BEYOND EXPERIENCE THE ROLE OF ANALYTICAL THINKING IN MANAGERIAL PERFORMANCE

ABSTRACT

In complex and uncertain organizational environments, understanding how cognitive processing aligned managerial decision-making has become increasingly important. Building on Dual Process Theory, this research is interested in the relationship between analytical and accumulated experience-based cognitive processing and managerial performance. Existing literature has extensively explored decision-making behavior, however, still limited empirical evidence exists on how different cognitive processing modes translate into performance outcomes in simulation-based managerial settings. This research focuses on whether analytical engagement and experience-based decision-making are associated with performance outcomes in the FLIGBY simulation environment. The analysis is based on data from 2,871 participants who completed the FLIGBY managerial simulation across multiple countries. Analytical engagement is measured through decision-making time as a proxy for System 2 processing, while work experience categories serve as an indirect indicator of experience-based automaticity associated with System 1 processing. Ordinary Least Squares (OLS) regression models are employed to examine the relationship between cognitive processing proxies and profit performance, controlling for demographic and country-level factors. The results point out that analytical engagement exhibits a strong positive and statistically significant association with profit outcomes across all model specifications. In contrast, learning effort shows a small negative relationship with performance, indicating that increased learning activity does not necessarily guarantee more effective decision-making. Experience displays a non-linear relationship with performance, indicating that accumulated experience alone does not consistently improve performance indicators. Country-level controls reveal modest cross-country differences in performance, however the effect of analytical engagement remains highly stable. These findings extend Dual Process Theory by providing empirical evidence that reflective and deliberate cognitive engagement is a more robust predictor of managerial performance than experience-based automaticity in a simulation-based context. The results display that organizations should prioritize the development of analytical reasoning and reflective decision-making capabilities in leadership development initiatives. Future research should incorporate direct measures of cognitive processing and test whether these relationships generalize across diverse organizational and cultural environments.

Keywords: managerial cognition; experience-based automaticity; analytical engagement; leadership effectiveness; FLIGBY; decision-making; simulation-based learning; Dual process theory.

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INTRODUCTION

In fast-changing organizational settings, the speed of decision-making has become increasingly critical, as leaders are often required to make rapid yet effective decisions, which is a critical leadership capability. Leaders are expected to make strategic choices under conditions of limited information, time pressure, cultural diversity (Cohen, 2009; Wang et al., 2016), and social norms (Erdi, 2015), which challenge leadership skills (Almeida & Buzády, 2022) and decision-making modes. The leader's experience is often viewed as a valuable

source of expertise; however, research suggests that decision quality may not depend only on accumulated experience, but also that decision makers rely on deliberate analytical reasoning.

Dual Process Theory provides a useful framework for understanding leadership decisions and differences in the decision-making behavior influenced by managerial cognition. The theory distinguishes between intuitive, experience-based processing modes and reflective, analytical cognitive reasoning (Kahneman & Tversky, 1979). In managerial settings, these two modes of thinking imply different decision-making approaches. Intuition enables quick responses based on accumulated experience and automaticity, which may lead to suboptimal or satisficing outcomes, whereas analytical reasoning involves slower and more time-consuming choices that allow deeper analysis, rational decision-making, greater learning effort, and potentially stronger leadership effectiveness outcomes (Baldacchino et al., 2022). Both forms of cognitive styles are considered crucial for effective leadership; however, limited evidence exists on whether accumulated experience continues to improve performance under uncertainty or whether greater reliance on analytical thinking is becoming more important (Kay et al., 2020; Schoemaker, 2004).

In addition, limited research has examined Dual Process Theory within simulation-based experiential learning environments that replicate complex managerial decision-making scenarios.

To address this gap, this study focuses on the relationship between accumulated experience-based automaticity and analytical engagement in the FLIGBY leadership simulation environment. Grounded in Dual Process Theory, analytical engagement is conceptualized as a behavioral manifestation of reflective cognition, while accumulated work experience serves as a proxy for experience-based automaticity. The study is interested in how these two cognitive approaches relate to managerial performance and contributes to a growing understanding of executive decision-making in complex organizational settings. The study addresses the following research question:

RQ: How do analytical engagement and experience-based automaticity influence managerial performance in complex decision-making environments?

