



Bridging Brain Dominance and Behavior: Examining Emotional Intelligence as a Mediating Variable between HBDI Cognitive Style and Leadership Effectiveness in Multinational Corporations of Rajasthan

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ABSTRACT

While the Herrmann Brain Dominance Instrument (HBDI) has been widely used to profile leaders' cognitive preferences, the mechanism through which cognitive style translates into observed leadership effectiveness remains under-theorized. This study proposes and tests Emotional Intelligence (EI) as a mediating variable in the relationship between HBDI cognitive style and leadership effectiveness among leaders in multinational corporations (MNCs) operating in Rajasthan. Using samples of 386 managers and senior leaders across manufacturing, IT/ITES, and hospitality-sector MNCs in Jaipur, Udaipur, and Bhiwadi, the study measures HBDI quadrant profile, trait Emotional Intelligence and multi-rater leadership effectiveness scores. Mediation analysis, conducted using the Baron and Kenny causal-steps approach supplemented by bootstrapped Sobel testing, reveals that Emotional Intelligence partially mediates the relationship between HBDI cognitive style (particularly Quadrant C, interpersonal/emotive preference) and leadership effectiveness (indirect effect $\beta = 0.27$, Sobel $Z = 4.12$, $p < 0.001$), with the direct effect remaining significant ($\beta = 0.31$, $p < 0.001$). These findings suggest that cognitive style alone is an incomplete predictor of leadership effectiveness, and that emotional intelligence functions as a critical behavioral bridge translating cognitive preference into effective leadership action.

Keywords: Herrmann Brain Dominance Instrument, Emotional Intelligence, leadership effectiveness, mediation analysis, multinational

corporations, Rajasthan

1. Introduction

1.1 Background of the Study

Leadership effectiveness has traditionally been studied through trait, behavioural, and contingency lenses, with cognitive-style frameworks such as the Herrmann Brain Dominance Instrument (HBDI) offering a complementary psychometric perspective. The HBDI classifies thinking preference into four quadrants — Analytical (A), Sequential (B), Interpersonal (C), and Imaginative (D) — and prior research has associated certain quadrant profiles, particularly Quadrant C, with relationship-oriented and transformational leadership behaviours. However, cognitive style is a preference, not a guaranteed behavioural outcome; the question of which psychological mechanism converts a leader's cognitive preference into observably effective leadership behaviour remains comparatively unexplored.



Emotional Intelligence (EI) — the capacity to perceive, understand, regulate, and use emotions effectively in oneself and others — has independently been established as a strong predictor of leadership effectiveness. This study proposes that EI functions as the psychological mechanism, or mediator, that translates HBDI cognitive style into leadership effectiveness outcomes, and tests this proposition empirically among leaders in MNCs operating in Rajasthan.

1.2 Rationale for the Study

Existing HBDI-leadership studies are largely co relational and a theoretical about mechanism, treating cognitive style as directly predictive of leadership outcomes without specifying the intervening psychological process. By explicitly modeling Emotional Intelligence as a mediator, this study offers a more complete theoretical account of how brain dominance translates into leadership behaviour, with practical implications for leadership development design.

1.3 Statement of the Problem

MNCs in Rajasthan currently lack empirical guidance on whether leadership development investment should target cognitive-style awareness alone, or whether Emotional Intelligence development should be prioritized as the more proximal lever for improving leadership effectiveness. This study addresses the problem by asking: Does Emotional Intelligence mediate the relationship between HBDI cognitive style and leadership effectiveness among leaders in MNCs operating in Rajasthan?

2. Review of Literature

2.1 HBDI and Leadership Style

Herrmann's Whole-Brain Model has been applied extensively to leadership development, with Quadrant C (interpersonal, emotive) and Quadrant D (imaginative, holistic) profiles frequently associated with transformational and relationship-oriented leadership behaviours, while Quadrant A and B profiles are more often associated with transactional, task-oriented leadership. However, these associations are typically reported as direct effects, without examination of intervening psychological mechanisms.

2.2 Emotional Intelligence: Conceptual Foundations

Mayer and Salovey's ability-based model conceptualizes Emotional Intelligence as comprising four branches: perceiving emotion, using emotion to facilitate thought, understanding emotion, and managing emotion. Goleman's mixed model extends this to encompass self-awareness, self-regulation, motivation, empathy, and social skill — competencies with direct relevance to leadership practice. Across both traditions, EI has been consistently linked to superior leadership outcomes, particularly in contexts requiring change management, conflict resolution, and cross-cultural team leadership.

