Neurofinance and Strategic Agility: A Study on Executive Cognitive Bias

Yazid Gharzah S Amala*, and Mursalim Nohong

Hasanuddin University, Makassar, Indonesia

*amalaygs24a@student.unhas.ac.id

Abstract. This study examines the crucial role of neurofinance-based executive cognition in enhancing the quality of strategic decision-making in dynamic corporate environments. Grounded in the intersection of contemporary neurofinance and behavioral strategy literature, this study deeply explores the influence of neurocognitive bias on strategic agility. Furthermore, this research positions executive rationality as a key mediating variable to understand the mechanism of this relationship. To achieve this objective, a quantitative approach was applied through a structured survey involving 285 mid-to-senior-level managers from various industrial sectors in Indonesia. Data analysis was conducted using Partial Least Squares Structural Equation Modeling (PLS-SEM) to validate the research model. The statistical analysis results show that neurocognitive bias has a significant negative influence on strategic agility. Interestingly, executive rationality was found to partially mediate this relationship. This indicates that while rationality can reduce the adverse impact of bias, its influence cannot be entirely eliminated. These findings make a significant contribution by providing empirical support for the integration of neurofinance insights into strategic management frameworks. Practically, the study recommends interventions such as cognitive awareness training for leaders and the development of a structured decision architecture to mitigate bias and strengthen organizational agility.

Keywords: Neurofinance, Strategic Agility, Executive Rationality, Cognitive Bias, PLS-SEM, Strategic Management.

1 Introduction

Strategic decision-making is increasingly influenced by the interplay of cognitive biases, emotional pressures, and complex environmental factors. Traditional models that assume rational, utility-maximizing decision-makers often fall short in explaining real-world managerial behavior [10]. The emergence of neurofinance—an interdisciplinary field combining neuroscience, finance, and psychology—has provided new insights into how brain mechanisms influence decision-making under risk and uncertainty [12].

M. Nohong et al. (eds.), *Proceedings of the 10th International Conference on Accounting, Management, and Economics (10th ICAME 2025)*, Advances in Economics, Business and Management Research 388,
https://doi.org/10.2991/978-94-6239-709-5_47

While neurofinance has primarily focused on investor behavior, its application to strategic leadership and corporate decision-making is gaining traction [14]. Executives often operate under time constraints, high stakes, and ambiguous information, leading to reliance on cognitive shortcuts such as overconfidence, confirmation bias, and framing effects [1]. These biases are now understood to be rooted in specific neural processes, notably the prefrontal cortex (executive control) and amygdala (emotional appraisal) [6].

Despite the growing attention to behavioral dimensions in strategic management, the integration of neurofinance insights into strategic decision-making remains underdeveloped. Much of the existing neurofinance literature has concentrated on individual investor behavior in capital markets, focusing on how emotions and cognitive biases affect investment choices and portfolio management [7]. While these contributions are valuable, they have yet to be extended meaningfully to the domain of strategic management, particularly in the context of executive-level decision-making.

Moreover, while behavioral strategy research has acknowledged the presence of cognitive biases such as overconfidence, escalation of commitment, and framing effects, it often treats these biases as static psychological tendencies, with limited exploration of their neurocognitive underpinnings [6]. This creates a theoretical disconnect between strategic behavior and the neuroscience of executive cognition, which has shown that such biases are frequently associated with specific patterns of brain activity, particularly in the amygdala and prefrontal cortex [4].

Another major gap lies in the limited empirical research that examines the impact of neurocognitive bias on strategic agility. While strategic agility has been widely promoted as a key organizational capability in dynamic environments [5], most studies have focused on external or structural drivers—such as organizational culture, digitalization, or leadership styles—rather than internal cognitive and emotional processes within decision-makers themselves. As a result, the cognitive antecedents of strategic agility remain underexplored, especially in terms of how biases might undermine or delay adaptive responses to change.

A further overlooked dimension is the mediating role of executive rationality. Although the concept of rationality is frequently mentioned in strategic management, it is rarely operationalized as a neurocognitive construct or tested as a mediator between bias and strategic outcomes. This neglects a crucial insight from neurofinance: that rational deliberation, often supported by the dorsolateral prefrontal cortex (DLPFC), plays a central role in moderating emotional impulses and overriding automatic heuristics [11]. Consequently, there is a need to investigate whether executive rationality serves as a compensatory mechanism that helps managers mitigate the effects of cognitive bias and enhance their strategic agility.

