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AI Leadership Without Integration: Human–AI Misalignment in Innovation Processes and Outcomes

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Abstract

This study examines the relationship between AI leadership, human-centered independence, and organizational innovation processes and outcomes, challenging the prevailing assumption that leadership-driven AI adoption automatically enhances performance. The research draws on a dual-structured model of AI leadership—AI-driven innovation leadership (Sun) and reflective AI governance leadership (Moon)—to assess whether these approaches contribute to human capability development and innovation performance. Data were collected from 2,754 respondents across diverse organizational contexts using a structured survey. The measurement model was validated through exploratory and confirmatory factor analysis, and the hypotheses were tested using structural equation modeling (SEM). The results show that none of the proposed positive relationships are empirically supported. Both leadership dimensions do not exert significant effects on human-centered independence or innovation performance, while the only significant relationship is negative, indicating that human-centered independence, when not integrated with AI, is associated with reduced innovation outcomes. The absence of mediation and negligible explained variance further confirm the lack of an integrated causal structure. These findings challenge linear models of AI leadership by demonstrating that the coexistence of AI-oriented leadership and human-centered capabilities does not ensure their integration. The study introduces the AI–Human Misalignment Framework, highlighting that innovation outcomes depend on alignment rather than the mere presence of capabilities.

Keywords: AI leadership; innovation processes and outcomes; human-centered independence; AI–human misalignment

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1. Introduction

The rapid diffusion of artificial intelligence (AI) across organizational contexts has intensified scholarly interest in the role of leadership in enabling innovation and transformation [1,2]. Existing research largely assumes that AI adoption, when supported by effective leadership, enhances organizational performance through improved decision-making, efficiency, and knowledge generation [3,4]. Within this stream, leadership is typically conceptualized as a facilitating mechanism that aligns technological capabilities with organizational goals, thereby driving innovation processes and outcomes [5–7]. At the same time, parallel research emphasizes the importance of maintaining human-centered capabilities, such as autonomy, critical thinking, and creativity, particularly in environments characterized by increasing algorithmic influence [8,9].

Despite these advances, existing research systematically overestimates the effectiveness of AI leadership by implicitly assuming functional alignment between AI systems, leadership practices, and human-centered capabilities [10,11]. Much of the existing literature is grounded in a linear and inherently optimistic assumption that AI leadership produces positive outcomes through a coherent

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chain of influence [12–14]. However, emerging critical perspectives suggest that digital leadership may also generate unintended consequences, including forms of control, dependency, and reduced autonomy, thereby challenging overly optimistic assumptions about its effectiveness [15] (Ott and Hoelscher, 2023). This assumption remains largely untested, with empirical evidence limited and fragmented, particularly in structurally misaligned organizational contexts [16,17]. Moreover, existing research rarely considers the possibility that these relationships may not hold at all, particularly in contexts where AI systems and human-centered practices are not effectively integrated [18]. In particular, prior studies have yet to examine whether the coexistence of different leadership approaches—such as innovation-oriented and governance-oriented AI leadership—results in their effective integration at the organizational level [19,20].

This gap is especially evident in the absence of research that conceptualizes misalignment—not alignment—as a normal, structurally embedded, and empirically observable condition in AI-enabled organizations [21]. This study addresses this gap by fundamentally reorienting the analytical focus from the assumed effectiveness of AI leadership to the structural conditions under which such effectiveness fails to materialize. In doing so, the study introduces the concept of an AI–Human Misalignment Framework, which conceptualizes innovation failure not as a consequence of insufficient leadership or capability, but as the result of structural disconnection between AI-oriented leadership, human-centered capabilities, and organizational processes. Unlike dominant linear models that assume alignment as given [22,23], the proposed framework treats misalignment as a fundamental and empirically observable condition. It demonstrates that the mere coexistence of AI-driven leadership and human-centered independence does not ensure integration, but may instead generate structural fragmentation and weak—or even negative—innovation outcomes. In this sense, leadership is reconceptualized not as an inherently beneficial driver of innovation, but as a contingent and context-dependent capability whose effectiveness depends on alignment mechanisms rather than its mere presence.

Although leadership is often treated as a unifying force [24], there is limited understanding of situations in which leadership practices fail to translate into operational changes or performance improvements [25]. Similarly, the role of human-centered independence is typically assumed to be inherently beneficial [26], without critically examining the conditions under which it may become disconnected from technological systems [27].

To operationalize this framework, the study develops and empirically tests a model that integrates two complementary dimensions of AI leadership—AI-driven innovation leadership (Sun dimension) and reflective AI governance leadership (Moon dimension)—with human-centered independence and organizational innovation performance. By doing so, the study moves beyond single-dimensional conceptualizations of leadership [28] and examines how different leadership logics interact within AI-enabled environments. The significance of this research lies in its direct challenge to dominant linear assumptions in AI leadership [29] and innovation literature [30]. Rather than examining whether AI leadership enhances performance, this study questions whether such effects emerge at all under conditions of structural disconnection. By demonstrating that leadership, human-centered capabilities, and innovation processes may coexist without functional integration, the study explains why substantial investments in AI-driven transformation do not necessarily translate into improved innovation outcomes.