The contribution of the research extends Dual Process Theory into leadership and management learning, demonstrates that analytical engagement has a stronger effect than accumulated experience, reveals potential limits of automaticity at higher experience levels, and provides evidence from simulation-based executive decision-making. The study also offers insights into behavioral leadership research by providing empirical evidence from Hungary, Kazakhstan, and Turkiye on executive decision-making and leadership effectiveness in complex and contextually diverse organizational environments.

LITERATURE REVIEW

Building on bounded rationality (Simon, 2000), which suggests that decision makers face cognitive constraints when processing information, this study draws on Dual Process Theory to examine how experience-based automaticity (System 1) and analytical engagement (System 2) influence managerial performance in a complex simulation environment.

According to Dual Process Theory, human decision-making operates through two distinct cognitive systems commonly referred to as System 1 and System 2. System 1 represents fast thinking, characterized as automatic, intuitive, emotional, associative, and effortless. It enables individuals to make rapid judgments and immediate responses under conditions of uncertainty and time pressure by relying on heuristics, prior experiences, and subconscious mental shortcuts (Kahneman, 2011; Shepherd et al., 2023). In contrast, System 2 represents slow thinking, which is deliberate, analytical, logical, and effortful. This mode of thinking requires conscious attention, systematic reasoning, and cognitive effort when solving complex problems, evaluating alternatives, or making strategic decisions. Kahneman argues that while System 1 supports speed

and efficiency in everyday decision-making, it is also more vulnerable to cognitive biases and errors, whereas System 2 provides more reflective and rational evaluation but requires greater mental resources and time. The interaction between these two systems plays a central role in leadership decision-making, particularly in complex organizational environments where executives must balance rapid intuitive judgments with careful analytical reasoning (Kahneman, 2011).

Intuitive decision-making is not merely a heuristic bias but can be an expert-based capability developed through experience. Phillips, Klein, and Sieck (2004) introduced the concept of intuitive decision-making, stressing that experience and feedback can mitigate cognitive limitations. The authors highlight the nature of expertise through the recognition-primed decision-making model, where quick intuitive decisions are made in crisis situations by scanning patterns and trends and matching them with potential threats or positive and negative outcomes. Intuition is a focal point in this type of decision-making since it is grounded in extensive experience and mental analysis of the situation, where the person ignores rules and step-by-step procedures due to impracticality and the need for urgent decision-making. The authors provide examples where heuristic-based decision-making is mostly used in real-life situations (e.g., emergency response). The authors advocate that intuitive decision-making can be trained via simulation-based training and scenario exercises to build expertise, feedback loops, and after-action reviews or lessons learned to strengthen pattern recognition. The key message is that intuitive decision-making outperforms analysis in dynamic and VUCA environments.

Moreover, the study by Eling et al. (2015) further reinforces the significance of cognitive integration by showing that intuition-first sequencing followed by analytical evaluation produces stronger innovation outcomes. Their findings show that the order and interaction of cognition matter for decision quality, suggesting that effective leaders combine rapid intuitive judgments with reflective analytical correction. Analytical positioning in decision-making is significant in managing complexity. Anderson (1999) and Nair et al. (2019), via Complexity Theory and complex adaptive systems concepts, reinforce that leaders interpret complexity through mental schemas, experiences, and decision-making patterns, which are aligned with the central Dual Process Theory framework of this research. As a result, leadership becomes both cognitive and systemic, supporting reflection-based approaches.

The theoretical foundation is further aligned with Van Assche's (2019) General Systems Theory and the adaptive governance of social-ecological systems, which conveys the significance of adaptive and inclusive governance through learning, knowledge diversity, and managing systems and interdependencies. This is in line with the analytical and reflective cognitive mode (System 2 thinking) of the central theory of the research. This literature directly informs the examination of sequencing effects between System 1 and System 2 in leadership simulations.