In addition, most prior studies have been conducted in Western corporate settings, and there is a lack of context-specific evidence from emerging markets such as Indonesia, where business environments are often characterized by institutional uncertainty, rapid technological shifts, and cultural complexity. Understanding how Indonesian executives deal with strategic decisions through the lens of neurocognitive mechanisms can offer valuable insights, both for local leadership development and for expanding the cultural scope of neuro-strategic research.

Taken together, these gaps underscore the need for a comprehensive empirical study that:

- Conceptualizes neurocognitive bias as a measurable construct within strategic decision-making,
- Investigates the direct and indirect effects of such bias on strategic agility,
- Explores executive rationality as a neurocognitive mediator, and
- Validates the model in an emerging market context using rigorous statistical techniques such as Partial Least Squares Structural Equation Modeling (PLS-SEM).

The current study is designed to fill these gaps. It proposes and tests a neuro-strategic framework that links neurocognitive bias, executive rationality, and strategic agility in a unified model. By doing so, this research contributes both to the theoretical advancement of behavioral and neurocognitive perspectives in strategic management, and to practical improvements in executive development, decision architecture, and strategic governance.

2 Literature Review

2.1 Neurofinance and Executive Decision-Making

Neurofinance is an interdisciplinary field that integrates neuroscience, psychology, and finance to understand how cognitive and emotional processes influence financial and strategic decisions. Traditional finance assumes rational decision-making based on complete information and logical reasoning; however, neurofinance challenges this notion by demonstrating that human decisions are often driven by subconscious neural mechanisms, affective states, and cognitive biases [16]].

In organizational contexts, executives frequently make complex strategic decisions under uncertainty. Their neural responses to risk, reward, and ambiguity shape the quality of those decisions. Studies using functional magnetic resonance imaging (fMRI) reveal that areas such as the amygdala, prefrontal cortex, and insula play critical roles in regulating risk perception and rational judgment [17]. Consequently, neurofinance provides a scientific lens to explore how executives' cognitive and emotional biases affect corporate outcomes.

2.2 Cognitive Bias and Strategic Agility

Cognitive bias refers to systematic deviations from rational judgment resulting from mental shortcuts or emotional influences [18]. In strategic management, executive cognitive bias can manifest as overconfidence, anchoring, confirmation bias, or loss aversion. Such biases can distort information processing, reduce adaptability, and hinder agile decision-making [19].

Strategic agility—the ability of an organization to sense, respond, and adapt to environmental changes swiftly—requires executives to balance cognitive flexibility with analytical rigor [20]. However, when cognitive biases dominate, strategic agility

is compromised because decision-makers rely excessively on heuristics or past experiences rather than data-driven insight. Conversely, executives who recognize and regulate their biases tend to foster greater organizational responsiveness and innovation.

2.3 Executive Rationality as a Mediating Mechanism

Executive rationality serves as a cognitive control mechanism that mitigates the adverse effects of bias on decision-making. It involves the ability to process information logically, evaluate alternatives systematically, and make balanced judgments under uncertainty [21]. In the neurofinance framework, rationality corresponds to the activation of the prefrontal cortex, which governs executive functions such as reasoning and self-regulation [22]. Empirical evidence suggests that rational executives are better equipped to interpret market signals accurately and lead organizations through volatile environments [23]. Therefore, rationality not only buffers the influence of cognitive bias but also strengthens the link between neurocognitive awareness and strategic agility.

2.4 Integrative Perspective

By integrating insights from neurofinance and strategic management, this study conceptualizes executive cognition as a central determinant of strategic agility. Neurocognitive bias represents the psychological constraints affecting executive behavior, while rationality operates as a moderating or mediating mechanism enhancing adaptive capability. Understanding these dynamics can help organizations develop leadership interventions—such as cognitive training, decision audits, and neurofeedback—to cultivate agile, bias-aware executives capable of steering firms through uncertainty.

