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The Generative Architecture of Leadership: A Critical Realist Exploration of Mechanism-Outcome Configurations

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Abstract

Purpose: The purpose of this study is to explore whether empirically observable patterns are consistent with the mechanism configuration proposed by the Systemic Leadership Model, using pattern-oriented analyses within a critical-realist framework. This framework conceptualizes leadership as an emergent phenomenon arising from the interaction of five generative mechanism families: structural-power, cultural-normative, relational-affective, human agency/psychological, and adaptive learning mechanisms. Building on sixteen empirically grounded indicator nodes, the study explores whether these mechanism families form a coherent systemic architecture and whether they exhibit differentiated, theoretically meaningful patterns of activation in relation to five leadership outcome domains—psychological health, task performance, organizational citizenship behavior, job crafting, and innovative behavior. In doing so, the study assesses whether leadership outcomes can be plausibly understood as emergent system states produced by context-specific constellations of generative mechanisms rather than by additive effects of isolated variables. Design: Survey data from N = 71 practicing leaders were analyzed using correlations, principal component analysis, and hierarchical clustering to examine systemic mechanism patterns. Associations between the mechanisms and psychological health, task performance, Organizational Citizenship Behavior (OCB), job crafting, and innovative behavior were examined using bivariate correlations. In line with critical-realist methodology, patterns of empirical convergence and divergence were interpreted retroductively as surface expressions of potential underlying generative tendencies in open organizational systems. Findings: The findings reveal a systemic architecture in which the five mechanism families of the SLM activate selectively rather than uniformly. Relational-affective and cultural-normative mechanisms form the empirical core of the system, showing notable and most consistent activation across analyses. Structural-power

mechanisms, affected by informal political dynamics, exert selective but substantial influence, while psychological agency mechanisms appear as a coherent but mostly latent subsystem. Adaptive learning mechanisms show minimal activation, indicating strong context dependence. Across outcomes, distinct mechanism constellations emerge: Psychological Health is influenced by relational, cultural, and psychological mechanisms; OCB arises from relational-affective and cultural-normative processes; Innovative Behavior is driven primarily by relational-affective mechanisms and selectively by political dynamics; Task Performance depends almost entirely on structural-power mechanisms; and Job Crafting is unrelated to any systemic mechanism family, pointing to intrapersonal generative powers. These differentiated patterns provide empirical support for the SLM's core proposition that leadership outcomes represent emergent states produced by context-specific combinations of generative mechanisms, rather than by universal or additive indicators. Originality/Value: This study advances leadership theory by offering a theory-guided exploration of a critical-realist, mechanism-based framework of leadership. Rather than proposing a definitive model or testing fixed hypotheses, it examines whether empirically observable patterns are consistent with the Systemic Leadership Model (SLM) as a plausible architecture of generative mechanisms spanning relational-affective, cultural-normative, structural-power, psychological, and adaptive-learning domains. The findings provide exploratory and indicative support for this architecture, suggesting that leadership patterns tend to organize around underlying causal tendencies rather than isolated behavioral or structural variables. In this respect, the SLM extends existing perspectives such as Relational Leadership Theory and Complexity Leadership Theory by clarifying the ontological status of relational and emergent phenomena and by integrating behavioral, cognitive, and cultural insights into a unified systemic framework. As an exploratory contribution, the model does not claim explanatory closure but offers a theoretically grounded heuristic for diagnosing how interdependent mechanisms may shape health, cooperation, innovation, and performance in open organizational systems, thereby providing a foundation for future confirmatory, longitudinal, and mixed-method research.

Keywords

Systemic Leadership Model, Critical Realism, Generative Mechanisms, Complexity Leadership, Relational Leadership, Retroduction

1. Introduction

Leadership research has generated a wide range of theoretical perspectives, yet the field remains conceptually fragmented. Existing approaches emphasize leader traits, behaviors, relational processes, contextual contingencies, or dynamic emergence, but they rarely explain the deeper causal structures through which leadership arises in organizational settings. Several major reviews note that leadership scholarship remains dominated by variable-centered descriptions of observable

patterns, offering limited insight into the forces that generate these patterns (Avolio et al., 2009; Dinh et al., 2014; Uhl-Bien & Arena, 2018). As a result, leadership is richly documented at the empirical level but insufficiently explained at the ontological level.

