


Applying the Triarchic Theory of Cognitive Disposition in AI stewardship

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Purpose: The purpose of this article is to philosophically argue the applicability of the Triarchic Theory of Cognitive Disposition (TTCD) in responsible artificial intelligence (AI) stewardship.

Design/methodology/approach: An overview of the Triarchic Theory and its three domains, Episteme-Analytical Intelligence, Techne-Inventive Intelligence, and Phronesis-Synergic Intelligence in relation to the challenges of integrating AI into our societies and organisations is provided, and argues that the theory provides a framework for responsible AI stewardship.

Findings/results: The article provides a conceptual philosophical framework for responsible AI stewardship.

Practical implications: The TTCD can help facilitate the responsible, ethical, and effective implementation of AI in organisational contexts. It provides practical examples of how the theory can be applied and highlights the ethical dilemmas associated with the integration of AI into our socio-economic fabric. The conceptualised insights can help guide business and society in the responsible integration of AI.

Originality/value: A new framework for addressing the challenges of integrating AI into our societies and organisations is provided. Practical examples demonstrate how the theory can be applied in organisational contexts, providing value to business leaders and practitioners. Additionally, the insights into the ethical quandaries associated with AI integration can benefit policymakers, academics, and society at large. Overall, the scientific contribution is its proposal of a comprehensive cognitive disposition that can guide responsible and effective AI stewardship.

Keywords: cognitive disposition; artificial intelligence (AI); responsible AI stewardship; episteme-analytical intelligence; techne-inventive intelligence; phronesis-synergic intelligence; leadership.

Introduction

In the age of digital transformation, where artificial intelligence (AI) continues to proliferate and permeate every facet of our societies and organisations, the imperative for responsible leadership has never been more obvious. The challenges associated with the integration of AI into our socio-economic fabric encompass ethical quandaries, trust deficits, and the dynamics of power and control (Brynjolfsson & McAfee, 2014; Choung et al., 2022; Scharre, 2018). As we grapple with these challenges, leadership theory and practice are continuously being re-evaluated and reconceptualised to meet the unique demands of this digital era.

In this essay, against the backdrop of AI's ascendance across all facets of human existence, I provide a succinct expose of where we are at in AI's march towards fusion with our existential reality, briefly introduce the *Triarchic Theory of Cognitive Disposition* (Oosthuizen, 2022), and argue a case for its leadership application in responsible AI stewardship in organisations. The theory offers an integrative framework, delineating three main domains, each comprising three sub-domains, that collectively capture the essence of the requisite contemporary leadership cognitive disposition. Specifically, it integrates *episteme-analytical intelligence*, *techne-inventive intelligence*, and *phronesis-synergic intelligence*, blending analytical ability, inventive capacity, and synergistic collaboration, respectively. As AI continues its relentless march into diverse sectors, from healthcare to finance to education to governance and beyond, there is a pressing need for leaders to not only understand AI but to steward it responsibly, ensuring that its integration brings about societal benefits while minimising potential harm.

I thus explore how the Triarchic Theory of Cognitive Disposition (TTCD) can be effectively applied in the realm of responsible AI stewardship. Through a synthesis of the theoretical

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foundations and its practical applications, I aim to illuminate a pathway for leaders to navigate the complex terrains of AI, leveraging the cognitive dispositions outlined in TTCD to foster ethical, trustworthy, and empowering AI ecosystems.

Challenges and trajectories of artificial intelligence in organisational settings

Artificial intelligence, since its conception by McCarthy et al. (1955, p. 2), has been accompanied by utopian promises and dystopian anxieties. As organisations across the globe rapidly integrate AI solutions into their core operations, understanding the current state and future trajectories of AI becomes vital (Enholm et al., 2022; Fountaine et al., 2019). Artificial intelligence's integration into businesses is not a mere addition of tech-tools and applications but a transformative alteration of core processes (Jarrahi et al., 2023). Over recent years, we have witnessed a surge in the adoption of AI-driven solutions for tasks ranging from customer service chatbots and sales predictions to talent acquisition and supply chain optimisation (Davenport & Ronanki, 2018), automation to healthcare, education and beyond (Díaz-Rodríguez et al., 2023). As Bughin et al. (2017) noted, the sectors experiencing the most significant AI-induced transformation include finance, healthcare, and telecommunications, with a significant influx of investments and innovations. However, as AI systems become more entrenched in organisational processes, concerns around their ethical use, the trustworthiness of their algorithms, and their potential to centralise or misuse power have grown (Floridi et al., 2018; Shin, 2021).