2. Literature Review and Hypothesis Development

The growing integration of artificial intelligence into organizational processes has repositioned leadership as a central mechanism for translating technological potential into innovation processes and outcomes [31]. Within this context, AI leadership is increasingly conceptualized as a multidimensional construct that combines externally oriented innovation dynamics with internally oriented governance and control mechanisms [32–34]. This duality reflects the need to balance exploratory and exploitative processes, often framed as complementary organizational capabilities in innovation systems [35]. The AI-driven innovation leadership (Sun dimension) captures the outward-facing, opportunity-seeking role of leadership, emphasizing idea generation, experimentation, and the strategic use of AI to identify emerging trends and innovation opportunities [36–38]. Prior research has consistently highlighted the role of leadership in enabling innovation by mobilizing resources, fostering creativity, and supporting experimentation [39]. In digitally intensive environments, AI further enhances this capability by accelerating information processing, enabling predictive insights, and expanding the creative potential of teams [40,41]. As a result, leaders who actively integrate AI into innovation processes are expected not only to drive innovation outputs but also to reshape how employees engage with knowledge and problem-solving tasks [42].

At the same time, the reflective AI governance leadership (Moon dimension) represents the inward-facing, evaluative role of leadership, focusing on critical assessment, ethical considerations, and risk management in the use of AI [43]. This dimension aligns with emerging discussions on responsible AI and governance structures, which emphasize the importance of human oversight, accountability, and ethical reflection in algorithmic decision-making [44–46]. Rather than simply enabling innovation, this form of leadership ensures that AI-driven processes remain aligned with organizational values and strategic objectives [47,48]. By structuring how AI is evaluated and implemented, reflective leadership is expected to influence both decision quality and long-term innovation sustainability. The interaction between these two leadership dimensions is particularly relevant when considering human-centered independence, conceptualized as the organization's ability to maintain critical thinking, autonomy, and operational capability independently of AI systems. While digital transformation literature often emphasizes technological augmentation [49], parallel streams of research highlight the importance of preserving human agency and cognitive autonomy in increasingly automated environments [50]. Human-centered independence reflects this balance, capturing the capacity of employees to operate without over-reliance on AI while still engaging with technologically supported processes [51,52].

From a theoretical perspective, leadership is expected to shape such capabilities by influencing both organizational culture and individual behavior [53]. Leaders who promote AI-driven innovation may simultaneously encourage employees to develop complementary skills, ensuring that human expertise remains relevant in AI-augmented contexts [54,55]. Similarly, leaders who emphasize governance and critical evaluation of AI are likely to reinforce independent thinking and responsible use of technology [56,57]. Based on these arguments, both leadership dimensions are expected to positively influence human-centered independence.

H1. *AI-driven innovation leadership positively influences human-centered independence in organizations.*

H2. *Reflective AI governance leadership positively influences human-centered independence in organizations.*

Beyond human capability development, leadership is widely recognized as a key determinant of organizational innovation performance. Innovation performance reflects the organization's ability to generate, implement, and sustain new ideas, processes, and products [58]. In the context of AI integration, leadership plays a crucial role in orchestrating technological and human resources to achieve innovation processes and outcomes. AI-driven innovation leadership is expected to directly enhance performance by accelerating idea generation, improving decision-making speed, and enabling data-driven innovation processes [59,60]. Similarly, reflective AI governance leadership contributes to innovation performance by reducing risks, ensuring ethical alignment, and improving the quality of decisions [61]. Effective governance mechanisms can prevent misalignment, enhance trust in AI systems, and support more sustainable innovation practices. Together, these dimensions represent complementary pathways through which leadership can influence innovation processes and outcomes.

H3. *AI-driven innovation leadership positively influences organizational innovation performance.*

H4. *Reflective AI governance leadership positively influences organizational innovation performance.*

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In addition to leadership effects, human-centered independence is commonly associated with innovation through its links to creativity, problem-solving, and adaptive capacity [62]. Research on creativity and innovation suggests that autonomy and independent thinking are critical drivers of novel idea generation and implementation [63]. In this sense, organizations that maintain strong human capabilities alongside technological integration are expected to achieve more robust and sustainable innovation processes and outcomes.

H5. *Human-centered independence positively influences organizational innovation performance.*

Finally, the relationship between leadership and innovation performance is often conceptualized as indirect, operating through intermediate organizational capabilities [64]. In this framework, human-centered independence may function as a mediating mechanism through which leadership influences performance. AI-driven innovation leadership may enhance performance by strengthening human capabilities, while reflective AI governance leadership may support performance through improved decision-making and critical evaluation processes [65]. This suggests that leadership does not only act directly but also indirectly through its impact on human-centered independence.

H6. *Human-centered independence mediates the relationship between AI-driven innovation leadership (Sun dimension) and organizational innovation performance.*

H7. *Human-centered independence mediates the relationship between reflective AI governance leadership (Moon dimension) and organizational innovation performance.*

However, this perspective implicitly assumes that these elements are functionally aligned and mutually reinforcing, an assumption that remains largely untested in AI-enabled organizational contexts. Taken together, this framework reflects a linear and integrative view of AI leadership, in which leadership influences human capability, which in turn drives innovation performance. Yet, as the subsequent analysis demonstrates, these assumed relationships may not hold in practice, highlighting the need to reconsider how AI and human-centered leadership interact within contemporary organizational environments. The proposed model consists of four latent constructs: AI-Driven Innovation Leadership (Sun), Reflective AI Governance Leadership (Moon), Human-Centered Independence (HCI), and Organizational Innovation Performance (OIP), which together capture the interplay between leadership, human capability, and innovation processes and outcomes in AI-enabled organizational environments.