This limitation is particularly evident in relational and complexity-oriented perspectives. Relational Leadership Theory (RLT) conceptualizes leadership as a co-constructed process of interaction and meaning-making, while Complexity Leadership Theory (CLT) describes leadership as an emergent property of dynamic interactions within complex adaptive systems. Although both frameworks provide valuable descriptive insights, neither specifies the generative mechanisms—in the sense of enduring causal powers—that give rise to recurring relational, structural, affective, or cultural patterns. References to "mechanisms" in these traditions typically denote interactional tendencies or process dynamics rather than explicitly theorized causal structures (Bhaskar, 1998; Archer, 1995; Danermark et al., 2002).

Addressing this gap requires an approach that distinguishes between empirically observable patterns and the underlying causal tendencies that may generate them. From a critical-realist perspective, leadership outcomes are not treated as additive effects of isolated variables but as patterned expressions of interacting causal powers operating in open systems. Empirical regularities therefore serve as informative traces rather than direct representations of causality, supporting exploratory, theory-guided inquiry into plausible mechanism configurations.

The Systemic Leadership Model (SLM) responds to this challenge by conceptualizing leadership as an emergent, open system generated by the interaction of deeper causal structures. While theoretically anchored in mechanism-based approaches in the social sciences, the SLM translates these principles into a domain-specific architecture of leadership mechanisms. It is informed by morphogenetic theory (Archer, 1995), realistic evaluation (Pawson & Tilley, 1997), and complexity-based leadership research (Lichtenstein et al., 2006), but differs from each by focusing on the endogenous generative architecture of leadership systems rather than on abstract social dynamics or discrete interventions.

The model specifies sixteen indicator nodes (K1 - K16) as empirically observable surface expressions that signal the possible activation of underlying generative mechanisms identified through prior theoretical, qualitative, and quantitative work (Krauter, 2018, 2019, 2020a, 2020b, 2022, 2023a, 2023b, 2024, 2025). These indicators capture observable aspects of leadership practice, including leader self-regulation, team orientation, trust and cohesion, contextual pressures, structural clarity, learning activity, communication quality, micropolitical dynamics, ethical-cultural norms, stress signals, affective dynamics, power and control tendencies, innovation climate, and psychological capacities.

The SLM further incorporates five outcome domains—psychological health, task performance, Organizational Citizenship Behavior (OCB), job crafting, and innovative behavior—which represent empirically established areas of leadership

influence. Both the indicator nodes and the outcome domains are treated as contingent empirical expressions of deeper causal configurations rather than as mechanisms themselves.

Against this backdrop, evaluating the SLM requires examining whether empirically observed patterns among the indicator nodes form a coherent systemic structure and whether these patterns align with the model's proposed mechanism-outcome configurations. Accordingly, the present study adopts an exploratory, pattern-oriented approach guided by two research questions:

RQ1: To what extent do empirically observed patterns align with the proposed systemic configuration of mechanisms and outcomes?

RQ2: Does the observed pattern structure provide exploratory support for the SLM as a plausible representation of leadership as an emergent open system?

By addressing these questions, the study assesses the conceptual coherence and exploratory plausibility of the SLM and contributes to advancing leadership research beyond variable-based description toward mechanism-oriented, theoretically integrated accounts of leadership in complex organizational systems.

2. Theoretical Framework: The Systemic Leadership Model

2.1. A Critical-Realist Ontology of Leadership

The Systemic Leadership Model (SLM) is grounded in a Critical-Realist (CR) ontology that conceptualizes leadership as an emergent phenomenon generated by the interaction of multiple generative mechanisms operating within open social systems. Rather than treating leadership as a set of observable behaviors, traits, or variables, CR conceptualizes leadership outcomes as the contingent effects of deeper causal powers that may or may not become empirically visible under specific contextual conditions.

Critical realism distinguishes three analytically separable but ontologically connected domains of reality (Bhaskar, 1998; Archer, 1995; Danermark et al., 2002):

1) The real domain, where generative mechanisms and causal powers exist independently of their observation;

2) The actual domain, where these mechanisms are activated and produce events or tendencies under enabling or constraining conditions;

3) The empirical domain, where only some of these events are experienced, measured, or recorded.

Within this ontology, mechanisms are not variables, indicators, behaviors, or latent factors. They are enduring causal structures with dispositional powers that generate tendencies toward particular outcomes, even though these tendencies may remain unactualized or empirically undetected in open, multi-mechanism contexts. Observable phenomena such as trust, communication quality, stress, motivation, micropolitics, or innovation climate therefore do not constitute mechanisms themselves; rather, they are empirical expressions or traces of deeper psychological, relational, structural, cultural, or power-related causal powers.

This distinction has two central implications for leadership research.

First, leadership cannot be reduced to additive effects of individual attributes or behaviors. Instead, it must be understood as a system-level emergent pattern arising from the interaction of human agency, relational dynamics, structural-power arrangements, cultural-normative forces, and learning processes.