The use of FLIGBY, a gamified leadership simulation tool, aligns with recent developments in experiential learning and competency-based assessment. FLIGBY places participants in virtual managerial environments characterized by limited time, incomplete information, competing objectives, and strategic uncertainty (Buzády et al., 2016). The simulation operationalizes leadership behavior through measurable competencies and has proven effective in developing soft-skill competencies associated with managerial effectiveness (Almeida & Buzády, 2022). Leadership effectiveness within FLIGBY is evaluated through participants' ability to prioritize goals, balance short-term operational challenges with long-term strategic objectives, and make acceptable rather than optimal decisions (Risley & Buzády, 2022). This perspective aligns closely with Simon's (2000) concept of satisficing and process adequacy. Throughout the simulation, participants make decisions affecting corporate atmosphere, profitability, sustainability, employee engagement, and project performance. As a result, FLIGBY provides a structured environment for observing how cognitive processing styles translate into measurable leadership outcomes.

Experiential learning theory further suggests that decision-making competence develops through active engagement, repeated feedback cycles, and reflective evaluation of outcomes (Almeida & Buzády, 2022). In complex adaptive environments, leaders continuously shift between experience heuristics and analytical processing depending on situational demands. FLIGBY therefore enables controlled exposure to complex decision contexts while allowing behavioral adaptation and leadership development to be observed in real time. Improvements in simulation performance may reflect experiential learning, pattern recognition, and adaptive cognitive processing rather than purely analytical calculation (Adobor, 2020).

Building on Dual Process Theory, and experiential leadership learning, this study shows that executives' cognitive processing styles influence leadership effectiveness in dynamic managerial environments. Reflective engagement and experience-based automaticity shape how leaders interpret information, respond to uncertainty, and manage organizational challenges under time pressure. These cognitive processes may influence leadership effectiveness differently across institutional contexts characterized by varying cultural norms and decision-making approaches (Hofstede, 1980; Markus & Kitayama, 1991; Choi, Choi, & Norenzayan, 2004; Turaeva et al.,2025). Accordingly, the study adopted the following hypotheses:

H1: Higher analytical engagement positively associated leadership effectiveness.

H2: Greater reliance on experience-based automaticity negatively influences leadership effectiveness in dynamic managerial environments.

H3: Institutional context moderates the relationship between cognitive processing and leadership effectiveness.

H4: Learning effort may exhibit a negative association with performance when it reflects remedial rather than strategic learning.

Theoretical framework

Ontologically, this study conceptualizes leadership behaviors and cognitive processing styles as observable, measurable, yet contextually embedded organizational phenomena shaped by institutional and cultural environments. Epistemologically, the research draws on Dual Process Theory to explain how knowledge about executive decision-making can be generated through simulation-based experiential data rather than self-reported cognition alone. In leadership contexts, these cognitive systems jointly shape decision quality, adaptability, and behavioral effectiveness under uncertainty. Complementing these perspectives, cross-cultural decision-making research (Hofstede, 1980; Markus & Kitayama, 1991; Choi, Choi, & Norenzayan, 2004) demonstrates that cognitive styles and decision norms vary across societies and serves as supporting theoretical background. Cultural and institutional environments influence the relative reliance on accumulated experience versus analytical reasoning, therefore shaping how leadership competencies are developed, expressed, and evaluated (Yates et al, 2022; Yates et al., 2012; Nisbett et al., 2001; Lipovka et al.,2025).

A robust theoretical framework integrates three foundational perspectives: bounded rationality, Dual Process Theory, and cross-cultural cognition research. Together, these perspectives explain how decision constraints, cognitive processing styles, leadership competencies, and cultural contexts jointly shape leadership effectiveness in complex environments.

These theoretical perspectives jointly establish a structured conceptual model described in Figure 1.

Figure 1 Conceptual logical chain

Cognitive limitations

↓

Accumulated experience automaticity vs Analytical engagement

↓

Managerial performance

This integrated approach addresses key gaps in leadership research by moving beyond self-reported cognition toward observable behavioral decision-making patterns, providing empirically grounded and context-sensitive insights into how executive cognition translates into leadership effectiveness under varying institutional conditions.