3 Methodology Research

3.1 Research Framework and Hypotheses

This study proposes an integrated neurofinance-informed behavioural strategy framework to explain how executive cognition shapes organisational responsiveness in dynamic environments. The research model is structured around three core constructs. First, neurocognitive bias represents executives' systematic deviations from objective judgement, reflected in tendencies such as anchoring, overconfidence, and confirmation-oriented information processing. These biases are expected to impede adaptive strategic behaviour by constraining how decision-makers interpret signals, evaluate alternatives, and respond to environmental change.

Second, executive rationality is conceptualised as the capacity for deliberate, logical, and reflective decision-making, including the systematic evaluation of evidence, the consideration of competing alternatives, and the regulation of impulsive judgments.

Within this model, rationality is positioned as a central cognitive mechanism through which executives can sustain analytical control under uncertainty. Because biased cognition typically encourages heuristic-driven processing, higher levels of neurocognitive bias are expected to be associated with lower levels of executive rationality.

Third, strategic agility refers to an organisation's ability to sense shifts in its environment, realign priorities, and implement timely strategic adjustments. Strategic agility is treated as an outcome that depends not only on structural and contextual factors, but also on the quality of executive cognition that underpins strategic choices. Executives who exhibit stronger rationality are expected to support more agile strategic responses by promoting disciplined interpretation of information and timely reconfiguration of strategic actions.

On the basis of these theoretical arguments, the study specifies direct relationships between neurocognitive bias, executive rationality, and strategic agility, and additionally proposes an indirect pathway in which executive rationality explains part of the effect of neurocognitive bias on strategic agility. The resulting hypotheses are summarised in **Table 1**.

Table 1. Hypothesis analysis

Code	Hypothesis
H1	Neurocognitive bias negatively influences strategic agility.
H2	Neurocognitive bias negatively influences executive rationality.
H3	Executive rationality positively influences strategic agility.
H4	Executive rationality mediates the effect of neurocognitive bias on strategic agility.

Source: Author's development, 2025

3.2 Sampling and Data Collection

Data were collected using a structured questionnaire administered to mid to senior level executives across several industrial sectors in Indonesia, including manufacturing, digital industries, services, and finance. A total of 285 usable responses were obtained and included in the analysis. The study employed purposive sampling to ensure that participants possessed decision-relevant experience and were able to provide informed responses regarding executive cognition and strategic decision processes. Accordingly, eligibility criteria required respondents to have at least five years of managerial experience and to be directly involved in strategic planning activities or in high-level organisational decision-making. These criteria were applied to increase the substantive relevance of the responses and to align the sample with the study's executive-level theoretical focus.

3.3 Measurement Instruments

All study constructs were measured using multi-item indicators captured through the questionnaire. The empirical model was assessed using Partial Least Squares Structural Equation Modelling implemented in SmartPLS 4. The analytical procedure followed established PLS-SEM reporting conventions. First, the measurement model was evaluated to confirm construct reliability and validity, including convergent validity assessed through the Average Variance Extracted, internal consistency assessed through Composite Reliability, and discriminant validity assessed using the Heterotrait to Monotrait ratio. Second, the structural model was examined by estimating path coefficients and their statistical significance, together with the explained variance of endogenous constructs as indicated by the coefficient of determination. Third, the proposed mediation effect was tested using a bootstrapping procedure with 5,000 resamples to obtain robust inference for indirect effects.

4 Results

4.1 Respondent Profile

The respondent profile based on gender shows that 63% of the respondents are male and 37% are female. This composition indicates that the majority of respondents are male, which may reflect the continued dominance of men in managerial or decision-making positions within the industries surveyed. This condition may also illustrate the organizational structure in the relevant sectors, where male representation tends to be higher than that of females.

The industry composition of the respondents demonstrates a considerable diversity of sectors, consisting of 30% manufacturing, 25% finance, 20% digital, and 25% other industries. This variation in industrial backgrounds reflects the diverse organizational contexts in which the respondents operate, ensuring that the study's results are not limited to a single type of industry. With representation from multiple sectors, the findings are expected to provide broader and more comprehensive insights into strategic practices across different industries, thereby enhancing the relevance and generalizability of the research outcomes.