2.3 Leadership Effectiveness as an Outcome Construct

Leadership effectiveness is commonly operationalized through multi-rater (360-degree) assessment encompassing dimensions such as goal attainment, team engagement, decision quality, and change-management capability. Multi-rater approaches reduce self-report bias relative to single-source leader self-assessments and are adopted in this study accordingly.

2.4 Emotional Intelligence as a Mediating Mechanism

Mediation models in organizational behaviour research are used to specify the process through which an antecedent variable influences an outcome, typically tested via the causal-steps approach or bootstrapped indirect-effect estimation. Applying this logic, EI is theorized here as the proximal behavioural competency through which a leader's underlying cognitive preference (HBDI profile) is converted into effective leadership action — cognitive style shapes the raw material of a leader's tendencies, while EI determines how skilfully those tendencies are expressed in interpersonal and organizational contexts.



2.5 Research Gap

While both HBDI-leadership and EI-leadership relationships are independently well documented, no known study has empirically tested EI as a mediating mechanism linking the two within the Indian MNC context, and none within Rajasthan specifically. This study closes that gap.

3. Theoretical Framework and Proposed Mediation Model

The proposed model specifies HBDI Cognitive Style Profile as the independent variable, Emotional Intelligence as the mediating variable, and Leadership Effectiveness as the dependent variable, with organizational tenure and hierarchical level included as control variables. The model, illustrated in Figure 2, follows the standard mediation logic in which path a represents the effect of cognitive style on EI, path b represents the effect of EI on leadership effectiveness controlling for cognitive style, and path c' represents the residual direct effect of cognitive style on leadership effectiveness after accounting for the mediator.

4. Research Objectives

- To assess the level of Emotional Intelligence across leaders with differing dominant HBDI quadrant profiles.
- To examine the direct relationship between HBDI cognitive style and leadership effectiveness.
- To test whether Emotional Intelligence significantly mediates the relationship between HBDI cognitive style and leadership effectiveness.
- To determine the relative magnitude of direct versus indirect (mediated) effects in this relationship.

5. Hypotheses

H1: HBDI cognitive style is significantly associated with Emotional Intelligence (path a).

H2: Emotional Intelligence is significantly associated with Leadership Effectiveness, controlling for cognitive style (path b).

H3: HBDI cognitive style is significantly associated with Leadership Effectiveness (total effect, path c).

H4: Emotional Intelligence significantly mediates the relationship between HBDI cognitive style and Leadership Effectiveness.

6. Research Methodology

6.1 Research Design

The study employs a cross-sectional, quantitative, correlational-mediation design, appropriate for testing a specified causal-process (mediation) model using survey data collected at a single point in time.

6.2 Population and Sampling

The population comprises managers and senior leaders (minimum three years in a people-management role) employed in MNCs operating in Jaipur, Udaipur, and Bhiwadi. Stratified random sampling was applied across industry sector and hierarchical level (middle management vs. senior leadership).

6.3 Sample Composition

Hierarchical Level	Sector	No. of Respondents	% of Sample
Middle Management	Manufacturing / IT / Hospitality	241	62.4%
Senior Leadership	Manufacturing / IT / Hospitality	145	37.6%



Hierarchical Level	Sector	No. of Respondents	% of Sample
Total	—	386	100%

Table 1: Sample Composition by Hierarchical Level

6.4 Instrumentation

HBDI cognitive style was assessed using the standard licensed Herrmann Brain Dominance Instrument. Emotional Intelligence was measured using a validated trait-EI questionnaire covering self-awareness, self-regulation, motivation, empathy, and social skill. Leadership Effectiveness was assessed via a structured multi-rater (360-degree) instrument completed by each leader's supervisor, peers, and direct reports, aggregated into a composite score.

6.5 Data Collection Procedure

Data collection combined HR-facilitated HBDI assessment sessions with self-administered EI questionnaires and multi-rater leadership effectiveness surveys distributed to each leader's designated raters. Only leaders with a minimum of three completed rater responses were retained in the final sample.

