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LIGHTS - Leadership

The paradoxes of augmented leadership in biopharma: Artificial intelligence, decision-making and the concentration of responsibility

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Abstract

Artificial intelligence is profoundly transforming decision-making processes in organizations, particularly in highly regulated and knowledge-intensive sectors such as biopharma. From clinical development and regulatory strategy to pharmacovigilance and market access, AI enhances analytical capabilities, reduces uncertainty, and accelerates strategic preparation. Yet it does not alter the fundamental nature of responsibility. Drawing on qualitative interviews with senior executives from the biopharmaceutical industry and its ecosystem, this paper argues that AI does not delegate decision-making authority but instead concentrates accountability. Building on decision theory (Simon, 1957; Kahneman, 2011) and research on human-AI interaction (Jarrahi, 2018; Raisch & Krakowski, 2021), it identifies four structural paradoxes — optimization versus responsibility, acceleration versus deliberation, algorithmic objectivity versus moral judgment, and augmentation versus dependency — that redefine leadership without displacing it. The findings suggest that AI increases the need for human oversight and governance rather than reducing it. Rather than weakening leadership, AI intensifies its demands, making responsibility more explicit, more visible, and more consequential in organizational practice.

Keywords: artificial intelligence, leadership, decision-making, responsibility, biopharma

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Foreword

This work is part of a qualitative research approach based on a series of in-depth interviews conducted with senior executives and leading experts from the biopharmaceutical industry and its broader ecosystem.

The authors would like to express their sincere gratitude to all participants for the time they generously devoted to these exchanges, for the quality of their analyses and for the candor of their reflections. Collected under conditions of anonymity to preserve freedom of expression, their insights have provided invaluable material, helping to inform, refine and at times challenge the initial intuitions underlying this work.

Through the diversity of their backgrounds and responsibilities, spanning executive roles within major pharmaceutical companies, biotechnology firms, investment funds, as well as expertise in leadership and executive coaching, these contributions offer a multifaceted perspective on the profound transformations currently shaping the sector.

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The paradoxes of augmented leadership in biopharma: Artificial intelligence, decision-making and the concentration of responsibility

Introduction: more intelligence, more exposure

Artificial intelligence is progressively redefining the architecture of decision-making within organizations. What was once a tool designed to automate repetitive tasks has evolved into a system capable of structuring reasoning, modeling uncertainty, and shaping strategic choices. In sectors such as biopharma, where decisions combine scientific uncertainty, regulatory constraints, patient safety considerations, and societal impact, this transformation is particularly visible and consequential. From clinical development and regulatory strategy to pharmacovigilance and market access, AI is increasingly influencing how complex decisions are prepared and evaluated.

Executives increasingly describe AI not as a replacement for human judgment but as a profound extension of it. As one senior leader observes, “AI helps us see clearer and faster. It turns complexity into something operational.” Another emphasizes that “the real shift is not in the answers we get, but in how we frame the questions we ask.”

Such observations echo a broader transformation already highlighted in the literature. For decades, decision theory has described organizational action as constrained by limited information, bounded rationality, and cognitive bias (Simon, 1957; Kahneman, 2011). AI appears to offer a partial response to these limitations by extending analytical capacity and reducing informational friction. In doing so, it creates the impression that better decisions may naturally emerge from better data and more sophisticated models.

Yet this assumption deserves closer examination. Decisions in biopharma are rarely reducible to problems of calculation. They involve uncertainty in the Knightian sense (Knight, 1921), where probabilities are incomplete, consequences are difficult to anticipate, and choices carry ethical as well as economic implications. A clinical program can be statistically promising and strategically undesirable. A market access decision can be financially rational and socially contested. A safety signal can require action before sufficient evidence is available.

In such contexts, the central issue is not whether AI improves decision quality. It often does. The more fundamental question concerns responsibility. If decision-making becomes increasingly informed, structured, and augmented by intelligent systems, what happens to accountability? Does it become shared between humans and algorithms? Does it become diluted across increasingly complex socio-technical systems? Or does it, paradoxically, become more concentrated?

Drawing on 12 in-depth interviews conducted with senior executives and experts from the biopharmaceutical industry and its broader ecosystem, this paper argues that AI does not dilute responsibility. On the contrary, it makes responsibility more visible, more explicit, and ultimately more difficult to evade.

The more AI-assisted decision-making becomes, the more exposed decision-makers become.

Augmentation without delegation

Across organizations, AI is consistently described as a tool of augmentation rather than substitution. Leaders rely on it to synthesize complex information, generate alternative scenarios, and structure strategic reasoning in environments characterized by informational saturation. “The value is not that AI decides for us,” one executive explains. “The value is that we arrive at the decision much better prepared.” This distinction between preparation and decision is central. AI transforms the upstream phases of decision-making but the final act of choice remains a human prerogative.

In biopharma, this distinction is particularly visible. AI can support clinical trial design, identify potential safety signals in large pharmacovigilance datasets, or help prioritize research and development investments across therapeutic areas. However, decisions affecting patient safety, regulatory submissions, portfolio allocation, or market access strategies ultimately remain the responsibility of executives, medical leaders, and regulatory authorities.

“I want options, not decisions. The decision is mine.” This boundary reflects a defining feature of leadership in high-stakes environments. Decisions are not merely analytical outputs; they are commitments carrying consequences across organizational and societal domains.

