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Kahneman's legacy in project management: Improving decision-making and performance

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1. Introduction

Daniel Kahneman's groundbreaking work in psychology and behavioral economics has had a profound influence on various fields, including project management. His work brought greater attention to the critical front-end phase of projects, where many of the cognitive biases and decision-making errors he identified can have the most impact on projects. His work has challenged conventional wisdom, offering a compelling alternative explanation for forecasting inaccuracies and project failures, moving beyond the traditional view that attributes them to technical errors and honest mistakes (Cantarelli et al., 2010; Flyvbjerg et al., 2002, 2009). This essay examines how key concepts from Kahneman's work enhance understanding of project underperformance, account for escalation of commitment, and improve project performance, concluding with avenues for future research.

2. Understanding project underperformance

Kahneman's dual-system theory, introduced in *Thinking, Fast and Slow* (2011), is the result of decades of research on judgment, decision-making, and cognitive biases. The theory distinguishes between two modes of thinking: System 1, characterized by fast, intuitive, automatic, and heuristic-driven decision-making, and System 2 which is slow, analytical, and deliberate (Kahneman, 2011).

In project planning, System 1 thinking often dominates decision-making, leading individuals to rely on heuristics and focus on best-case scenarios (Buehler et al., 1994). While heuristics enable quick decision-making, they often lead to systematic errors and cognitive biases (Kahneman & Tversky, 1979), such as optimism bias, where planners systematically underestimate risks and overestimate success. This bias fosters the Planning Fallacy (Kahneman & Tversky, 1979), as individuals and organizations fail to account for past experiences and assume their projects will proceed as intended. This tendency is reinforced by the "inside view" in project planning, which emphasizes project-specific details over historical comparisons (Kahneman & Lovallo, 1993).

Kahneman's work has contributed to the identification of additional cognitive biases that impact project planning (Flyvbjerg, 2021). For instance, with uniqueness bias, managers believe that their projects are one of a kind, whereas in reality, this is rarely the case (Flyvbjerg et al., 2025). This can lead managers to dismiss lessons from other projects, causing them to underestimate risks, overestimate opportunities, and make poor decisions. Moreover, pessimism bias can lead to overly conservative budgets, with inflated risk allowances leading to pessimistic rather than optimistic projections (Love et al., 2019, 2022).

In addition to cognitive bias, political bias has been recognized as a significant factor influencing large-scale projects (Flyvbjerg, 2018; Flyvbjerg et al., 2009, 2018). This political bias, or strategic misrepresentation, is the "tendency to deliberately and systematically distort or misstate information for strategic purposes" (Flyvbjerg, 2021, p. 532).

These additional biases led to a refinement of the Planning Fallacy, recognizing its distinct origins, and differentiating between the *honest* (or unintentional) Planning Fallacy driven by delusional optimism and the *intentional* Planning Fallacy (Ika et al., 2022) driven by strategic deception. Kahneman's role in shaping the literature on the Planning Fallacy is well recognized [for a more extensive review, see the study by Ika and Pinto (2025)].

3. Explaining escalation of commitment

While not a cognitive bias itself, escalation of commitment is shaped by cognitive and motivational biases and is widely recognized as a key contributor to cost overruns, delays, and broader project failure (Cantarelli et al., 2010). Escalation of commitment (also referred to as lock-in) is defined as the "tendency for individuals to become overly committed to escalation situations" (Staw & Ross, 1987, p. 41). Initially applied to the implementation phase, this was later expanded to include the decision-making phase (Cantarelli et al., 2010). Escalation of

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commitment underpins the occurrence of strategic misrepresentation. In his analysis of the Channel Fixed Link case, Winch (2013) illustrates how future-perfect strategizing encourages strategic misrepresentation at the project's inception. This initial deception then triggers a cycle of escalation of commitment, as it entices investment and, later, growing awareness of failure prompts continued support driven by sunk costs, reputational concerns, and political pressures.