3. Materials and Methods

A total of 2,754 respondents participated in the study, recruited through the Prolific platform between March 2025 and March 2026. The survey was administered online using a structured questionnaire. Participation was voluntary and anonymous, and respondents were informed about the purpose of the study prior to completing the questionnaire. To ensure data quality, attention checks and response consistency controls were embedded in the survey, and incomplete or invalid responses were excluded from the final dataset. To ensure the relevance and validity of responses, a screening (filter) question was applied at the beginning of the survey. Only respondents who confirmed that they were currently employed in organizations where artificial intelligence tools are used in work processes were allowed to proceed. This approach ensured that all participants had direct or indirect experience with AI-enabled organizational environments. The original questionnaire consisted of 35 items distributed across four constructs: AI-Driven Innovation Leadership (Sun dimension), Reflective AI Governance Leadership (Moon dimension), Human-Centered Independence, and Organizational Innovation Performance. All items were measured using a five-point Likert scale (1 = strongly disagree, 5 = strongly agree).

Following data screening and measurement validation procedures, including exploratory and confirmatory factor analysis, the instrument was refined to a final set of 21 items. Items with low factor loadings, cross-loadings, or insufficient contribution to construct validity were removed. The retained items demonstrated satisfactory psychometric properties and were used in subsequent structural modeling. The conceptualization and operationalization of the constructs were informed by established theoretical foundations in leadership, innovation, and human-centered capability research. The AI-Driven Innovation Leadership dimension draws on the Dynamic Capabilities perspective [37], emphasizing the role of leadership in sensing, seizing, and transforming innovation opportunities. The Reflective AI Governance Leadership dimension is grounded in emerging literature on responsible AI and organizational governance, particularly in relation to human oversight and ethical decision-making [66].

Human-Centered Independence is conceptually linked to research on autonomy, creativity, and intrinsic motivation, particularly the work of Teresa Amabile [63], which highlights the role of independent thinking and human judgment in innovation processes. Finally, Organizational Innovation Performance builds on established innovation performance literature, capturing the organization's ability to generate, implement, and sustain innovation outcomes. Prior to analysis, the dataset was screened to ensure its suitability for multivariate techniques. Missing data were minimal and handled using listwise deletion. The distribution of variables was examined, and no severe deviations from normality were detected. Additionally, no extreme outliers were identified that could distort the results. These procedures confirmed that the data met the assumptions required for factor analysis and structural equation modeling.

The analytical procedure is grounded in structural equation modeling (SEM), which was employed as the primary method for simultaneously assessing the measurement and structural components of the model. Prior to SEM estimation, the dataset was evaluated for factorability using the Kaiser–Meyer–Olkin measure and Bartlett's Test of Sphericity, followed by maximum likelihood exploratory factor analysis with oblimin rotation to identify the underlying factor structure. The resulting four-factor solution was subsequently validated through confirmatory factor analysis, demonstrating excellent model fit and supporting the reliability and convergent validity of the constructs. Discriminant validity was confirmed using the Fornell–Larcker criterion and the HTMT ratio. Within the SEM framework, both direct and indirect (mediation) effects were estimated to test the hypothesized relationships. Although the overall model fit indices indicate a well-specified model, the structural paths are predominantly non-significant and the explained variance remains negligible, suggesting that the proposed theoretical structure is not supported by the empirical data. The study was conducted in accordance with standard ethical guidelines for social science research. Given the large sample size and the robustness of the measurement model, non-significant structural relationships are interpreted as substantive findings rather than issues of statistical power.

4. Results

As shown in Table 1, the sample (N = 2,754) reflects a structurally diverse and digitally engaged workforce, providing a robust empirical basis for examining human-centered AI leadership. The balanced gender distribution and concentration in early and mid-career stages (63.0% aged 18–40) indicate a population actively involved in adaptive and innovation-driven organizational contexts. The educational profile is notably advanced, with 77.9% of respondents holding at least a bachelor's degree, supporting the cognitive and analytical capacities required for both exploratory (Sun) and evaluative (Moon) leadership functions. Organizational roles are predominantly situated at operational and mid-management levels (64.8%), where the interaction between idea generation and structured implementation is most pronounced, aligning with the dual leadership logic proposed in the study. As presented in Table 1, the sectoral distribution spans both digitally intensive (IT, e-commerce) and traditional industries (manufacturing, telecommunications), enabling the observation of AI governance across heterogeneous organizational environments. Importantly, AI adoption is largely situated at moderate to advanced levels, with 69.7% of organizations reporting at

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least moderate use and 11.8% identifying AI as a core strategic technology. Taken together, these characteristics indicate that the sample captures organizations operating at different stages of AI integration, where the balance between outward-oriented (Sun) and inward-oriented (Moon) leadership becomes critical for translating AI governance into innovation processes and outcomes.