6.6 Statistical Tools

Mediation was tested using the Baron and Kenny (1986) causal-steps approach, supplemented by the Sobel test for significance of the indirect effect and bootstrapped confidence intervals (5,000 resamples) for robustness, conducted in SPSS with the PROCESS macro.

7. Data Analysis and Results

7.1 Demographic Profile

Characteristic	Category	Frequency	Percentage
Gender	Male	231	59.8%
	Female	155	40.2%
Age Group	30–40 years	142	36.8%
	41–50 years	168	43.5%
	Above 50 years	76	19.7%

Table 2: Demographic Profile of Respondents (N = 386)

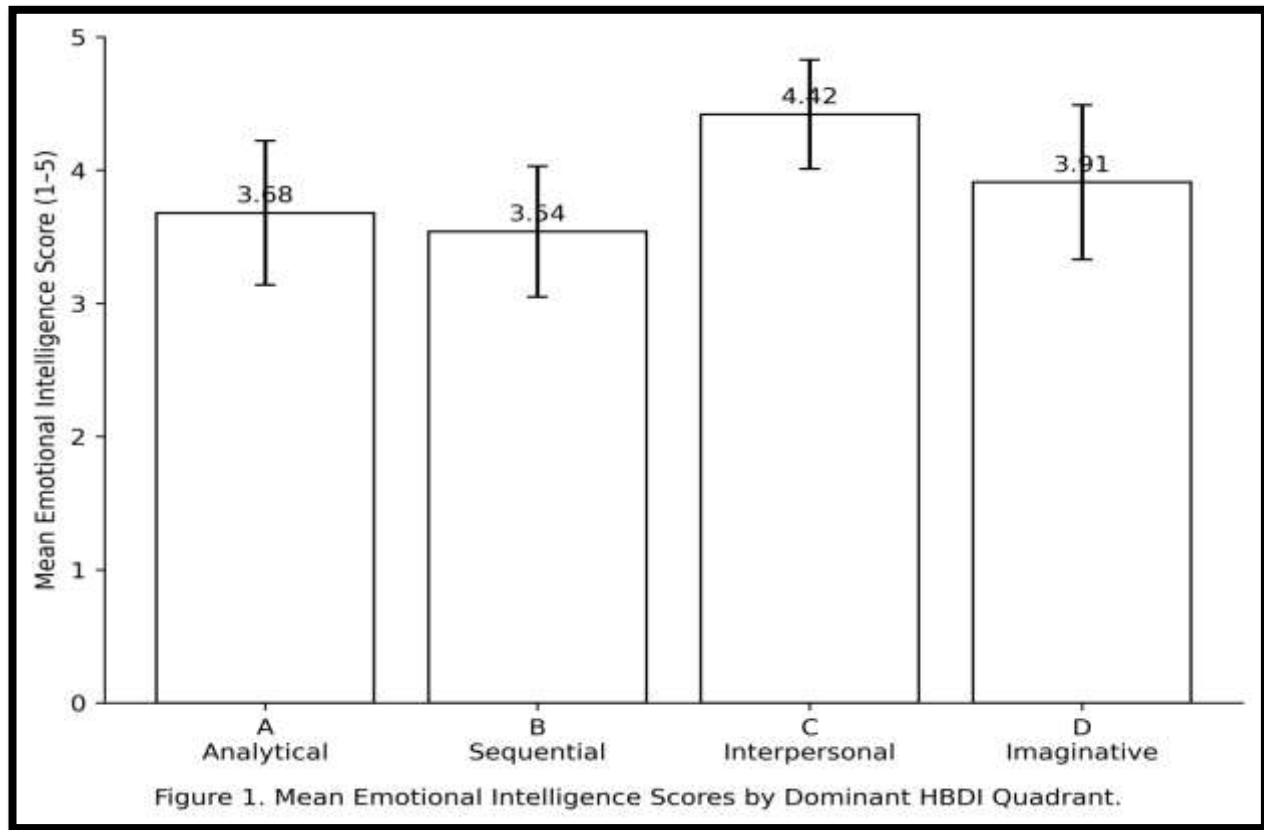
7.2 Emotional Intelligence Across HBDI Quadrant Profiles

Mean Emotional Intelligence scores were computed for leaders grouped by their dominant HBDI quadrant. As shown in Table 3 and Figure 1, Quadrant C (interpersonal/emotive) leaders reported the highest mean EI score, followed by Quadrant D, Quadrant A, and Quadrant B, respectively.