The composition of respondents based on job position shows that 54% are mid-level managers and 46% are senior executives. This proportion indicates that most respondents occupy strategic roles within the organizational structure, either as a link between top management and operational levels or as key decision-makers. With their direct involvement in the formulation and implementation of strategic policies, the perspectives of these respondents are highly relevant and credible in providing insights into leadership dynamics and decision-making processes at the organizational level.

4.2 Measurement Model

The measurement model results show that the Average Variance Extracted (AVE) values for all constructs exceed the recommended threshold of 0.5, with values ranging

from 0.52 to 0.72. These findings indicate good convergent validity, meaning that the indicators used in the model are able to explain more than 50% of the variance of their respective constructs. Consequently, each construct is well represented by its indicators, confirming that the measurement model is reliable and appropriate for further structural analysis.

The results of the measurement model assessment indicate that the Composite Reliability (CR) values range from 0.82 to 0.91. This range reflects a high level of internal consistency across all examined constructs, suggesting that the indicators within each construct consistently measure the same underlying variable. Therefore, the measurement items used in this study produce stable, reliable data and are appropriate for further analysis.

The evaluation results of the measurement model indicate that all Heterotrait–Monotrait (HTMT) ratios are below the threshold of 0.85, confirming that discriminant validity has been established. This finding suggests that each construct in the model is clearly distinct and does not overlap with other constructs. Consequently, each measured concept truly represents a different variable, and the measurement model can be considered valid in terms of both convergent and discriminant validity.

4.3 Structural Model

Table 2. Partial Least Squares Structural Equation Modeling (PLS-SEM)

Hypothesis	Path	**β**	**t-value**	**p-value**	**Result**
H1	Bias → Agility	-0.28	3.91	0.000	Supported
H2	Bias → Rationality	-0.35	4.56	0.000	Supported
H3	Rationality → Agility	0.41	5.82	0.000	Supported
H4	Indirect (Mediation)	0.14	3.26	0.001	Partial Mediation

Source: Author's development, 2025

The results indicate that cognitive bias has a significant negative effect on both agility (H1) and rationality (H2), meaning that higher levels of bias reduce managerial rationality and decision-making agility. Rationality shows a significant positive effect on agility (H3), suggesting that rational thinking enhances an organization's ability to respond swiftly and effectively to change. The partial mediation effect (H4) reveals that rationality partially mediates the relationship between bias and agility. This means that while bias directly decreases agility, part of its effect operates indirectly through reduced rationality.

The R^2 value for the Strategic Agility variable is 0.45, indicating that approximately 45% of the variance in strategic agility can be explained by the variables included in the model, namely bias and rationality. This result reflects a moderate level of explanatory power, meaning that the structural model is able to provide a reasonably strong explanation of the strategic agility phenomenon under investigation. Nevertheless, the remaining 55% of the variance is influenced by other factors outside

the model, highlighting opportunities for future research to incorporate additional variables in order to enhance the model's explanatory strength.

The evaluation of the structural model shows a Standardized Root Mean Square Residual (SRMR) value of 0.048, which is below the acceptable threshold of 0.08. This value indicates a good level of fit between the empirical data and the proposed theoretical model. Therefore, the research model meets the criteria for a good model fit and can be considered appropriate and reliable for further analysis and the testing of relationships among variables.

5 Discussion

5.1 Main Findings

H1: Neurocognitive Bias → Strategic Agility (β = -0.28, p < 0.001). The first hypothesis is supported, indicating that neurocognitive bias has a negative and significant effect on strategic agility. This finding is consistent with prior studies which emphasize that cognitive biases—such as overconfidence, anchoring, and loss aversion—impair executive capacity to respond flexibly to dynamic environments [13]. Biased leaders tend to rely on mental shortcuts and emotional judgment, limiting their openness to novel information or adaptive strategies. Neurologically, such biases are often rooted in amygdala overactivation and reduced prefrontal regulation [7].

From a strategic standpoint, when leaders succumb to biases, they are more likely to engage in strategic inertia or make reactive decisions based on incomplete or skewed data. This reinforces the argument that organizations seeking agility must address not only structural and process barriers but also cognitive-emotional barriers within executive minds.