Table 1. Sample characteristics (N = 2,754).

Variable	Category	N	%
Gender	Male	1443	52.4
	Female	1311	47.6
Age	18–30 years	939	34.1
	31–40 years	795	28.9
	41–50 years	565	20.5
	51–60 years	343	12.5
	61+ years	112	4.1
Education	High school	486	17.6
	Bachelor's degree	1023	37.1
	Master's degree	830	30.1
	PhD / Doctorate	295	10.7
	Other	120	4.4
Organizational role	Executive / Senior management	325	11.8
	Middle management	596	21.6
	Team leader / supervisor	594	21.6
	Professional / specialist	869	31.6
	Technical expert	370	13.4
Work experience	<5 years	783	28.4
	6–10 years	723	26.3
	11–20 years	648	23.5
	21–30 years	403	14.6
	>30 years	197	7.2
Industry	IT / Software	631	22.9
	Finance / FinTech	394	14.3
	Telecommunications	319	11.6
	Manufacturing / Industry 4.0	426	15.5
	E-commerce / Digital platforms	491	17.8
	Education / EdTech	262	9.5
	Other	231	8.4
AI usage level	Not used	262	9.5
	Pilot projects	571	20.7
	Moderate use	893	32.4
	Extensive use	703	25.5
	Core technology	325	11.8

Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy is 0.952, indicating a very high level of shared variance among variables and confirming that the dataset is suitable for factor analysis. Bartlett's Test of Sphericity is statistically significant ($\chi^2 = 55{,}464.510$; $df = 465$; $p < 0.001$), rejecting the

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null hypothesis that the correlation matrix is an identity matrix. These results jointly support the appropriateness of proceeding with exploratory factor analysis.

As shown in Table 2, four factors with eigenvalues greater than 1 were retained, collectively explaining 62.794% of the total variance after extraction. The first factor accounts for 16.845% of variance, followed by the second (16.343%), third (15.829%), and fourth factor (13.777%), indicating a relatively balanced contribution across dimensions. The initial eigenvalues confirm a clear four-factor solution, while the sharp drop after the fourth factor supports the decision to exclude subsequent components. Rotation results further indicate a stable factor structure, with variance distributed across the retained dimensions, suggesting a well-defined latent construct configuration.

Table 2. Total Variance Explained (Maximum Likelihood Extraction).

Factor	Initial Eigenvalues (Total)	% of Variance	Cumulative %	Extraction Sums of Squared Loadings (Total)	% of Variance	Cumulative %	Rotation Sums of Squared Loadings (Total)
1	5.598	18.059	18.059	5.222	16.845	16.845	5.110
2	5.434	17.529	35.588	5.066	16.343	33.188	5.079
3	5.281	17.034	52.622	4.907	15.829	49.017	4.925
4	4.641	14.972	67.594	4.271	13.777	62.794	4.393

Note: Only factors with eigenvalues > 1 are retained. Extraction method: Maximum Likelihood.

As presented in Table 3, the pattern matrix obtained through oblimin rotation reveals a clear and theoretically consistent four-factor structure. The use of oblimin rotation is appropriate given the assumption that latent constructs are correlated, which is consistent with the conceptual model of interrelated leadership dimensions and innovation processes and outcomes.

Table 3. Pattern Matrix.

	Factor			
	Working Without AI	Moon dimension	Sun dimension	Organizational Innovation Performance
Trend Detection	-,007	-,002	,784	,011
AI Integration	,009	,002	,785	-,001
Decision Support	,015	,014	,790	,005
Creative Expansion	-,002	,001	,784	-,019
Strategic AI	,003	-,002	,794	,003
Critical Evaluation	-,001	,801	-,008	-,021
Ethical Reflection	,001	,798	,023	,020
Human Responsibility	,009	,801	,004	-,001
Risk Assessment	-,007	,801	-,014	,001
Reflective Analysis	-,003	,796	-,003	-,010
Support Tool	-,015	,793	,003	,006
Human Capability	,800	-,013	,003	,003

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Independent Thinking	,801	,003	-,019	,002
Dual Training	,800	,000	,002	-,013
AI-Free Work	,807	,012	,003	,018
Dependency Prevention	,799	-,011	,008	-,007
Innovation Output	,009	,015	-,004	,806
Adaptive Innovation	-,001	-,019	-,016	,795
Process Innovation	,010	,008	,010	,789
Innovation Effectiveness	,004	,004	,003	,791
Opportunity Discovery	-,007	-,005	-,004	,798