Ethical dilemmas in AI deployment often centre around issues like algorithmic biases, data privacy, and transparency (Gillespie et al., 2023). For instance, automated hiring tools, if not properly trained, can inadvertently propagate biases present in historical data, leading to unfair hiring practices (Dastin, 2018). Additionally, with AI systems often operating as 'black boxes', the lack of transparency can hinder the understanding and accountability of their decisions (Castelvecchi, 2016; Choung et al., 2022; Floridi et al., 2018). Trust in AI systems is, therefore, paramount, especially in sectors like healthcare, where decisions have life-altering consequences. However, the unpredictability and opacity of certain AI models, particularly deep learning, have made establishing trust a significant hurdle. While there are initiatives to make AI models more explainable (Ribeiro et al., 2016), widespread adoption in organisational settings remains a challenge. Furthermore, the delegation of decisions to automated systems raises concerns about power dynamics (Jarrahi et al., 2023). Who controls the AI? How can misuse be prevented? These questions have become central in discussions around AI governance. Moreover, there is a growing fear of AI systems making autonomous decisions that are not in an organisation's or society's best interest, emphasising the importance of creating robust control mechanisms (Russell et al., 2015).

Thus, while AI offers unprecedented potential for organisational efficiency and innovation, its integration is riddled with complex challenges. Addressing these requires not only technological solutions but a profound rethinking of leadership strategies and cognitive dispositions (Oosthuizen, 2022). Traditional leadership paradigms often fall short in addressing the multifaceted challenges posed by AI, such as ethical dilemmas, trust issues, and the dynamic nature of technological change. Scholars like Brynjolfsson and McAfee (2014) and Scharre (2018) underscore the urgent need for leadership approaches that can navigate these complexities effectively. The growing body of literature on leadership in the digital economy advocates for a shift towards more adaptive, ethical, and innovative leadership styles (Fountaine et al., 2019; Jarrahi et al., 2023). In this context, the TTCD offers a robust framework that integrates analytical, inventive, and synergic intelligences, providing leaders with the necessary cognitive tools to steward AI responsibly. By fostering a holistic cognitive disposition, the TTCD not only addresses the ethical and practical challenges of AI, but also aligns with the broader discourse on evolving leadership paradigms for the digital age.

Philosophical reflection on artificial intelligence in organisational settings

The integration of AI into organisational settings, with all its accompanying challenges, prompts us to consider deeper philosophical issues around human agency, ethics, and the nature of intelligence itself. The confluence of technology and philosophy offers a rich tapestry of insights into how we ought to approach AI's ascent in our modern institutions. Historically, intelligence has been the dominion of sentient beings, largely associated with consciousness, self-awareness, and subjective experience (Searle, 1980). Artificial intelligence, however, pushes the boundaries of this definition. If an entity can perform tasks, solve problems, and even create without consciousness, what then defines intelligence? This challenge compels us to reconsider our very definitions of cognition, intelligence, and consciousness, accounting for the unique capabilities and constraints of artificial entities (Chalmers, 1995; Díaz-Rodríguez et al., 2023).

Thus, if AI systems can make decisions, who bears the moral responsibility for those decisions? Traditional ethical frameworks place humans at the centre of moral agency, but the integration of AI introduces shared agency between humans and machines (Díaz-Rodríguez et al., 2023; Floridi & Sanders, 2004). This raises questions about the nature of responsibility. If an AI system causes harm, is it the fault of the system, the programmers, the users, or the organisation deploying it? A more distributed notion of agency requires an equally distributed and nuanced understanding of responsibility. As AI systems gain more autonomy, we are confronted with philosophical issues about control and power. The age-old fear of creating something beyond our control is now a tangible reality (Bostrom, 2014; Lennox,

2020; Tegmark, 2017). It prompts reflections on the very nature of creation, mastery, and the potential consequences of ceding control to non-human entities. At what point does delegation become abdication? This concern aligns with broader philosophical dialogues on the balance of power between creators and their creations.