RESEARCH DESIGN

Data Collection

This study adopts a quantitative, cross-sectional research design using behavioral data generated from the FLIGBY (Flow Is Good Business for You) leadership simulation platform. The study is grounded in behavioral decision science and Dual Process Theory, and examines how cognitive processing styles influence leadership effectiveness in simulated managerial environments.

The FLIGBY simulation provides a controlled yet realistic experiential learning environment in which participants assume managerial roles and make decisions across dynamic organizational scenarios. These scenarios capture behavioral indicators of leadership decision-making, including strategic choices, stakeholder interactions, ethical dilemmas, and resource allocation.

The dataset consists of individual-level observations from 2,871 participants across three countries: Hungary, Kazakhstan, and Turkiye. This cross-country structure enables analysis of cognitive and behavioral variation across different institutional and cultural contexts.

The dataset captures variation in individual cognitive engagement, decision behavior, and accumulated experience within the simulation environment. This includes decision-making time, learning effort, experience categories, and resulting performance outcomes. The sample is sufficiently heterogeneous in both behavioral inputs and institutional settings, enabling robust estimation of cognitive-performance relationships.

The study employs a cross-sectional observational design using secondary behavioral data derived from simulation-based participant actions. The research is non-experimental, as cognitive processing styles are inferred from observed behavioral proxies rather than directly manipulated.

The FLIGBY simulation measures real-time decision-making behavior across 23 episodes and 29 leadership competencies, producing multidimensional behavioral performance data.

Data Analysis

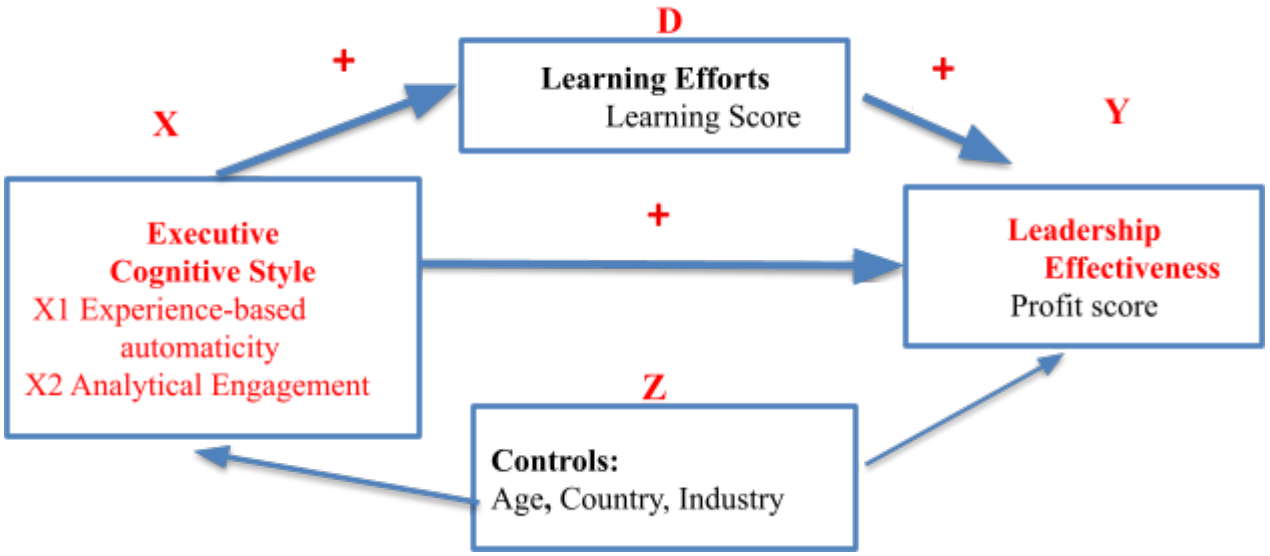
Sample and inclusion criteria. The analysis includes participants who completed the full FLIGBY simulation, provided complete performance data, and had at least basic leadership or managerial experience. These criteria ensure data completeness and behavioral validity within the simulation environment.