H2: Neurocognitive Bias → Executive Rationality (β = -0.35, p < 0.001). This hypothesis is also supported, showing that higher levels of neurocognitive bias are associated with lower levels of executive rationality. This confirms neuroscientific findings that suggest decision-makers with excessive emotional interference and shortcut-driven thinking have less engagement in prefrontal cortex–based reflective thinking [8].

From a behavioral strategy lens, rationality is not merely a trait but a cognitive capability shaped by both internal (brain structure, stress tolerance) and external factors (decision environments, organizational culture). This study reveals that when cognitive biases dominate, executive rationality—the ability to regulate emotion, resist heuristics, and apply deliberative logic—declines, making leaders less effective in strategic roles.

This finding aligns with Sadler-Smith et al. (2021), who argue that improving rationality involves not just awareness but also cognitive training to enhance emotional regulation and cognitive flexibility.

H3: Executive Rationality → Strategic Agility (β = 0.41, p < 0.001). The third hypothesis is strongly supported, demonstrating that executive rationality has a positive

and significant impact on strategic agility. Rational leaders are more capable of interpreting complex environments, questioning assumptions, and formulating adaptive strategic responses.

This supports the assertion by [11] that cognitive flexibility and rational reflection are prerequisites for navigating VUCA (Volatile, Uncertain, Complex, and Ambiguous) environments. The prefrontal cortex—responsible for inhibition, working memory, and planning—is often more active among leaders with higher rationality, allowing them to suppress impulsive reactions and consider long-term consequences [4].

Practically, this suggests that strategic agility is not only a function of structural readiness but also a result of rational cognitive behavior at the top management level.

H4: Mediation of Executive Rationality (Indirect Effect = 0.14, $p < 0.01$). The mediation analysis confirms that executive rationality partially mediates the relationship between neurocognitive bias and strategic agility. This implies that while biases can directly impair agility, their negative impact can be buffered or reduced through rational cognitive control.

This partial mediation supports the dual-process theory [10], where System 1 (automatic, biased) thinking can be moderated by System 2 (deliberate, rational) intervention. The neurofinance literature similarly posits that deliberative circuits in the prefrontal cortex can override emotional and biased responses, leading to more adaptive decision-making [12].

The main findings of this study are highly significant for strategic management practices, as they highlight that improving decision quality requires not only reducing cognitive bias but also actively cultivating executive rationality. This can be achieved through structured interventions such as cognitive-behavioral training to enhance awareness of thinking patterns, executive coaching to strengthen reflective leadership skills, mindfulness practices to improve focus and emotional regulation, and real-time decision debriefs to evaluate choices immediately after they are made. In addition, organizational systems should be deliberately designed to promote rational reflection, for example by incorporating devil's advocacy in board-level discussions or applying red-teaming approaches in strategic planning processes, thereby ensuring more balanced, critical, and well-considered strategic decisions.

5.2 Theoretical Implications

From a theoretical perspective, this study extends the neurofinance literature into the field of strategic management by empirically validating the influence of cognitive neuroscience variables on strategic behavior. The findings reinforce dual-process theory, which posits that the brain's decision-making systems—emotionally reactive (System 1) and deliberative, analytical (System 2)—play a crucial role in shaping strategic agility. By demonstrating that strategic decisions are significantly affected by cognitive and emotional processes, this study provides a stronger theoretical foundation for integrating neuroscience into strategic management frameworks. Consequently,

organizations are theoretically encouraged to develop leadership capabilities through bias recognition and emotional regulation training, apply structured decision-making tools to reduce dependence on flawed heuristics, and incorporate neuroscience-based coaching approaches to strengthen rational cognition, particularly in high-pressure strategic contexts.

6 Conclusion

This study emphasizes the importance of integrating neurofinance insights into strategic leadership development. By identifying neurocognitive bias as an inhibiting factor and executive rationality as a balancing mechanism, organizations can enhance the quality of decision-making processes and strengthen their leadership development pathways. The findings highlight that understanding cognitive and emotional mechanisms in financial decision-making can foster more adaptive and rational strategic behavior among executives. However, several limitations need to be acknowledged. The cross-sectional research design limits the ability to draw causal conclusions, and reliance on self-reported data may introduce response bias that affects the validity of the findings. Moreover, as the sample consisted solely of managers in Indonesia, the generalizability of the results may be constrained by potential cultural influences on cognitive and behavioral patterns. Future studies are recommended to incorporate neurophysiological measures such as electroencephalography (EEG) or heart rate variability (HRV) to enrich the understanding of neural mechanisms underlying executive decision-making. Researchers may also explore the moderating role of organizational culture and conduct cross-cultural replications to examine the universality of the observed relationships across different managerial contexts.