It is a truism that our relationship with the unknown has always been a central philosophical theme, and AI, especially its 'black box' aspects, amplifies this (Castelvecchi, 2016; Choung et al., 2022). When we do not fully understand the workings of a system, yet rely on it, we are treading a fine line between trust and faith. The age of AI compels a re-evaluation of our epistemological stances: What does it mean to know, and can we trust without fully knowing? Onyeukaziri (2023) argues that the questions on the moral, ethical, and legal responsibilities of AI actions are external to the epistemic framework and authority of the science of AI. He contests that:

[P]hilosophy is rather the proper science, whose nature is to reflect and elucidate the epistemic problematics around the moral, ethical, and even legal questions around the science and development of AI. (p. 74)

In reflecting on the current state and future trajectories of AI in organisational settings, it is evident that this technological evolution is not merely a practical challenge but a profound philosophical one. Our approach to AI, I argue, cannot merely be technical or managerial – it must be deeply philosophical, as the questions AI raises touch the very core of our understanding of existence, intelligence, and morality. It is in this pursuit of navigating the ethics, trust, and control challenges of AI in organisational settings, that I propose the TTCD as holding promise in charting a course towards responsible AI stewardship.

The triarchic theory of cognitive disposition

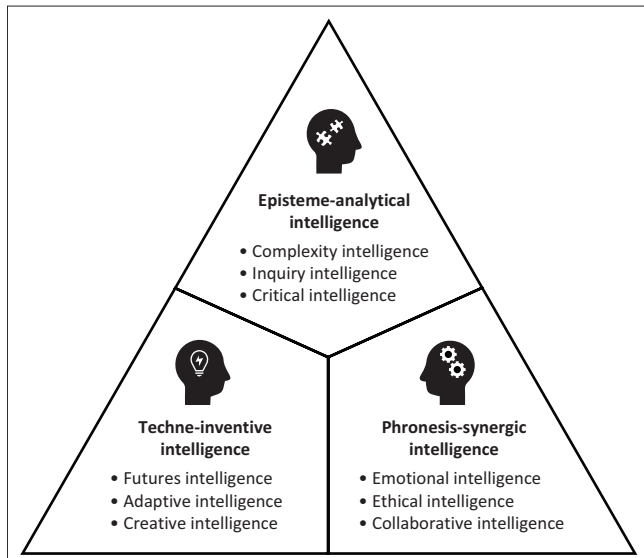
The TTCD was the result of an extensive study undertaken by Oosthuizen (2022) that set out to determine the cognitive disposition top-management requires to navigate the context of the Fourth Industrial Revolution (4IR). The notion of *cognitive disposition* can be understood from the premise of De Houwer et al. (2017) who posit that cognition can be viewed both in terms of its complex interactions with the environment and the information processing that guides these interactions. Ritchhart (2001) describes thinking dispositions as traits that drive and shape our cognitive abilities to promote beneficial thinking, which is evident in our regular voluntary actions. Dispositions not only guide our strategic thinking but also activate relevant knowledge, making it readily available to address the current context. Notably, dispositions differ from mere desires; they are backed by action and carry the capability to execute that action. Unlike repetitive habits, dispositions lead to a broad range of responses instead of specific acts. Combined, the intensity and presence of these dispositions define our intellectual character or, cognitive disposition (Ritchhart, 2001, p. 146).

Given the aforementioned, it was theorised that the cognitive disposition of top executives correlates with each of the nine pinpointed intelligence categories that initially emerged from a Delphi-study (Complexity Intelligence, Collaborative Intelligence, Emotional Intelligence, Inquiry Intelligence, Futures Intelligence, Adaptive Intelligence, Creative Intelligence, Critical Intelligence, and, Ethical Intelligence) (Oosthuizen, 2022; Oosthuizen et al., 2023a). These categories were then integrated into three higher-order constructs to facilitate modelling on a more abstract higher-level dimension and its more concrete lower-order subdimensions (Sarstedt et al., 2019).