Kahneman's work on prospect theory significantly advanced our understanding of escalation of commitment by providing a complementary explanation (Whyte, 1986) to the dominant self-justification perspective (Brockner et al., 1986; Staw, 1976). The framing of the situation as a choice between losses is the primary driver, not the need to justify past actions. In the domain of losses, individuals become more risk-seeking as the fear of realizing a loss increases their willingness to take risks (Brockner, 1992; Whyte, 1986). This means that when faced with the choice between a sure loss (by abandoning the project) and the possibility of a larger loss but also a chance to recover (by escalating commitment), individuals are more likely to choose the riskier option of escalation.

This tendency to act on the fear of loss rather than rational evaluation is a characteristic of System 1 thinking. When faced with losses, individuals often prefer to increase their commitment rather than acknowledge failure, a tendency driven by optimism and overconfidence. Juliusson (2006) showed that optimistic participants were more likely to continue investing, while pessimistic individuals tended to withdraw.

In addition to loss aversion and the framing effect, System 1 thinking can also explain some of the other factors that lead to escalation (Brockner et al., 1981; Staw & Ross, 1987a). For example, System 1 thinking drives self-justification by triggering immediate, emotional reactions. Instead of objectively reassessing decisions, individuals instinctively defend past choices to avoid cognitive dissonance. Similarly, in face-saving situations, fast, heuristic-driven responses push individuals to escalate commitment to avoid feelings of embarrassment or perceived failure, even when rational reflection (System 2) would suggest cutting losses.

Emotions therefore significantly shape escalation of commitment. While Wong et al. (2006) found that individuals with high negative affect tend to withdraw from failing projects to avoid discomfort, Harvey and Victoravich (2009) show that it is the type of emotion that matters. Emotions such as pride, hope and overconfidence may sustain commitment, whereas fear and distress are more likely to trigger withdrawal.

Prospect theory has also given rise to a new strand of inquiry into risk perceptions and their influence on escalation of commitment. For instance, Wong (2005) found that risk propensity and outcome expectancy increase escalation of commitment, while risk perception reduces it. Similarly, Cantarelli et al. (2022) showed that risk responses vary based on individual risk aversion; risk-averse decision-makers tend to be more cautious, whereas risk-seeking ones tend to downplay escalation risks, making escalation more likely. Decision-makers also often fail to accurately assess the true risks of escalation, increasing the likelihood of escalation of commitment. System 1 thinking contributes to this misjudgment by relying on heuristics and emotional responses instead of analytical reasoning. Both cognitive and political biases can contribute to flawed risk perception and increased persistence, with cognitive bias operating at either a conscious or unconscious level, and political bias manifesting as either intentional or unintentional strategic manipulation (Cantarelli et al., 2022).

4. Improving project performance

Kahneman's dual-process theory helps explain cognitive biases that lead to systematic misjudgments in project planning and provides insights into practical solutions. By recognizing the dominance of System 1 in decision-making, planners can deliberately engage System 2 to counteract biases, shift from an inside view to an outside view, and improve forecasting accuracy. Adopting an outside view, such as reference class forecasting (RCF), encourages comparison with similar past projects, helping to counter optimism bias and improve the accuracy of time and cost estimates (Flyvbjerg, 2006; Kahneman & Lovallo, 1993; Kahneman & Tversky, 1979; Lovallo & Kahneman, 2003). "Unpacking" or "segmentation" is another debiasing strategy that can improve project planning (Kruger & Evans, 2004). Unpacking can help reduce forecasting errors associated with the Planning Fallacy by highlighting overlooked steps and ensuring a more realistic assessment of task completion. Moreover, pre-mortem analysis (Klein, 2007) and structured checklists (Kahneman et al., 2011) enhance System 2 thinking. A pre-mortem analysis engages System 2 by prompting teams to imagine their project has already failed and systematically work backward to identify potential causes (Klein, 2007). Similarly, checklists enforce a disciplined, step-by-step evaluation process, reducing oversights and heuristic-driven errors by ensuring that all critical factors are considered before decisions are made.

Furthermore, various de-escalation factors are derived from Kahneman's work. For example, the explicit presentation of opportunity costs (e.g., Molden & Hui, 2011; Sarangee et al., 2014) and the use of positive framing (Schoorman et al., 1994) help counteract loss aversion and framing effects. Decision aids such as warnings or instructions (Ohlert & Weißenberger, 2020) and third-party audits (Montealegre & Keil, 2000) serve to slow down intuitive responses, thereby engaging System 2 processes, which support more accurate judgments.