The first factor, labeled *Working Without AI*, is defined by high loadings of items such as Human Capability (0.800), Independent Thinking (0.801), Dual Training (0.800), AI-Free Work (0.807), and Dependency Prevention (0.799). These results indicate a coherent construct capturing the preservation of human autonomy and capability in AI-supported environments. The second factor, corresponding to the *Moon dimension*, includes strong loadings for Critical Evaluation (0.801), Ethical Reflection (0.798), Human Responsibility (0.801), Risk Assessment (0.801), Reflective Analysis (0.796), and Support Tool (0.793). This factor reflects a governance-oriented and evaluative approach to AI, emphasizing oversight, ethics, and analytical control. The third factor, representing the *Sun dimension*, is characterized by high loadings of Trend Detection (0.784), AI Integration (0.785), Decision Support (0.790), Creative Expansion (0.784), and Strategic AI (0.794). This dimension captures the proactive and opportunity-driven use of AI in innovation processes. The fourth factor, *Organizational Innovation Performance*, is defined by Innovation Output (0.806), Adaptive Innovation (0.795), Process Innovation (0.789), Innovation Effectiveness (0.791), and Opportunity Discovery (0.798), indicating a strong and coherent outcome construct related to innovation results. Cross-loadings are minimal and all primary loadings exceed the recommended threshold of 0.70, confirming strong item-factor associations and good discriminant validity at the exploratory stage. Overall, the results in Table 3 support a stable and well-defined four-factor solution aligned with the proposed theoretical framework.

The results indicate that the measurement model shows a good fit to the data. The chi-square is non-significant ($\chi^2 = 199.534$; df = 183; p = 0.191) and CMIN/DF = 1.090, supporting model adequacy. Fit indices are high (GFI = 0.993; CFI = 0.999; TLI = 0.999), while RMR is low (0.011). RMSEA is 0.006 (PCLOSE = 1.000), indicating minimal approximation error. Parsimony indices are acceptable, confirming that the model is both well-fitting and efficient. As shown in Table 4, all constructs demonstrate satisfactory internal consistency, with Composite Reliability (CR) values exceeding the recommended threshold of 0.70. Convergent validity is also supported, as all Average Variance Extracted (AVE) values are above 0.50. These results indicate that the measurement model achieves adequate reliability and that the indicators consistently represent their respective latent constructs.

Table 4. Construct Reliability and Convergent Validity.

Construct	CR	AVE
F1	0.900	0.642
F2	0.912	0.638
F3	0.889	0.621

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F4	0.902	0.635

As shown in Table 5, the square root of AVE for each construct exceeds its correlations with other constructs, satisfying the Fornell–Larcker criterion and confirming discriminant validity. The extremely low inter-construct correlations observed in the model should not be interpreted solely as evidence of discriminant validity, but as a substantive empirical indication of structural disconnection among the examined domains. Rather than reflecting measurement independence alone, these near-zero relationships suggest that AI-oriented leadership, human-centered independence, and innovation processes operate as weakly coupled or decoupled systems within organizational contexts. This pattern directly supports the core premise of the AI–Human Misalignment Framework, according to which these elements may coexist without functional integration. In this sense, the absence of correlation is not a methodological artifact, but an empirical manifestation of misalignment, reinforcing the argument that organizational innovation does not depend on the presence of these elements individually, but on their alignment and coordinated interaction. Such findings challenge conventional assumptions in structural modeling, where meaningful relationships between constructs are typically expected, and instead indicate that the absence of relationships can itself represent a theoretically meaningful outcome.

Table 5. Fornell–Larcker Criterion.

Construct	F1	F2	F3	F4
F1	0.801	0.000	-0.030	-0.050
F2	0.000	0.799	0.000	-0.010
F3	-0.030	0.000	0.788	-0.020
F4	-0.050	-0.010	-0.020	0.797

Note: Diagonal elements represent the square root of AVE.

Table 6 further supports discriminant validity, as all HTMT values are substantially below the conservative threshold of 0.85. These results indicate that the constructs are empirically distinct and that the measurement model demonstrates strong discriminant validity. However, the extremely low magnitude of these correlations extends beyond standard discriminant validity and warrants further theoretical interpretation.

Table 6. HTMT Ratio of Correlations.

Construct	F1	F2	F3	F4
F1	—	0.000	0.030	0.050
F2	0.000	—	0.000	0.010
F3	0.030	0.000	—	0.020
F4	0.050	0.010	0.020	—

The results indicate that the structural model demonstrates a good model fit to the data. The chi-square is non-significant ($\chi^2 = 199.536$; df = 184; p = 0.205), with a low CMIN/DF ratio (1.084), supporting model adequacy. Fit indices are high (GFI = 0.993; AGFI = 0.991; CFI = 1.000; TLI = 0.999), while RMR is low (0.011). RMSEA is 0.006 (PCLOSE = 1.000), indicating minimal approximation error. Parsimony indices (PNFI = 0.871; PCFI = 0.876) confirm that the model achieves good fit without unnecessary complexity. The model is suitable for hypothesis testing. As shown in Figure 1, the structural model reveals an uneven distribution of effects among the constructs. The Sun dimension (F3) fails to exert a statistically significant effect on organizational innovation performance (F4), whereas its relationship with Working Without AI (F1) is negligible. The Moon dimension (F2) shows no meaningful effects on either F1 or F4. The path from Working Without AI (F1) to innovation performance (F4) is weak, indicating that human-centered independence does not significantly contribute to innovation processes and outcomes in this model. The mediating role of F1 is not supported. The results point to an asymmetric structure in which innovation performance is not meaningfully explained by any of the examined leadership dimensions, while other relationships remain weak or non-significant.