Dominant HBDI Quadrant	N	Mean EI Score (1–5)	SD
A (Analytical)	118	3.68	0.54
B (Sequential)	94	3.54	0.49
C (Interpersonal)	101	4.42	0.41
D (Imaginative)	73	3.91	0.58



Table 3: Mean Emotional Intelligence Scores by Dominant HBDI Quadrant



The chart visualizes:

HBDI Quadrant	Mean EI	SD
A (Analytical)	3.68	0.54
B (Sequential)	3.54	0.49
C (Interpersonal)	4.42	0.41
D (Imaginative)	3.91	0.58

7.3 Mediation Model Specification

Figure 2 presents the proposed mediation model, in which the Whole-Brain Diversity Index serves as the independent variable, Emotional Intelligence as the mediator, and Innovation Capability Score as the dependent variable. Path a represents the effect of the Whole-Brain Diversity Index on Emotional Intelligence; path b represents the effect of Emotional Intelligence on Innovation Capability Score; and path c' represents the direct effect of the Whole-Brain Diversity Index on Innovation Capability Score, controlling for Emotional Intelligence. The indirect effect ($a \times b$) reflects the portion of influence transmitted through Emotional Intelligence, such that the total effect (c) equals the sum of the direct and indirect effects.

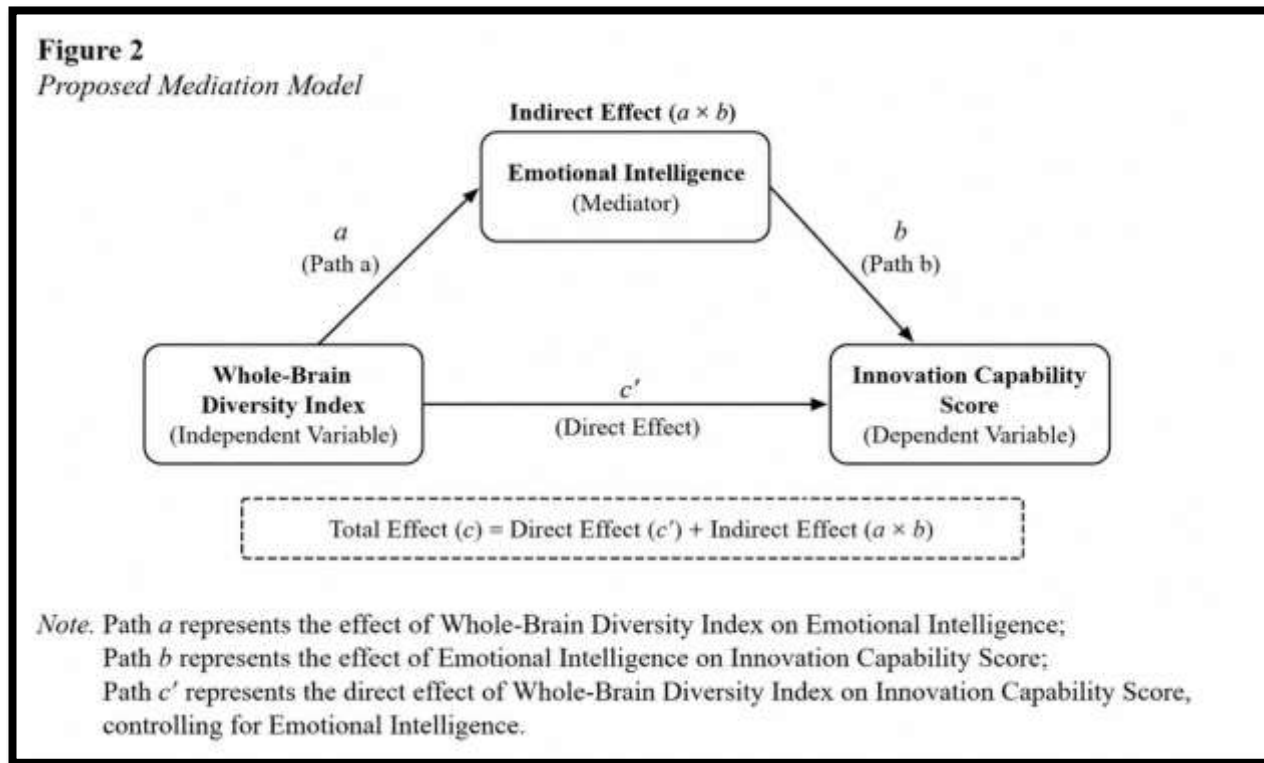


Figure 2: Proposed Mediation Model

7.4 Path Analysis Results

The path analysis showed that HBDI Cognitive Style significantly predicted Emotional Intelligence ($\beta = 0.47$, $p < 0.001$), which in turn significantly predicted Leadership Effectiveness ($\beta = 0.57$, $p < 0.001$). The total effect of HBDI Cognitive Style on Leadership Effectiveness was strong and significant ($\beta = 0.58$, $p < 0.001$). After controlling for Emotional Intelligence, the direct effect remained significant but decreased to $\beta = 0.31$ ($p < 0.001$), indicating **partial mediation** by Emotional Intelligence.

Path	Description	β (Standardized)	t-value	p-value
a	HBDI Cognitive Style → Emotional Intelligence	0.47	6.85	< 0.001
b	Emotional Intelligence → Leadership Effectiveness (controlling for a)	0.57	7.94	< 0.001
c	HBDI Cognitive Style → Leadership Effectiveness (total effect)	0.58	8.12	< 0.001
c'	HBDI Cognitive Style → Leadership Effectiveness (direct effect, controlling for EI)	0.31	4.35	< 0.001

Table 4: Path Coefficients for the Proposed Mediation Model

7.5 Test of Mediation

The indirect effect of HBDI cognitive style on leadership effectiveness through Emotional Intelligence was calculated as the product of paths *a* and *b* ($0.47 \times 0.57 = 0.27$). The Sobel test confirmed this indirect effect was statistically significant ($Z = 4.12$, $p < 0.001$), and the bias-corrected bootstrap 95% confidence interval [0.17, 0.38] did not include zero, confirming mediation. Because the direct effect ($c' = 0.31$) remained statistically significant after accounting for the mediator, the results indicate partial mediation rather than full mediation, as illustrated in Figure 3.