This research utilizes a secondary dataset provided by ALEAS Simulations , the developer and administrator of the FLIGBY simulation platform. Data were collected by ALEAS Simulations in accordance with its data protection and participant consent procedures. The dataset made available to the researchers was fully anonymized and contained no personally identifiable information. The dataset stored on secure, password-protected systems accessible only to the research team. The original data remain under the control of ALEAS Simulations and are retained in accordance with applicable data management and data protection policies. The analysis was conducted using de-identified participant data and complied with established ethical principles for research involving human subjects.

To account for heterogeneity in individual and contextual characteristics, the model includes control variables capturing demographic, experiential, and institutional differences, specifically age, industry, work experience, and country of participation.

Variables Description. The research is grounded in a Directed Acyclic Graph (DAG) framework described as Conceptual Map below, which specifies the causal relationships among independent variables and performance outcomes and control variables.

Figure 2 Causal Mind map



The detailed description of dependent and explanatory variables is summarized in Table 1 below.

Table 1 Description of key variables

Type of Variable	Variable Name	Description
Dependent Variable (Y)	Profit Score	Organizational performance score, which represents individual-level performance outcomes within the FLIGBY simulation environment.
Independent Variable (X1)	Analytical Engagement (Hours)	Time spent making decisions in the simulation (proxy for analytical vs intuitive decision-making)
Independent Variable (X2)	Experience-based automaticity	Work experience (categorical: grouped into 6 experience levels ranging from 0 years to 15+ years), professional background affecting decision behavior (1 = lowest experience group, 6 = highest experience group)
Mediator (D)	Learning Score	Measures how much time participants spend on learning activities about the company within the simulation. This variable reflects cognitive investment in knowledge

		acquisition, also associated with analytical cognitive processing
Control Variables (Z)	Age (years)	Age of participants (years), individual-level demographic control.
	Country	Country of participant (categorical variable, included as fixed effects) captures institutional and contextual differences across Hungary, Kazakhstan, and Turkiye.

The empirical analysis uses ordinary least squares (OLS) regression to estimate the relationship between cognitive processing styles, experience, and leadership effectiveness. Prior to estimation, the analysis assessed potential multicollinearity among explanatory variables using Variance Inflation Factors (VIF).

The baseline model is specified as:

$$Profit_i = \beta_0 + \beta_1\, Analytical\ Engagement\ Hours_i + \beta_2 LearningEffort_i + \beta_3 Experience\ based\ automatic$$

Country-level fixed effects are included using factor variable notation to control for institutional and cultural heterogeneity.

The model examines:

1. Direct effects of cognitive processing proxies on performance
2. Role of experience-based automaticity in decision outcomes
3. Institutional variation across countries

The interpretation of cognitive processing is grounded in Dual Process Theory:

- System 2 is proxied by analytical engagement in decision-making time and learning effort
- System 1 is proxied by accumulated experience

The above empirical model is aligned to the hypothesis and theoretical framework and summarized in Table 2 below:

Table 2 Aligned empirical model with hypothesis and theory

Theoretical Concept	**Variable**	**Expected Effect**	**Hypothesis**
Analytical engagement	Decision-making time	Positive	H1
Analytical engagement	Learning effort	Negative	H4
Accumulated experience automaticity	Experience	Negative	H2
Institutional context	Country	Moderation effect	H3

Validity and Data Quality

The FLIGBY simulation ensures high internal validity by standardizing decision environments while capturing real-time behavioral data. This allows for consistent cross-participant comparison under identical

decision conditions. The simulation-based approach reduces self-report bias and enables behavioral measurement of cognitive processes in leadership contexts.

RESULTS

This section summarizes the empirical findings on the relationship between decision-making speed and leadership effectiveness in profit performance. The sample consists of 2,871 observations from participants who completed the FLIGBY simulation game individually.

Table 3 below presents descriptive statistics for the variables used in the analysis. The descriptive statistics indicate moderate variation across the key variables in the dataset. The sample is diverse in age, experience, and country, suggesting broad representation across different contexts. The average age of participants is **41.34 years**, reflecting a mature sample with a broad age range (19- 78 years). The experience levels average **3.33** on a 6-point scale (0-15+ years work experience), indicating professional backgrounds. The country variable describes three country groups, such as Hungary, Kazakhstan and Turkiye, indicating cross-cultural data on institutional and contextual diversity in managerial decision-making that presents heterogeneity.