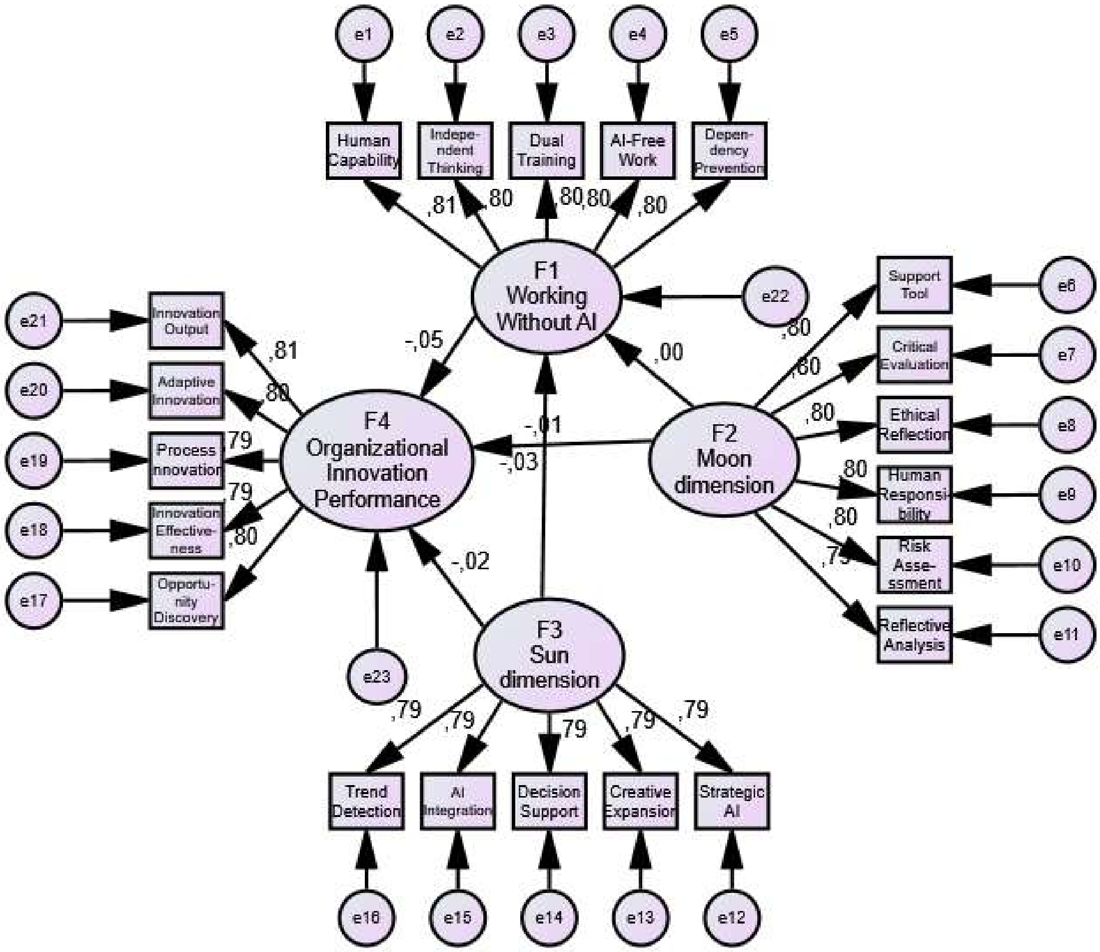

Figure 1. Structural Equation Modeling (SEM). Source: Own elaboration.

As shown in Table 7, none of the hypothesized relationships are supported. The effects of both the Sun (F3) and Moon (F2) dimensions on Working Without AI (F1) and organizational innovation performance (F4) are non-significant. Although the path from F1 to F4 is statistically significant (p = 0.022), its negative direction contradicts the hypothesized positive relationship, leading to the rejection of H5. These findings indicate that the proposed positive relationships among constructs are not empirically confirmed in the structural model.

Table 7. Structural Model Results.

Hypothesis	Path	β (Standardized)	SE	C.R.	p-value	Supported
H1	F3 (Sun) → F1 (Working Without AI)	-0.026	0.023	-1.227	0.220	No
H2	F2 (Moon) → F1 (Working Without AI)	0.000	0.021	0.021	0.983	No

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H3	F3 (Sun) → F4 (Innovation Performance)	-0.025	0.022	-1.152	0.249	No
H4	F2 (Moon) → F4 (Innovation Performance)	-0.012	0.020	-0.559	0.576	No
H5	F1 (Working Without AI) → F4 (Innovation Performance)	-0.048	0.020	-2.284	0.022	No

As shown in Table 8, the indirect effects of both the Sun (F3) and Moon (F2) dimensions on organizational innovation performance (F4) through Working Without AI (F1) are negligible and not statistically significant. The confidence intervals include zero, confirming the absence of mediation. These findings indicate that human-centered independence does not mediate the relationship between AI leadership dimensions and innovation performance.

Table 8. Mediation Effects (Standardized).