Second, empirical regularities—such as correlations, components, or clusters—cannot be interpreted as direct evidence of causal structures. From a CR perspective, such patterns serve as diagnostic clues that inform retroductive reasoning about which generative mechanisms may plausibly be operating.

Accordingly, CR rejects both positivist variable-based explanation and purely interpretivist description. Explanation proceeds neither through statistical inference alone nor through narrative interpretation, but through theoretically guided exploration of whether observed empirical tendencies are *consistent with* proposed causal architectures. Mechanisms are therefore not inferred from covariation alone, but from the convergence of empirical patterns, theoretical coherence, and contextual plausibility.

Within this framework, leadership outcomes are understood as emergent system states rather than as direct effects of isolated leadership actions. Different outcomes may arise from different constellations of mechanisms, and the same mechanism may produce divergent empirical expressions depending on contextual conditions. This implies selective, non-uniform, and context-sensitive activation patterns—an assumption that stands in contrast to universalistic or variable-centered leadership models.

The SLM adopts this critical-realist logic by explicitly differentiating between:

1) Generative mechanisms operating in the real domain (e.g., relational-affective, cultural-normative, structural-power, human-agency, and adaptive learning mechanisms);

2) Indicator nodes located in the empirical domain, which capture observable surface expressions of these mechanisms;

3) Contextual conditions that enable, constrain, or modulate mechanism activation.

This ontological framing directly motivates the study's exploratory research questions. Rather than testing causal hypotheses, the study examines:

1) whether empirical relations among sixteen indicator nodes exhibit a coherent systemic pattern consistent with the proposed mechanism architecture (RQ1);

2) whether selective associations between these indicators and five outcome domains align with the differentiated causal tendencies expected in an open social system (RQ2).

In sum, the critical-realist ontology underlying the SLM provides the conceptual foundation for treating leadership as an emergent, mechanism-driven phenomenon. It legitimizes the use of exploratory, pattern-oriented analyses and frames empirical findings as indicative, provisional, and theory-dependent evidence for the plausibility of a systemic leadership architecture—rather than as definitive proof of causal structures.

2.2. Indicator Nodes as Empirical Expressions of Underlying Mechanisms

Across eight studies conducted between 2018 and 2025 (Krauter, 2018, 2019, 2020a, 2020b, 2022, 2023a, 2023b, 2024, 2025), the SLM research program identified sixteen recurring empirical patterns, referred to as *indicator nodes*. These nodes represent empirical-domain expressions of deeper causal structures operating in the real domain. They encompass psychological states (e.g., stress, doubt), relational phenomena (e.g., communication patterns, emotional contagion), organizational structures (e.g., micromanagement, KPI usage), cultural expressions (e.g., fairness, psychological safety), and contextual patterns (e.g., environmental volatility).

Table 1 summarizes the content, empirical grounding, and programmatic origins of each node. The table provides an integrated overview of how the 16 indicators were conceptually defined, which theoretical and empirical foundations they build upon, and how they were operationalized within the Systemic Leadership Model.

Table 1. Overview of the sixteen systemic leadership mechanisms, their definitions, and theoretical foundations.

Nodes	Description	Empirical sources	Author sources
K1 Leader	Self-efficacy, decision competence, responsibility	Bracht et al. (2021)	Krauter (2018, 2019, 2020a, 2023b)
K2 Team	Motivation, team climate, cooperation	Chen & Kanfer (2024); Paredes-Saavedra et al. (2024)	Krauter (2022, 2023a)
K3 Team Dynamics	Trust, cohesion, conflict culture, reflexivity	Lines et al. (2021); Marques-Quinteiro et al. (2022)	Krauter (2022)
K4 External Factors (VUCA)	Market, regulation, technology, culture	Syamsir et al. (2025); Esenyel (2024)	Krauter (2018, 2025)
K5 Structure	Roles, decision clarity, governance	Asamani et al. (2025); Kundu et al. (2020)	Krauter (2020a, 2020b)
K6 Processes	Learning loops, PDCA, team learning	Lines et al. (2021); Marques-Quinteiro et al. (2022)	Krauter (2023a, 2024)
K7 KPIs/Observer Bias	Bias detection, decision bias in metrics	Hristov et al. (2022)	Krauter (2020b)
K8 Interactions	Communication, psychological safety	Shankar et al. (2025); Dietl et al. (2023)	Krauter (2022, 2023b)
K9 Implicit Dynamics	Micropolitics, shadow networks, power	Jevnaker & Olaisen (2023); Bush (2023); Schirmer (2022); Kumar (2025); Kumar & Brazaitis (2023)	Krauter (2020a)
K10 Ethics & Culture	Psychological safety, values, and ethical climate	Edmondson & Bransby (2023); Shen (2024); Qasim & Laghari (2025)	Krauter (2020b, 2023a)
K11 Stress	Workload, exhaustion, faulty decisions	Dannheim et al. (2022); Teetzen et al. (2023); Davis (2024); Kleynhans et al. (2022)	Krauter (2019, 2023b)