Research on human–AI interaction confirms this complementarity. AI systems enhance rather than replace human judgment (Jarrahi, 2018; Raisch & Krakowski, 2021). Yet, as analytical capacity increases, responsibility becomes more visible and more difficult to evade.

The paradoxes of augmented leadership

The integration of AI into decision-making processes reveals a set of structural paradoxes that redefine leadership without displacing it.

The first paradox lies in the coexistence of increasing analytical optimization and unchanged human accountability. AI enables precise modeling and comparison of alternatives, yet it cannot assume the consequences of decisions. “If something goes wrong, they will blame me, not the algorithm.” The more optimized decisions become, the more exposed the decision-maker becomes.

In biopharma, this exposure can be particularly significant. AI may support decisions regarding clinical trial design, portfolio prioritization, or the identification of safety risks. Yet when a development program is terminated, a therapeutic area is deprioritized, or a patient safety issue emerges, accountability remains attached to human decision-makers rather than to the systems that informed their choices.

A second paradox concerns time. AI accelerates decision preparation, compressing analysis that once required weeks into hours. However, organizations require time for interpretation, alignment, and deliberation. “The machine is fast. The organization isn’t.” Leadership therefore involves regulating speed as much as leveraging it.

A third paradox relates to objectivity. AI appears to offer neutral decision support through data-driven outputs. Yet these outputs depend on embedded assumptions. “The algorithm can tell you what works best. It cannot tell you what’s right.” Ethical judgment remains irreducible. This limitation is especially visible in decisions involving benefit–risk

assessments, patient access, or resource allocation, where scientific evidence alone cannot determine what is ethically or socially acceptable.

Finally, augmentation creates dependency. AI enhances cognitive capacity but also reshapes how decisions are formulated. “The more we use it, the harder it becomes to think without it.” This introduces a shift from human-centered reasoning to system-mediated reasoning. Over time, this may influence how organizations frame scientific, medical, and commercial questions, potentially narrowing the diversity of perspectives brought to complex strategic decisions.

Managerial implications: responsibility as the last human advantage

The findings presented in this paper suggest that the growing integration of AI into decision-making processes does not challenge the necessity of leadership as much as it transforms its foundations. Much of the contemporary debate surrounding AI focuses on automation, substitution, and the possibility that machines may progressively assume functions traditionally associated with managerial authority. The empirical evidence collected here points in a different direction.

What appears to be changing is not the existence of leadership but the nature of its contribution. Historically, leaders derived part of their legitimacy from their ability to gather information, interpret complexity, and formulate decisions under uncertainty. AI increasingly assists with each of these activities. It processes information more rapidly than humans, identifies patterns that escape individual cognition, and generates scenarios with unprecedented speed.

Yet none of these capabilities addresses the central question that organizations ultimately face: who is responsible for the consequences of a decision?

This question becomes particularly salient in biopharma because decisions affect not only organizational performance but also patient outcomes, public trust, and societal expectations. In such contexts, responsibility cannot be reduced to technical correctness. A decision may be analytically optimal and still be perceived as unacceptable. Conversely, a decision may be imperfect from a predictive standpoint yet remain legitimate because it reflects ethical commitments or precautionary principles.

The paradox, therefore, is that the more organizations rely on AI to enhance rationality, the more visible the limits of rationality become. Algorithms can optimize decisions, but they cannot legitimize them. They can support judgment, but they cannot replace the act of assuming responsibility.

This observation resonates with broader reflections on technology and accountability. As Floridi and Cowls (2019) argue, AI systems may transform the conditions of action, but moral agency remains fundamentally human. Similarly, Jonas (1979) emphasized that technological progress does not diminish responsibility; it enlarges its scope by increasing the potential consequences of human action. The executives interviewed in this study express a remarkably similar intuition. Far from feeling protected by AI, many describe feeling more exposed because the availability of sophisticated analytical tools reduces the possibility of attributing failure to ignorance or insufficient information.

In this sense, responsibility may represent the last irreducibly human dimension of leadership. Information can be augmented. Analysis can be accelerated. Communication can even be simulated. Responsibility cannot be outsourced.

Conclusion: the weight of responsibility

Artificial intelligence is transforming the conditions under which decisions are made. It expands analytical capacity, reduces informational complexity, and enables organizations to navigate uncertainty with greater precision. In sectors such as biopharma, these capabilities already influence critical activities ranging from clinical development and pharmacovigilance to regulatory strategy and market access.

Yet the evidence presented in this paper suggests that AI does not alter the fundamental nature of leadership. The core function of leadership has never been the mere production of information. It has been the capacity to assume responsibility for decisions whose consequences cannot be fully known in advance. As one executive succinctly summarized, “AI makes you smarter. But it also makes your responsibility heavier.”

This statement captures the central insight of the study. AI does not diminish leadership. It strips away some of its traditional informational burdens and reveals more clearly what remains. In an increasingly augmented environment, leadership is defined less by the ability to know and more by the willingness to assume.

Artificial intelligence may eventually automate analysis, prediction, and even communication. What it cannot automate is the burden of answering for a decision.

In an AI-augmented world, responsibility remains the last irreducibly human dimension of leadership.

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