Based on the strength of correlations, and drawing on Sternberg's (1999) triarchic theory of intelligence, augmented by Aristotle's three intellectual virtues (episteme, techne, and phronesis), Complexity Intelligence, Inquiry Intelligence, and Critical Intelligence were integrated into *Episteme-Analytical Intelligence*; Futures Intelligence, Adaptive Intelligence, and Creative Intelligence into *Techne-Inventive Intelligence*; and Emotional Intelligence, Ethical Intelligence, and Collaborative Intelligence into *Phronesis-Synergic Intelligence* (Oosthuizen, 2022). Aristotle's (ca. 350 B.C.E./1925) three intellectual virtues – *episteme* (theoretical knowledge), *techne* (practical knowledge or craft), and *phronesis* (practical wisdom) – provide a foundational framework for understanding the cognitive dispositions necessary for effective leadership in the age of AI. *Episteme* involves the pursuit of universal truths and scientific understanding, guiding leaders in analytical and evidence-based decision-making. *Techne* pertains to the skilful application of knowledge to create and innovate, essential for leaders to adapt and thrive in rapidly changing technological environments. *Phronesis*, or practical wisdom, emphasises ethical considerations and the ability to make judicious decisions in complex, real-world situations. Integrating these Aristotelian virtues into the TTCD enriches the framework by grounding it in a time-tested philosophical tradition that balances theoretical insight, practical skill, and ethical responsibility, thus providing a comprehensive framework for responsible AI stewardship.

Initially termed the *4IR Integrated Intelligence Framework* (Oosthuizen, 2022), the nomenclature was adapted to the *Triarchic Theory of Cognitive Disposition* (Oosthuizen et al., 2023b) as it was linguistically deemed more appropriate.

It is important to note, though, that the integrated intelligence framework or TTCD (See Figure 1) is not a psychological tool but a framework for leadership and management practice. The framework proposes that there are three distinct domains, which in turn consist of three sub-domains each. As a unified integrative framework, it represents the cognitive disposition required to navigate 4IR. The term 'intelligence' in this context hence implies the general mental capability, involving the ability to reason, plan, solve problems, think abstractly, comprehend complex ideas, learn quickly, and learn from experience (Gottfredson, 1997; Nevid, 2013; Winston & Patterson, 2006).



Source: Oosthuizen, J.H. (2022). *A fourth industrial revolution integrated intelligence taxonomy and measurement framework for top management*. Unpublished doctoral dissertation. University of Stellenbosch

FIGURE 1: Triarchic theoretical framework of cognitive disposition.

Episteme-analytical intelligence

Complexity Intelligence refers to a set of abilities that enable an individual to navigate complex and dynamic environments. This intelligence encompasses several skills, including the ability to recognise and resolve gaps between current situations and desired states, achieve ill-defined goals, and intuitively grasp salient features of ambiguous situations. Additionally, it involves integrating perceptual processes, emotions, moral agency, and language to shape judgements. Complexity Intelligence also entails synthesising scientific theory with practical skill and goal realisation. Finally, it involves identifying complex problems, reviewing related information, and developing and evaluating options to implement effective solutions (Oosthuizen, 2022; Oosthuizen et al., 2023a, 2023b).

Inquiry Intelligence refers to a set of abilities that enable individuals to engage in lifelong learning and create a culture of learning within their organisation. This intelligence involves self-directing one's own learning and determining the skill sets required for future work. It also includes creating an environment for learning-on-demand, collaborative learning, and organisational learning. Additionally, Inquiry Intelligence promotes the importance of lifelong learning and the ability to understand what learning is appropriate for the occasion and to act accordingly. Learning from real-life challenges is also a crucial aspect of Inquiry Intelligence. Finally, it involves the ability to unlearn and relearn, turning knowledge into understanding (Oosthuizen, 2022; Oosthuizen et al., 2023a, 2023b).

Critical Intelligence refers to a set of skills that enable individuals to think reflectively and make sound decisions based on reasoning and evidence. This intelligence involves applying

standards or criteria for accuracy, relevance, and depth of thinking. It also requires thinking authentically about real problems and asking questions, attempting to answer those questions, and trusting the results of reasoning. Additionally, Critical Intelligence involves accurately knowing what to do next and actively, persistently, and carefully considering any belief or supposed form of knowledge in terms of the grounds that support it and the conclusions it tends to lead to. Analysing arguments and making inferences using inductive or deductive reasoning is also a crucial aspect of Critical Intelligence. Moreover, it requires appreciating the multi-layered facets of complex realities in a given situation, balancing tensions, and critically reflecting towards practice. Finally, Critical Intelligence involves using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions, or approaches to problems (Oosthuizen, 2022; Oosthuizen et al., 2023a, 2023b).