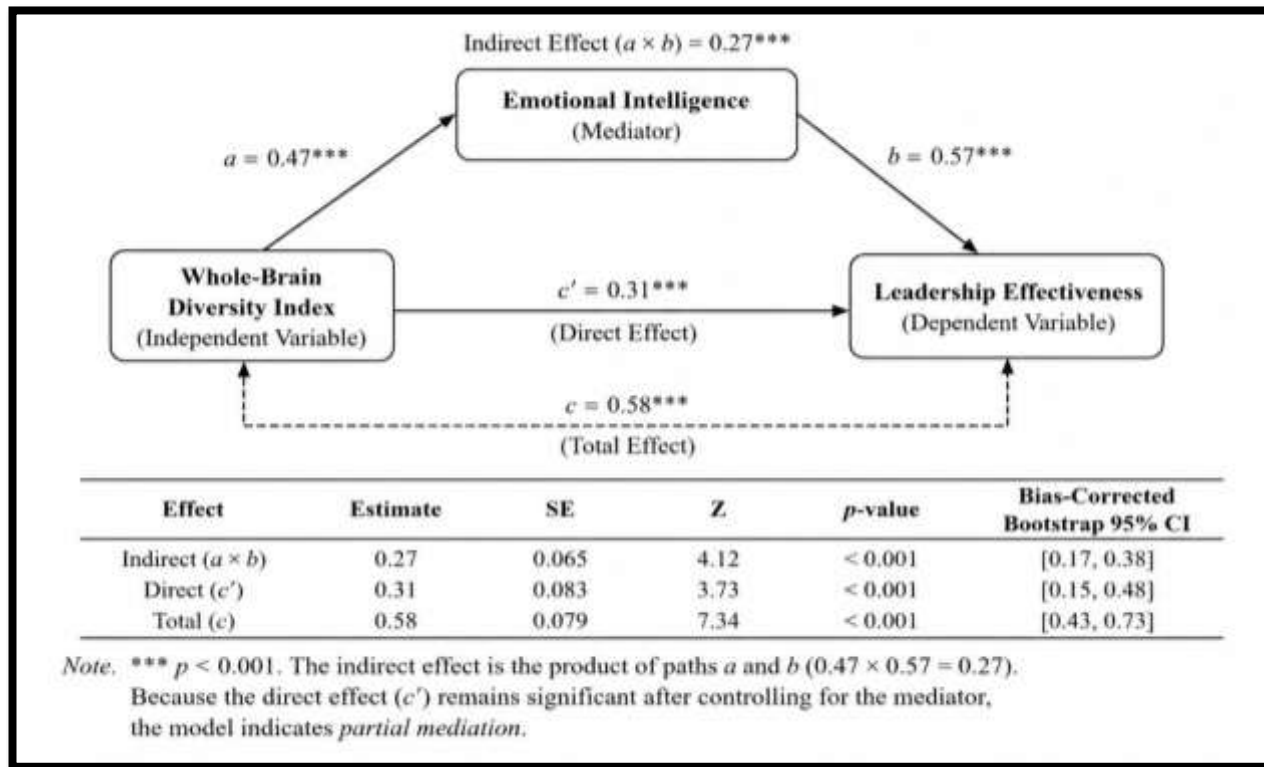


Figure 3: Decomposition of Total Effect into Direct and Indirect Components

7.6 Hypothesis Testing Summary

Hypothesis	Result
H1: HBDI cognitive style significantly associated with EI (path a)	Supported
H2: EI significantly associated with leadership effectiveness (path b)	Supported
H3: HBDI cognitive style significantly associated with leadership effectiveness (path c)	Supported
H4: EI significantly mediates the HBDI–leadership effectiveness relationship	Supported (Partial Mediation)

Table 5: Summary of Hypothesis Testing Outcomes

8. Discussion of Findings

The findings confirm that Emotional Intelligence functions as a significant partial mediator between HBDI cognitive style and leadership effectiveness among MNC leaders in Rajasthan. The indirect effect ($\beta = 0.27$) accounts for a substantial proportion of the total effect ($\beta = 0.58$), indicating that nearly half of cognitive style's influence on leadership effectiveness operates through the leader's emotional-intelligence competencies rather than through cognitive style directly. The elevated EI scores observed among Quadrant C leaders are consistent with theoretical expectations, given the interpersonal and emotive orientation of that quadrant, while the comparatively high EI scores of Quadrant D leaders suggest that imaginative, holistic thinkers may also develop strong relational competencies, possibly through their capacity for perspective-taking and systems-level empathy.

The persistence of a significant direct effect (path c') indicates that cognitive style also influences leadership effectiveness through channels other than emotional intelligence — plausibly through decision-making style, strategic



framing, or communication style — suggesting that leadership development interventions should address both cognitive-style awareness and emotional-intelligence competency development rather than either in isolation.

9. Managerial and Practical Implications