5. Future research avenues

This essay has shown that Kahneman's work has significantly influenced project management research, while highlighting some underexplored areas, notably the recognition of emotions in project planning and decision-making. In this context, investigating the role of mindfulness in projects presents a valuable avenue for future research.

Langer and Moldoveanu (2000, p. 2) described mindfulness as a deliberate and engaged state of awareness, marked by "a heightened state of involvement and wakefulness." This heightened awareness makes individuals more attuned to the realities of the situation at hand, including potential risks and complexities that might be overlooked (Daniel et al., 2022).

Kahneman's work on cognitive biases and dual-system thinking aligns with key themes in mindfulness research, which shows that mindfulness not only enhances awareness but can also shift decision-making from automatic, bias-driven decisions (System 1) to more rational deliberate (System 2) thought processes. This shift is achieved by slowing down decision-making, encouraging nonjudgmental observation, and reducing the influence of emotions and habitual responses, thereby facilitating a more balanced risk assessment, and enhancing cognitive flexibility (Good et al., 2016). Overall, mindful managers can better assess whether taking a risk in a loss context is rational or just emotional, thus moving from System 1 to System 2 thinking.

Studies have shown that mindfulness enhances decision-making by reducing cognitive biases such as optimism bias (Daniel et al., 2022), sunk cost bias (Hafenbrack et al., 2014; Karelaia & Reb, 2020), confirmation bias and overconfidence bias (Daniel et al., 2022; Karelaia & Reb, 2020; Maymin & Langer, 2021) and anchoring (Maymin & Langer, 2021). The effect of mindfulness on loss aversion is mixed. Maymin and Langer (2021) report an increase in loss aversion, while Zhang et al. (2021) suggest that outcomes depend on framing and the specific dimensions of mindfulness that are emphasized.

Kahneman's (2011) distinction between the "experiencing" and "remembering self" suggests that mindfulness can enhance happiness by grounding individuals in the present and reducing cognitive biases. In project settings, it may counter focusing illusions, such as status or short-term project outcomes (Ika & Pinto, 2025; Kahneman et al., 2006) by shifting attention to long-term value and well-being. By aligning

present experience with memory, mindfulness supports more balanced decision-making and sustainable happiness. Responding to Ika and Pinto's (2025) recommendation for further research on happiness and well-being, mindfulness provides a valuable approach to exploring the underlying mechanisms.

Projects in high-risk, high-complexity environments may benefit from adopting a High-Reliability Organization (HRO) principles, particularly collective mindfulness, to improve project performance. Some existing practices already reflect this approach. For example, *pre-occupation with failure* encourages planners to focus on worst-case scenarios rather than best-case optimism. Reference class forecasting (RCF) exemplifies this approach, using historical cost overruns to improve forecasting and act as an early warning sign for future projects (Daniel et al., 2022). Moreover, both Leleur et al. (2015) and Servranckx et al. (2021) advocate combining RCF with expert judgement, aligning with *deference to expertise*.

Future research could investigate the impact of mindfulness on cognitive biases and project performance, as most existing studies focus on organizational-level effects. Although some research has examined mindfulness in project contexts, its specific influence on decision-making and project outcomes remains largely unexplored.

To conclude, Kahneman's work provides an influential lens for understanding the psychological drivers behind project planning, risk perception, and decision-making. His insights help explain why projects often deviate from expectations and have contributed to the development of practical solutions. By applying these insights, project managers can improve planning accuracy, mitigate bias, and make more deliberate choices, ensuring that decisions are driven by critical thinking rather than cognitive shortcuts.

Data availability statement

No new data were created or analyzed during this study. Data sharing is not applicable to this article.

CRediT authorship contribution statement

Chantal C. Cantarelli: Conceptualization, Writing – original draft, Writing – review & editing.

Declaration of interest

None.

Declaration of generative AI and AI-assisted technologies in the writing process

Statement: During the preparation of this work the author used ChatGPT (OpenAI) in order to improve language. After using this tool/service, the author reviewed and edited the content as needed and takes full responsibility for the content of the publication.

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