Techne-inventive intelligence

Futures Intelligence refers to the ability to plan for the future by combining a certain mindset with a specific methodology. This involves systematic thinking about the future, which can be used to inform current decision-making processes. It is not a formulaic approach like traditional strategic planning but instead considers various scenarios such as what may happen, what could happen, what is likely to happen, and what we want to happen. In addition, futures intelligence maps the past, present, and future, anticipates future problems and their consequences, and is aware of the grand patterns of change. It also extends analysis to include worldviews, myths, and metaphors and creates alternative futures (Oosthuizen, 2022; Oosthuizen et al., 2023a, 2023b).

Adaptive Intelligence refers to the ability to adapt to unanticipated situations and effectively change in response to altered situations. This involves recognising patterns, adjusting solutions, and implementing plans of action accordingly. Instead of reacting to change, adaptive intelligence anticipates it and adapts within the dynamic flow of real-time events unfolding. It also adapts to changes in both internal and external environments and strategically re-orientates the organisation. Additionally, it improves the ease with which change is implemented and tolerates uncertainty while coping with new and challenging situations (Oosthuizen, 2022; Oosthuizen et al., 2023a, 2023b).

Creative Intelligence refers to the ability to generate new and useful ideas that are accepted as tenable or satisfying. This involves systematically evaluating novel ideas and selecting the most promising ones, promoting them for approval, and acquiring resources to implement them. Creative intelligence also requires the ability to think non-conventionally, analytically, and practical-contextually, and to overcome obstacles, take sensible risks, tolerate ambiguity, and foster self-efficacy. It is crucial to balance creativity and discipline to produce practical outcomes. Moreover, creative intelligence helps to develop new ideas and answers to opportunities and challenges presented by the Fourth Industrial Revolution.

A culture of experimentation that tolerates failure and links innovation to a new purpose should also be created to promote creative intelligence (Oosthuizen, 2022; Oosthuizen et al., 2023a, 2023b).

Phronesis-synergic intelligence

Emotional Intelligence refers to the capacity to understand and manage one's own emotions, as well as recognise and respond to the emotions of others. It involves monitoring and distinguishing between different feelings and using this information to guide one's thoughts and actions. Individuals with high emotional intelligence exhibit self-awareness, self-regulation, motivation, empathy, and social skills. They are able to develop positive relationships and inspire emotional commitment from those around them. Furthermore, emotional intelligence contributes to strengthening organisational culture, enhancing resilience, and increasing flexibility. It involves demonstrating emotional stability, control, and regulation, while also recognising personal emotions and biases and setting them aside when necessary. Individuals with strong emotional intelligence possess the emotional strength to persevere in the face of opposition and can effectively process and integrate their thoughts and feelings, fostering healthy relationships with themselves and others (Oosthuizen, 2022; Oosthuizen et al., 2023a, 2023b).

Ethical Intelligence refers to the ability to demonstrate appropriate conduct based on ethical standards, both in personal actions and in relationships with others. It involves actively promoting ethical behaviour among followers through effective communication, reinforcement, and decision-making. Individuals with ethical intelligence exhibit honesty, care, and principled behaviour, ensuring fairness and balance in their decision-making processes. They possess the capability to think beyond short-term gains and consider the long-term consequences, drawbacks, and benefits of their actions. Ethical intelligence also encompasses humility and a genuine concern for the greater good, while simultaneously striving for fairness, taking responsibility, and showing respect to all individuals. These individuals contribute to creating an ethical work environment by applying social learning principles. They possess ethical reflexivity, drawing from formal ethical principles while remaining open to the specific details of each situation. Ethical intelligence involves aligning one's thoughts, desires, and actions with ethical standards and fostering harmony between reason, emotions, and behaviour. It emphasises a sense of community and a focus on the greater good rather than self-interest. Ethical intelligence requires attentiveness to moral issues, engaging in cognitive reflection on morality and moral matters. Furthermore, individuals with ethical intelligence remain alert to emerging moral issues where established moral guidelines may not yet exist. They actively determine their own moral identity and that of their organisation, working towards developing new ethical norms that contribute to a better society based on a clear vision of how and why those norms are beneficial (Oosthuizen, 2022; Oosthuizen et al., 2023a, 2023b).