The average profit score is **63.34** with relatively low standard deviation of **6.44,** suggesting that organizational performance is fairly concentrated around the mean, although extreme values range from 38 to 100. Analytical engagement time**,** measured in hours, has a mean of **5.14 hours** with the standard deviation of **1.67** which indicates moderate variation in cognitive decision-making styles with extreme values from 0.31 to 11.98 hours. Learning effort, measured in scores, exhibits the ranges from 0 to 100 with a mean of 19.90 and a standard deviation of 23.07, indicating substantial variation in knowledge engagement of individuals.

Table 3 Descriptive Statistics of variables

Variable	Mean	Std. Dev.	Min	Max
Profit	63.34	6.44	38	100
Analytical engagement (hours)	5.14	1.67	0.31	11.98
Learning Score	19.90	23.07	0	100
Experience	3.33	1.51	1	6
Age	41.34	10.47	19	78
Country	1.33	0.61	1	3

- N = 2,871
- Descriptive statistics computed from FLIGBY simulation dataset
- Profit represents performance outcome in the FLIGBY management simulation

The correlation matrix described in Table 4 indicates correlations among the study variables. The correlation analysis indicates that profitability is *most strongly associated* with analytical engagement hours (r = 0.405), while learning effort exhibits a weaker positive association with profitability (r = 0.134). Analytical engagement hours and learning effort are moderately correlated (r = 0.401), suggesting that individuals who engage in more analytical thinking also tend to invest more effort in learning. Experience category is strongly correlated with age (r = 0.623), as expected, but shows only weak associations with the other variables. Overall, the correlations indicate moderate relationships among the key predictors and do not suggest severe multicollinearity concerns.

Table 4 Correlation Matrix of variables

Variable	Profit	Analytical Engagement (hours)	Learning Score	Age	Experience
1. Profit	1				
2. Analytical Engagement (hours)	0.405	1			
3. Learning Score	0.134	0.401	1		
4. Age	0.070	0.228	0.064	1	
5 Experience	0.011	0.115	0.037	0.623	1

- N = 2,871
- Pearson correlation coefficients. Statistical significance levels are reported in the regression analysis.
- Experience category is an ordinal variable coded from 1 (lowest experience) to 6 (highest experience)
- low VIF values (1.19–2.18

Table 5 summarizes the analysis of both baseline and full model specification of key variables. The results indicate that **analytical engagement,** measured in hours **is a strong and robust predictor of performance**, with a consistently positive and highly significant effect on profit across both baseline and full models. This indicates that higher levels of reflective and analytical cognitive processing are associated with improved managerial outcomes in the FLIGBY simulation.

In contrast, **learning effort** points to a **small negative relationship with performance**, becoming statistically significant in the full model. This suggests that increased learning activity does not necessarily translate into better decision effectiveness and may reflect challenges in applying newly acquired information.

Regarding **experience (proxy for accumulated experience-based automaticity)**, results highlight a **non-linear and generally negative association with performance**, particularly for mid-level experience categories, while the highest experience level loses significance after adding cross-cultural controls. This suggests that greater experience does not automatically enhance decision quality in complex dynamic managerial environments and might be sensitive to contextual factors.

The inclusion of country-level controls slightly increases model explanatory power and profit performance variation slightly improves from 17 % to 17.4% while maintaining the stability of the main effects. This stability indicates that analytical engagement is a robust predictor of performance independent of country-level differences.

Additionally, participants from Kazakhstan ($\beta = -0.879$, $p < 0.01$) and Turkiye ($\beta = -0.985$, $p < 0.05$) **perform significantly worse than the baseline country**, indicating meaningful cross-country differences in performance outcomes. These differences may reflect institutional, educational, or cultural variations influencing managerial decision-making processes within simulation-based environments. Overall, the results support the argument that reasoned analytical cognition strengthens leadership effectiveness and performance, whereas greater reliance on accumulated experience and heuristics may reduce adaptability under complex and dynamic decision conditions.

