieved from <https://www.linkedin.com/pulse/ai-corporate-social-responsibility-minh-trinh/>
 118. Tsung, E. W. K. (2016). *The philosophy of management research*. Routledge.
 119. UNESCO. (2023, March 30). Artificial intelligence: UNESCO calls on all governments to implement global ethical framework without delay. Retrieved from <https://www.unesco.org/en/articles/artificial-intelligence-unesco-calls-all-governments-implement-global-ethical-framework-without>
 120. Webb, A. (2018). *The signals are talking: Why today's fringe is tomorrow's mainstream*. PublicAffairs.
 121. Wilson, I., & Ralston, B. (2006). *Scenario planning handbook: Developing strategies in uncertain times*. South-Western Educational Pub.
 122. Vincent, J. (2023, April 3). AI is entering an era of corporate control. *The Verge*. Retrieved from <https://www.theverge.com/23667752/ai-progress-2023-report-stanford-corporate-control>
 123. Visual Paradigm. (n.d.). What is a futures wheel? Retrieved from <https://online.visual-paradigm.com/knowledge/decision-analysis/what-is-futures-wheel/>
 124. Center for Humane Technology. (2023, April 5). The A.I. dilemma - March 9, 2023. *YouTube*. Retrieved from <https://www.youtube.com/watch?v=xoVJKj8lcNQ&t=5s>
 125. Zhang, M. (2023, June 9). In largest-ever Turing test, 1.5 million humans guess little better than chance. *Artisana*. Retrieved from <https://www.artisana.ai/articles/in-largest-ever-turing-test-1-5-million-humans-guess-little-better-than>
 126. Zhang, M. (2023, April 26). Stanford/MIT study: GPT boosts support agent productivity by up to 35%. *Artisana*. Retrieved from <https://www.artisana.ai/articles/stanford-mit-study-gpt-boosts-support-agent-productivity-by-up-to-35>