Collaborative intelligence refers to the capacity to engage in effective collaboration and cooperation with others. It involves utilising negotiation skills and employing open communication and a formal process to find the best solutions and mitigate the impact of crises. Collaborative intelligence fosters a relational system where individuals share common aspirations and a shared conceptual framework, guided by principles of justice and fairness. It relies on each individual's awareness of their motives towards others. Individuals with collaborative intelligence leverage a sense of individual and shared purpose, as well as trust, to drive positive change and work towards the common good. They prioritise trust, communication, commitment, knowledge sharing, and transparent actions. Collaboration and knowledge sharing are central to their approach in completing tasks and solving problems. Furthermore, collaborative intelligence involves creating positive narratives that inspire hope and enable individuals and groups to actively participate in and benefit from ongoing transformations. It also encourages the promotion of new forms of multi-stakeholder collaboration, extending beyond traditional organisational boundaries, and engaging stakeholders outside the organisation. This adaptability and openness to collaboration with diverse stakeholders contribute to the long-term sustainability and success of the organisation (Oosthuizen, 2022; Oosthuizen et al., 2023a, 2023b).

Applicability of the triarchic theory of cognitive disposition to responsible artificial intelligence stewardship

In an age where AI's ubiquity promises transformation and disruption alike, responsible stewardship, as noted, is not just a technical or managerial challenge, but also philosophical one. The integration of AI into organisational settings demands more than traditional leadership models that were primarily based on human interactions and manual processes. Instead, it beckons for an evolved leadership disposition, one that is embedded in understanding and shaping the complex interplay of ethics, intelligence, and agency in an AI-dominated landscape. I therefore argue that the TTCD offers a compelling framework for this very purpose. Let us dissect its applicability from a philosophical standpoint.

The confluence of Episteme-Analytical, Techne-Inventive, and Phronesis-Collaborative: Ancient philosophical discourse, especially in the Aristotelian tradition, has long distinguished between different kinds of knowledge: 'episteme' (theoretical understanding), 'techne' (craft or technical knowledge), and 'phronesis' (practical wisdom) (Aristotle, ca. 350 B.C.E./1925). In the context of AI, these distinctions gain renewed significance. Yet, while these concepts provide valuable insights into the nature of knowledge and decision-making, the TTCD builds upon and extends these ideas to meet the specific challenges of AI integration. The TTCD uniquely synthesises Aristotelian virtues with Sternberg's triarchic theory of intelligence,

creating an inclusive framework that addresses the cognitive, ethical, and collaborative dimensions required for contemporary leadership. By integrating *Episteme-Analytical Intelligence* for understanding complex AI systems, *Techne-Inventive Intelligence* for fostering innovation and adaptability, and *Phronesis-Synergic Intelligence* for ethical and collaborative decision-making, the TTCD offers a nuanced approach that is specifically tailored to navigate the complexities of AI. This holistic model not only draws from ancient wisdom but also incorporates modern psychological insights, making it uniquely suited to guide leaders in responsibly stewarding AI technologies. Hence, AI's transformative power necessitates leaders who possess Episteme-Analytical Intelligence, Techne-Inventive Intelligence, and Phronesis-Synergic Intelligence. That implies, firstly, an understanding of the complexities, the capacity for inquiry, and critical assessment of AI systems. Secondly, the foresight to anticipate AI's trajectory, the adaptability to emergent AI technologies, and the creativity to innovate ethically and responsibly with AI tools. Thirdly, emotional acumen to navigate the human-AI interface, ethical grounding to ensure AI's responsible application, and collaborative prowess to integrate diverse human and machine capacities harmoniously.

Ethics, trust, and control in the age of AI: Drawing from the earlier exploration of AI challenges in organisational settings, the components of Phronesis-Synergic Intelligence, particularly ethical intelligence, directly address the moral dimensions of AI. Leaders equipped with a developed ethical intelligence would be more attuned to recognising and mitigating algorithmic biases, ensuring transparency, and aligning AI's operations with organisational and societal values. Also, establishing trust in AI systems is no simple feat. It demands both an in-depth understanding of AI (Episteme-Analytical Intelligence) and the creative capacity to present AI processes transparently and understandably to stakeholders (Techne-Inventive Intelligence). Additionally, control in an AI ecosystem requires a synthesis of all three domains. The epistemic domain ensures a thorough comprehension of AI's capabilities and limitations. The techne domain provides tools and strategies to rein in and direct AI's potential, while the phronetic domain emphasises the humanistic, collaborative, and ethical aspects of managing power dynamics.