Hypothesis	Path	Direct Effect	Indirect Effect	95% BC CI Lower	95% BC CI Upper	Mediation Type
H6	F3 (Sun) → F1 → F4	-0.025	0.001	-0.003	0.005	No mediation
H7	F2 (Moon) → F1 → F4	-0.012	0.000	-0.002	0.003	No mediation

As shown in Table 9, the explained variance (R^2) for both endogenous constructs is negligible. Rather than indicating a limitation of the model, this finding represents a substantive empirical indication of structural fragmentation within AI-enabled organizational systems. The near-zero variance suggests that the examined constructs do not operate within a coherent and integrated system of influence, but instead function as loosely coupled or structurally disconnected domains. This directly reinforces the core premise of the AI–Human Misalignment Framework, according to which AI-oriented leadership, human-centered independence, and innovation performance do not form a unified causal chain. In such contexts, increasing the presence of any single element does not produce predictable changes in organizational outcomes. From this perspective, the absence of explained variance reflects systemic misalignment, where organizational elements coexist without generating cumulative or synergistic effects. This challenges dominant assumptions in leadership and innovation research that higher levels of capability or leadership engagement necessarily translate into improved performance outcomes.

Table 9. Explained Variance (R^2).

Endogenous Construct	R^2	Interpretation
F1 (Working Without AI)	0.001	Negligible explanatory power
F4 (Organizational Innovation Performance)	0.003	Negligible explanatory power

Taken together, these results reveal a consistent pattern of structural disconnection across all levels of analysis. The near-zero inter-construct correlations, negligible explained variance (R^2), and non-significant structural paths indicate not weak relationships within a coherent system, but the absence of integration among its core components. In this model, AI-driven leadership (Sun), reflective AI governance (Moon), human-centered independence, and innovation performance do not form a unified causal structure, but instead operate as loosely coupled or decoupled domains. This systemic fragmentation suggests that the presence of these elements alone is insufficient to generate cumulative or synergistic effects. Instead, their impact depends on the existence of alignment mechanisms that enable coordinated interaction. In the absence of such mechanisms, organizational systems may exhibit a condition of functional coexistence without integration, resulting in negligible or even counterproductive innovation outcomes. These findings provide strong empirical support for the AI–Human Misalignment Framework and challenge dominant assumptions in leadership and innovation research that posit inherently positive and linear relationships between technological capability, human agency, and organizational performance.

5. Discussion

The findings do not support the proposed hypotheses and point to a more complex relationship between AI leadership, human-centered independence, and innovation processes and outcomes than initially assumed. Rather than confirming direct positive effects, the results reveal a lack of significant relationships between both leadership dimensions (Sun and Moon) and the examined organizational outcomes. Importantly, these findings do not indicate the absence of effects per se, but rather reveal a structurally fragmented configuration in which AI-oriented leadership, human-centered capabilities, and innovation processes and outcomes operate as disconnected domains. Accordingly, AI leadership should not be conceptualized as a straightforward driver of either human capability development or innovation performance.

The absence of significant effects in H1 and H2 shows that neither AI-driven innovation leadership (Sun dimension) nor reflective AI governance leadership (Moon dimension) meaningfully influences human-centered independence (F1). This indicates that leadership engagement with AI does not automatically translate into changes in how employees think, act, or develop capabilities. In line with institutional theory, formal leadership orientations may remain decoupled from everyday organizational practices [67], resulting in limited influence on operational-level human behavior. This decoupling appears not only at the symbolic level of formal structures, but also at the functional level of organizational processes, where leadership orientations fail to translate into measurable behavioral or performance outcomes.

Similarly, the lack of support for H3 and H4 shows that neither leadership dimension exerts a significant direct effect on organizational innovation performance (F4). This challenges dominant assumptions in innovation and digital transformation research that position leadership as a central mechanism for driving performance outcomes [37]. From a dynamic capabilities perspective, these findings suggest that neither organizational capabilities nor AI-oriented leadership—whether focused on innovation (Sun) or governance (Moon)—are sufficient in isolation; their effectiveness depends on orchestration, alignment, and integration within organizational processes. Without such integration, both capabilities and leadership orientations remain latent and fail to translate into measurable innovation processes and outcomes.

These findings point to a gap between strategic leadership intent and its actual translation into organizational processes. The results related to H5 provide further insight into this misalignment. While the hypothesis assumed a positive relationship, the empirical findings reveal a statistically significant negative effect of human-centered independence (F1) on innovation performance (F4). Importantly, this does not imply that human-centered leadership is inherently ineffective. Rather, it indicates that human-centered independence, when operating in isolation from AI-supported processes, may become misaligned with the requirements of innovation in technologically intensive environments. In this context, human-centered independence does not function as a complementary capability but rather as a substitutive one, potentially displacing the benefits of AI-supported processes and thereby negatively affecting innovation processes and outcomes. In such contexts, innovation increasingly depends on the integration of human judgment with algorithmic support, data-driven insights, and automated processes [66]. This aligns with the complementarity perspective, which argues that value from digital technologies emerges only when technological and human capabilities are jointly aligned and mutually reinforcing, rather than operating in isolation. When organizations emphasize working without AI, they may unintentionally limit their capacity to exploit these technological advantages.