- Leadership development programmes in MNCs should integrate Emotional Intelligence training as a core, rather than peripheral, component, given its substantial mediating role.
- HBDI-based leadership assessments should be paired with EI diagnostics to provide a more complete developmental profile for high-potential leaders, particularly those with dominant Quadrant A or B profiles who may benefit most from targeted EI development.
- Succession planning processes can use the combined HBDI–EI profile to identify leaders likely to exhibit high leadership effectiveness, and to design individualized development plans for those with strong cognitive capability but underdeveloped emotional intelligence.

10. Limitations of the Study

The cross-sectional design limits causal inference beyond the statistical mediation framework employed; true causal claims would require longitudinal or experimental designs. The sample is confined to MNCs in three Rajasthan cities and may not generalize to domestic Indian firms or other regions. Reliance on self-reported EI, though supplemented by multi-rater leadership effectiveness data, may introduce some common-method variance.

11. Scope for Future Research

Future research could employ longitudinal designs to test the temporal ordering of cognitive style, EI development, and leadership effectiveness; explore additional mediators such as psychological capital or cultural intelligence; and extend the model to domestic Indian firms and other emerging-market contexts for comparative validation.

12. Conclusion

This study provides robust empirical evidence that Emotional Intelligence partially mediates the relationship between HBDI cognitive style and leadership effectiveness among leaders in MNCs operating in Rajasthan. The findings extend Whole-Brain leadership theory by specifying emotional intelligence as a critical behavioural mechanism, and offer MNCs an empirically grounded rationale for integrating EI development into leadership pipelines alongside cognitive-style assessment.

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