The necessity of an integrative approach: AI's challenges are multi-faceted, and addressing them requires an integrative, holistic approach, precisely what the TTCD proposes. By fostering development across all three domains and their respective sub-domains, leaders can be equipped with a cognitive disposition that resonates with the intricate demands of responsible AI stewardship. The TTCD not only aligns with ancient philosophical wisdom but also aptly addresses the contemporary challenges posed by AI's rise. By promoting a comprehensive cognitive disposition, it offers a philosophical roadmap for leaders to navigate and shape the AI-driven future responsibly and effectively.

From theory to practice: Leadership development

To move the leadership discourse forward, it is essential to consider how the cognitive dispositions encapsulated in the TTCD can be cultivated in leaders and integrated into leadership development programmes. The effective development of Episteme-Analytical Intelligence, Techne-Inventive Intelligence, and Phronesis-Synergic Intelligence requires a deliberate and structured approach within educational and professional training environments:

- *Episteme-Analytical Intelligence* can be developed through rigorous analytical training, fostering critical thinking, and emphasising evidence-based decision-making. Leadership programmes should incorporate case studies, problem-solving exercises, and data analysis projects that challenge leaders to apply theoretical knowledge to real-world scenarios.
- *Techne-Inventive Intelligence* necessitates an environment that encourages creativity, innovation, and adaptability. Leadership curricula should include design thinking workshops, innovation labs, and scenario planning exercises. These activities help leaders to anticipate future trends, adapt to new technologies, and devise creative solutions to emerging challenges.
- *Phronesis-Synergic Intelligence* focuses on ethical decision-making, emotional intelligence, and collaborative skills. Developing this intelligence involves training in ethics, empathy, and communication. Leadership development programmes should offer courses on ethical leadership, emotional intelligence workshops, and team-building activities that promote collaboration and trust.

Current leadership development programmes and curricula must be restructured to accentuate these intelligences. Traditional leadership training often focuses heavily on technical skills and theoretical knowledge, with insufficient attention to ethical considerations and adaptive thinking. Integrating the TTCD framework can address these gaps, providing a more holistic approach that aligns with the demands of responsible AI stewardship.

To achieve this, organisations and educational institutions should incorporate interdisciplinary approaches, combining insights from psychology, philosophy, technology, and management. They should also foster a culture of continuous learning and development, encouraging leaders to engage in lifelong learning and reflective practices.

Ultimately, the 'holy grail' of leadership development lies in effectively fostering the required cognitive dispositions and behavioural approaches. By embracing the TTCD framework, leadership development programmes can equip leaders with the comprehensive cognitive toolkit necessary to responsibly navigate the complexities of AI and drive sustainable organisational success.

From theory to practice: Practical examples

To illustrate how these principles can be applied in responsible AI stewardship and bridging the gap between abstract postulation and concrete action, the following practical examples can potentially guide ethical AI development, deployment, and governance in an organisational setting.

Episteme-analytical intelligence

- *Complexity Intelligence*: Before implementing a new AI system for recruitment, an organisation conducts a comprehensive systems analysis to understand potential biases and the cascading effects these biases could have on company culture, diversity, and long-term growth.
- *Inquiry Intelligence*: A leader constantly encourages their team to pose critical questions about the AI solutions being proposed. For instance, if a vendor suggests a new AI-driven marketing tool, the team is competent to ask, 'How does it work? What data does it need? How does it ensure user privacy?'
- *Critical Intelligence*: During quarterly reviews, the leader ensures that the performance metrics of AI systems are critically assessed against their claimed capabilities. Any discrepancies lead to an in-depth review and potential recalibration.

Techne-inventive intelligence

- *Futures Intelligence*: Leadership arranges regular brainstorming sessions about the future of AI in their industry. They play out scenarios 5 or 10 years ahead, enabling the company to strategically position itself for future challenges and opportunities.
- *Adaptive Intelligence*: When a deployed AI system in customer service receives backlash for not understanding user sentiments effectively, the leadership quickly pivots, enhancing the system's training data and integrating more human oversight until the AI's performance improves.
- *Creative Intelligence*: Instead of using off-the-shelf AI solutions, an organisation encourages its employees to participate in hackathons and idea-generation platforms to conceive novel AI applications that are tailored to the company's unique challenges.