References

1. Ariely, D., & Jones, B.: Behavioral economics and executive decision making. Journal of Behavioral Strategy, 12(2), 105–119, (2023).
2. Bazerman, M. H., & Moore, D. A.: Judgment in managerial decision making (9th ed.). Wiley. (2021).
3. Boyatzis, R. E., Rochford, K., & Jack, A. I. (2021). Emotional intelligence and leadership: A neuroscience perspective. Leadership Quarterly*, 32*(2), 101443.
4. Camerer, C., Frydman, C., & Nave, G.: The neuroscience of strategic decisions. *Annual Review of Economics, 13*, 481–509, (2021).
5. Doz, Y., & Kosonen, M.: Fast strategy and strategic agility. Long Range Planning, 54(5), 102044, (2021).
6. Eisenhardt, K. M., Graebner, M. E., & Sonenshein, S.: Cognitive leadership and strategic change. Academy of Management Review*, 45*(2), (2020),205–226.
7. Frydman, C., & Nave, G.: Neuroscience and the emergence of neurofinance. *Nature Reviews Neuroscience 22*(2), 82–92, (2021).
8. Hsu, M., & Yoon, C.: Executive control and decision-making: Neuroscientific insights. Journal of Neuroscience and Economics *7*(1), 21–34, (2023).

9. Jack, A. I., Boyatzis, R. E., & Cavanagh K. V.: Coaching for neural integration in leadership. Journal of Applied Psychology *108*(1), 101–119, (2023).
10. Kahneman, D.: Thinking, fast and slow. Farrar, Straus and Giroux, (2011).
11. Laureiro-Martínez, D., & Brusoni, S.' Cognitive flexibility and strategic decision-making. Strategic Management Journal*, 42*(8), 1481–1503, (2021).
12. Lo, A. W.: Adaptive markets and cognitive neuroscience. Journal of Behavioral Finance, *22*(3), 233–245, (2021).
13. Park, S. H., & Sohn, S. Y.: Behavioral biases of managers and firm performance. *Asia Pacific Journal of Management, 37*(2), 433–453, (2020).
14. Peterson, R. L.: Trading on sentiment: The power of minds over markets (2nd ed.). Wiley, (2022).
15. Sadler-Smith, E., et al.: Intuition in management: A neuroscientific review. *Journal of Management Inquiry, 30*(2), 134–146, (2021).
16. Kuhnen, C. M., & Knutson, B. (2005). The neural basis of financial risk taking. Neuron, 47(5), 763–770.
17. Lo, Andrew W., & Repin, Dmitry V. (2002). The psychophysiology of real-time financial risk processing. Journal of Cognitive Neuroscience, 14(3), 323–339.
18. Tversky, A., & Kahneman, D. (1974). Judgment under Uncertainty: Heuristics and Biases. Science, 185(4157), 1124-1131.
19. Hodgkinson, G. P., & Healey, M. P. (2011). Psychological foundations of dynamic capabilities: Reflexion and reflection in strategic management. Strategic Management Journal, 32(13), 1500-1516. https://doi.org/10.1002/smj.964.
20. The Dynamics of Strategic Agility: Nokia's Rollercoaster Experience
Doz, Y. L. & Kosonen, M. (2008). The dynamics of strategic agility: Nokia's rollercoaster experience. California Management Review, 50(3), 95–118.
21. Simon, H. A. Making management decisions: The role of intuition and emotion. Academy of Management Executive, 1(1), 57–64. (1987)
22. Bechara, A., Damasio, H., & Damasio, A. R. (2000). Emotion, decision making and the orbitofrontal cortex. Cerebral Cortex, 10(3), 295–307.
23. Hodgkinson, G. P., & Sadler-Smith, E. (2018). The dynamics of intuition and analysis in managerial and organizational decision making. Academy of Management Perspectives, 32(4), 473–492.