Table 5. Baseline and Full Regression Models: Determinants of Profit

Variables	**Model 1: Baseline**	**Model 2: Full Specification**
Variable	**(1) Baseline**	**(2) Full Model**
Analytical Engagement hours	1.638*** (0.074)	1.654*** (0.074)
Learning Score	-0.010* (0.005)	-0.011** (0.005)
Age	0.012 (0.014)	0.005 (0.014)
Experience category (2)	-0.151 (0.413)	-0.090 (0.413)
Experience category (3)	-0.328 (0.357)	-0.226 (0.357)
Experience category (4)	-1.074*** (0.395)	-0.883** (0.398)
Experience category (5)	-1.339*** (0.437)	-1.148*** (0.439)
Experience category (6)	-1.004* (0.543)	-0.848 (0.545)
Kazakhstan	—	-0.879*** (0.297)
Turkiye	—	-0.985** (0.420)
Constant	55.268*** (0.575)	55.615*** (0.595)
Observations	2,871	2,871
R^2	0.170	0.174
Robust SE	Yes	Yes

Robust standard errors are reported in parentheses.
*** p < 0.01, ** p < 0.05, * p < 0.10.

System 2 is proxied by hours of analytical engagement and learning effort.
System 1 is proxied by categorical work experience (dummy variables), capturing reliance on accumulated experiential heuristics.

Reference categories:Experience level = 1 and baseline country: Hungary.

DISCUSSION

The study examined the role of cognitive processing styles on leadership decision-making in complex managerial settings tested in a simulated learning environment, drawing on Dual Process Theory.

The findings provide strong evidence that analytical engagement, measured by decision-making hours, is a robust and positive predictor of performance outcomes. This relationship remains stable across the analysis and confirmed by both baseline and full specification models and robustness of the effect. This is in line with the theoretical interpretation of slow, logical and reflective analytical reasoning enhances the decision

quality and the leadership effectiveness results measured in KPIs as profitability in complex and uncertain organizational settings (Kahneman, 2001; Anderson, 1999; Nair et al., 2019).

In contrast, learning effort highlights a small but statistically significant negative relationship with performance. This may indicate that too much dedication in learning activities does not necessarily translate into effective application of knowledge in dynamic decision contexts or individuals might experience a challenges of applying gained knowledge.

The second theoretical construct is accumulated experience-based automaticity proxied via work experience categories reveals a nonlinear and negative association with the profit performance. In line with initial assumptions, the accumulated experience showed diminishing returns and not consistently showed improved profitability results and even lower performance indicators in higher work experience categories. This effect can be interpreted as heuristic bias, ignoring rules and procedures (Phillips et al., 2004) or rigidity trap in complex organizations that might lead to the ineffective use of decision choices (Anderson, 1999; Nair et al., 2019). Another argument for the findings can be cross-cultural effects on leadership performance due to cultural and societal norm (Hofstede, 1980; Markus & Kitayama, 1991; Choi, Choi, & Norenzayan, 2004). This is confirmed by the performance results of participants from Kazakhstan and Turkiye that demonstrate lower performance compared to the baseline group, indicating contextual variation in decision-making effectiveness. This effect might be explained by individualistic and collectivistic cultural roots and backgrounds suggested by the existing cultural research (Choi, Choi, & Norenzayan, 2004) in information gathering, risk taking and implementation strategies (Soman, 2024; Wu et al., 2004).

Despite these findings, the increase in explanatory power of models after including country controls is limited, suggesting that individual-level cognitive factors play a more dominant role than contextual effects.

Overall, the findings consistently point out that analytical engagement is the strongest determinant of performance, while experience and learning effects are more context-dependent and heterogeneous.

Theoretical Contribution

These results support Dual Process Theory by providing empirical evidence that slow, analytical cognitive engagement processing plays a central role in enhancing performance in simulation-based managerial decision environments. The study highlights the importance of distinguishing between cognitive effort and experiential accumulation when explaining decision effectiveness in complex and dynamic environments.

Practical Implications

The findings of this research have several important practical implications for managerial practice, leadership development, and organizational decision-making.