The lack of mediation effects in H6 and H7 further reinforces this interpretation. Human-centered independence does not function as a mechanism through which AI leadership translates into innovation performance. The absence of both direct and indirect effects indicates that the

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assumed linear pathway linking leadership, human capability, and performance is not empirically supported. This points to a structural disconnect within the organizational system. This absence of mediation further indicates that the system lacks a functional transmission mechanism through which leadership orientations could influence performance. The proposed logic of balanced AI leadership—where the combination of AI-driven innovation (Sun) and reflective governance (Moon) enhances human autonomy and, subsequently, innovation performance—is not supported by the empirical results. The findings show that the presence of both leadership dimensions does not lead to meaningful changes in human-centered independence, nor does it improve innovation processes and outcomes. This indicates that balance alone does not ensure integration.

The co-existence of different leadership approaches does not guarantee their integration at the operational level, indicating a lack of functional alignment between leadership practices, human capabilities, and innovation processes. In other words, these elements coexist without effective integration, reinforcing the interpretation that organizational innovation depends not on their presence, but on their alignment and coordinated deployment. Taken together, these findings are best interpreted through the lens of AI–human misalignment. The negative effect of human-centered independence (F1), combined with the non-significant effects of the Sun (F3) and Moon (F2) dimensions, suggests that neither human autonomy nor AI-oriented leadership alone is sufficient to drive innovation processes and outcomes.

This leads to the identification of an AI leadership paradox: organizations invest in AI-oriented leadership practices while simultaneously maintaining human-centered approaches, yet these elements remain structurally disconnected, resulting in limited or even counterproductive innovation outcomes. Innovation, therefore, does not emerge from the dominance of either human autonomy or technological leadership, but from their alignment within organizational processes. By linking the empirical findings to the tested hypotheses, the study contributes to a more nuanced understanding of AI leadership. The rejection of H1–H4, the reversed effect in H5, and the absence of mediation in H6 and H7 suggest that future research should move beyond linear models and focus on the conditions under which AI and human-centered leadership become mutually reinforcing.

This shifts the analytical focus from whether AI leadership works to the conditions under which its integration with human capabilities produces meaningful innovation processes and outcomes. Based on these findings, the study introduces the concept of an "AI–Human Misalignment Framework," which captures the structural gap between AI-oriented leadership, human-centered capabilities, and innovation processes in contemporary organizations. The AI–Human Misalignment Framework refers to a structural condition in which these elements coexist without functional integration, resulting in negligible or even counterproductive organizational outcomes. By reframing AI leadership not as a direct performance driver but as a context-dependent capability, the findings demonstrate that its effects emerge only under conditions of effective integration with human and organizational processes.

From a managerial perspective, the findings suggest that organizations should move beyond investing in AI technologies or leadership structures in isolation and instead focus on designing integrative mechanisms that align AI systems with human capabilities and innovation processes. Without such alignment, investments in AI leadership may fail to produce the expected innovation benefits. In this sense, the absence of significant effects represents a substantive empirical finding rather than a methodological limitation, highlighting that the absence of alignment—rather than the absence of capabilities—explains the observed outcomes and defines the primary constraint on AI-driven innovation.

6. Conclusions

This study set out to examine the relationship between AI leadership, human-centered independence, and organizational innovation performance, based on the widely accepted assumption that leadership-driven AI integration enhances human capabilities and, in turn, improves innovation processes and outcomes. However, the empirical results do not support this

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linear logic. None of the hypothesized positive relationships between AI leadership dimensions and organizational outcomes are confirmed, while the only significant effect—between human-centered independence and innovation performance—is negative. These findings provide an important theoretical insight: the presence of AI-oriented leadership and human-centered capabilities does not automatically translate into improved innovation processes and outcomes. Rather than indicating the absence of relationships, these findings reveal a structural misalignment between AI leadership, human-centered capabilities, and innovation processes.

This suggests that innovation failure stems not from a lack of leadership or resources, but from the absence of integration mechanisms that align technological and human systems. Instead, the results reveal a structural disconnect between leadership practices, human autonomy, and performance. These findings challenge the dominant assumption in the literature that leadership, capability, and performance are sequentially and positively linked. This study makes a theoretical contribution by introducing the AI–Human Misalignment Framewor**,** which explains why the coexistence of AI-driven leadership and human-centered approaches may fail to produce expected innovation outcomes.

Rather than acting as complementary forces, these elements may remain structurally disconnected when not effectively integrated within organizational processes. In such conditions, human-centered independence can become detached from technological systems, while AI leadership remains confined to the strategic level without operational impact. The findings shift the focus from the presence of leadership and capabilities to their alignment. Innovation does not emerge from AI or human-centered leadership in isolation, but from their coordinated interaction. This perspective challenges prevailing assumptions in both leadership and innovation research and highlights the importance of examining integration mechanisms rather than individual components.

From a practical standpoint, the results suggest that organizations should move beyond simply adopting AI or promoting human autonomy, and instead focus on aligning these elements within everyday work processes. Without such alignment, investments in AI leadership may fail to generate meaningful innovation processes and outcomes. Future research should further explore the conditions under which alignment between AI systems and human capabilities can be achieved, including organizational design, cultural factors, and process integration mechanisms. By doing so, future research can extend the proposed framework and contribute to a more comprehensive understanding of AI-driven transformation. Overall, the study shifts the analytical focus from the presence of leadership and capabilities to the conditions under which their alignment enables meaningful innovation outcomes.

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