Phronesis-synergic intelligence

- *Emotional Intelligence*: Recognising that employees might be anxious about AI taking over their jobs, leadership initiates open dialogues, training sessions, and upskilling programmes to transition staff into roles where they work symbiotically with AI, ensuring no abrupt layoffs.
- *Ethical Intelligence*: Prior to the deployment of any AI system, an ethics committee, consisting of diverse stakeholders, reviews the system for potential ethical

pitfalls, ensuring issues like bias, discrimination, and privacy breaches are thoroughly addressed.

- *Collaborative Intelligence*: Leadership creates cross-functional AI teams, merging tech experts with ethicists, business strategists, and frontline employees. This ensures that AI solutions are holistic, considering technical feasibility, ethical implications, business needs, and user experience.

Integration in practice

Consider, for example, an organisation explores the option to implement an AI-driven customer support chatbot. Using the integrative approach:

- They would first analyse (Episteme-Analytical) how this AI would fit into their existing support ecosystem, understanding its complexities.
- They would creatively (Techne-Inventive) design or choose a chatbot solution that is tailored to their customer demographics and anticipates future needs.
- And finally, they would ensure that the bot is emotionally attuned (Phronesis-Synergic) to the users, respects their privacy, and is overseen by a collaborative team that can iteratively refine its operations based on real-world feedback.

These practical examples, driven by the principles of TTCD, ensure that AI is implemented responsibly, ethically, and effectively in organisational contexts.

Conclusion

The march of AI into organisational terrains presents a paradigm shift that goes beyond mere technological adoption. It invites us into a deep re-examination of leadership, cognition, and responsibility, requiring us to blend historical wisdom with future-forward thinking. The intricacies of the nexus between humans and machines are embedded not just in codes and algorithms but also in a more ancient code – the philosophical considerations that have shaped human thought for millennia.

Triarchic Theory of Cognitive Disposition serves as a beacon in this evolving landscape, offering a blueprint for responsible AI stewardship that resonates with both age-old philosophical insights and the unique challenges of our contemporary age. It reminds us that leading in the era of AI is not merely about understanding the machine but also about deepening our understanding of ourselves.

This article has traversed the current state of AI in organisations, highlighting the entangled challenges of ethics, trust, and control. It has also ventured into a philosophical reflection, drawing on established literature to understand the broader implications of AI's trajectory. Here, the theory stands out not as a mere academic construct but as a vital tool, offering leaders the cognitive framework to navigate the complexities of an AI-driven world.

In light of the discussions, several key takeaways subsequently emerge:

- *Integrative thinking is crucial:* The multifaceted challenges of AI demand an integrative leadership approach. By emphasising the interconnectedness of its three domains, the TTCD offers a holistic lens through which leaders can view and address AI-related issues.
- *Emphasis on ethical grounding:* With the growing influence of AI, ethical considerations take centre stage. The theory underscores the importance of ethical intelligence, pushing leaders to align technological advancements with moral imperatives.
- *The human-AI synergy:* As machines grow in capability, the human touch becomes even more crucial. The TTCD's emphasis on emotional and collaborative intelligence champions the harmonious integration of human intuition and AI precision.
- *Continuous evolution:* AI's landscape is ever-evolving. The TTCD's emphasis on adaptive and futures intelligence propels leaders to remain agile, anticipating shifts and pivoting accordingly.

In sum, as we stand at the crossroads of an AI revolution, the TTCD emerges as more than just a guide; it is a compass, orienting leaders towards responsible, ethical, and effective AI stewardship. As organisations grapple with AI's transformative potential, adopting such a comprehensive cognitive disposition will be instrumental in shaping a future where technology serves humanity, and not the other way around. The true measure of our success in this endeavour will not just be the sophistication of our AI systems but the wisdom with which we deploy them.

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Competing interests

The author declares that he has no financial or personal relationships that may have inappropriately influenced him in writing this article.

Ethical considerations

An application for full ethical approval was made to the Research Ethics Committee of Boston City Campus and ethics consent was received on 10 November 2023. The ethics waiver number is EW20231110-001.

Author's contributions

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Data availability

Data sharing is not applicable to this article, as no new data were created or analysed in this study.

Disclaimer

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