First, the strong positive effect of analytical engagement highlights that organizations should encourage reflective and deliberate decision-making among managers. The implication for organizations is that they create environments that support structured analysis and critical thinking rather than relying primarily on rapid heuristic-based, intuitive judgments. The next implication is that investment in learning too much does not necessarily guarantee better leadership performance outcomes. Therefore, the trainings need to be considered from practical relevance and applicability to real decision-making tasks and challenges. Further practical implication is accumulated experience results. The nonlinear relationship of accumulated experience and profitability does not automatically guarantee better decision effectiveness because of overcomplexity of organizations, rigidity traps and contextual issues. This suggests that organizations should not rely solely on seniority or tenure as indicators of decision quality. Instead, continuous cognitive development and adaptive learning should be encouraged across all experience levels to be able to balance in situational demands of the organization. It means that leadership development programs should be

adapted to different cultural and institutional environments rather than applying uniform training approaches. Overall, the findings show that leadership performance is primarily driven by active cognitive engagement rather than experience or learning intensity alone. Therefore, organizations should prioritize the development of analytical thinking, critical reasoning, and decision-quality skills in leadership and provide corresponding support.

Limitations and Future Research

Despite the contributions of this study, several limitations should be acknowledged. The first limitation of the study is that cognitive processing style (System 1 vs. System 2) is measured indirectly through decision-making time, accumulated work experience and learning efforts rather than through direct psychological or behavioral experiments. As a result, longer decision-making time may not fully capture analytical reasoning, since the time spent making decisions can also reflect hesitation, uncertainty, or inefficiency. In addition, learning effort is measured by time invested in learning activities rather than by the quality or effectiveness of acquired knowledge. Also, the accumulated experience-based automaticity is proxied by accumulated work experience which might facilitate the automatic processing of situations in decision-making process, however is not a direct measure and may support only pattern recognition. Next, the cross-sectional data limits the ability to draw causal conclusions regarding the relationships between cognitive processing and performance outcomes. The implication is that the sample is drawn from specific countries and contexts, which may limit the generalizability of the findings to other cultural or institutional environments. In addition, the research is based on a FLIGBY simulation-based environment, which might not fully capture the complexity and constraints of real-world managerial decision-making contexts. Consequently, the findings should be interpreted as associations based on behavioral proxies rather than precise measurements of cognitive processes.

CONCLUSION

This research tested the relationship between cognitive processing modes and managerial performance in the FLIGBY simulation environment through the lens of Dual Process Theory. The findings show strong evidence that analytical engagement, operationalized as System 2 processing, is positively associated with performance outcomes. The positive trend of analytical engagement remains stable across model specifications, indicating that reflective and deliberate decision-making is a robust predictor of managerial performance. These findings align with Kahneman's proposition that careful and effortful cognitive processing contributes to higher-quality decisions, particularly in complex and uncertain environments. In contrast, learning effort indicates a small negative association with performance. This means that greater investment in learning activities does not automatically guarantee improved decision effectiveness and may reflect diminishing returns or challenges in knowledge application. The same pattern can be observed with the accumulated experience-based automaticity. The findings further indicate that accumulated experience does not consistently improve leadership performance outcomes. While experience may facilitate intuitive and heuristic judgments and pattern recognition, its value appears to depend on context and do not substitute for active analytical engagement. The research expands the literature by providing empirical evidence that System 2 processing is a stronger and more consistent predictor of performance than experience-based automaticity in a simulation-based managerial context. It also supports the value of simulation-based environments for examining cognitive processes and decision-making behavior in organizational settings. From a practical side, the findings indicate that organizations should place greater emphasis on developing analytical reasoning and reflective decision-making capabilities. Leadership development trainings should therefore focus on enhancing critical thinking and decision-quality skills rather than relying solely on

accumulated experience or increased learning activity. Future research should incorporate direct measures of System 1 and System 2 processing, such as reflective questionnaires administered after FLIGBY or other simulation gameplay, and examine whether the observed relationships generalize across different organizational and cultural contexts. Overall, the research results highlight the central role of analytical cognitive engagement in enhancing managerial performance and give a deeper understanding of decision-making effectiveness in complex environments.

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