Continued

K12 Doubt/ Uncertainty	Uncertainty, hesitation	Artinger et al. (2025); Salameh-Ayanian et al. (2025);	Krauter (2018, 2020a)
K13 Emotional Contagion	Emotional transfer leader ↔ team	Paganin et al. (2023); Herrando & Constantinides (2021)	Krauter (2023b)
K14 Authority & Micromanagement	Control impulse, loss of trust	Grill (2023); Irani-Williams et al. (2021)	Krauter (2020a)
K15 Innovation Culture	Innovation climate, experimentation	Fuad et al. (2022); Xu et al. (2023); Gui et al. (2024)	Krauter (2022, 2025)
K16 Psychology	EI, empathy, bias, affect	Coronado-Maldonado & Benítez-Márquez (2023); Ogunyemi (2025); Chukwuka & Sondhi (2024); Muss et al. (2025)	Krauter (2019, 2023b, 2025)

Taken together, the sixteen nodes constitute the empirical surface structure of leadership systems. Because leadership phenomena emerge from the interaction of multiple causal forces, recurring patterns of node co-activation provide insight into how underlying mechanisms tend to cluster in empirical settings. The analyses revealed a stable set of higher-order constellations, indicating that leadership-relevant mechanisms rarely operate in isolation but instead form interconnected systemic patterns.

Five such constellations consistently emerged across analyses:

1. Structural-power dynamics;
2. Cultural-normative patterns;
3. Relational-affective processes;
4. Psychological and human agency-related regulation;
5. Adaptive learning cycles.

Through retroductive reasoning, these recurrent configurations were interpreted as *mechanism families*—sets of generative mechanisms that jointly give rise to observable leadership phenomena. Together, these families represent the minimal systemic structure required to account for the observed empirical regularities across studies.

Within this framework, one indicator required conceptual reclassification. Leader Agency (K1) was treated as a generative mechanism operating in the real domain, reflecting the critical-realist understanding of human agency as a constitutive causal power rather than a mere empirical expression. In contrast, External Factors (K4) consistently functioned as a contextual enabler or constraint, shaping mechanism activation without constituting a causal mechanism itself.

Table 2 integrates these conceptual decisions by presenting the five mechanism families, their constituent generative mechanisms, the indicator nodes through which they become empirically visible, and the contextual conditions shaping their activation.

Table 2. Mechanism families, their generative mechanisms, indicator nodes, and contextual conditions.

Mechanism Family (Real Domain)	Generative Mechanisms (M)	Indicator Nodes (I)	Context (C)	Description
1. Structural-Power Mechanisms	K5 Structure (M); K9 Implicit Dynamics (M)	K14 Micromanagement (I); K7 KPIs/Observer Bias (I)	—	Formal and informal power relations, roles, governance, micropolitics.
2. Cultural-Normative Mechanisms	K10 Ethics & Culture (M); K15 Innovation Culture (M)	—	—	Deep normative causal powers shaping fairness, psychological safety, and innovation norms.
3. Relational-Affective Mechanisms	K3 Team Dynamics (M)	K8 Interactions (I); K13 Emotional Contagion (I); K2 Team Motivation (I)	—	Trust, cohesion, conflict norms, socio-emotional coupling patterns.
4. Human Agency/ Psychological Mechanisms (neu)	K1 Leader Agency (M)	K11 Stress (I); K12 Doubt (I); K16 Psychology (I)	—	Human agency as generative power; expressed via emotion regulation, attention, uncertainty processing.
5. Adaptive Learning Mechanisms	emergent learning/ reflexivity (M)	K6 Processes (I)	K4 External Factors (C)	Systemic feedback integration, reflexive updating, adaptation to change.

Note: Although team motivation (K2) contains psychological elements, it is classified as an indicator within the relational-affective mechanism family because its empirical content (acceptance, cooperation, feedback, collective motivation) reflects socially co-constructed processes rather than individual-level agency.

2.3. Exploration of the Five Mechanism Families

2.3.1. Structural-Power Mechanisms

Structural-power mechanisms arise from formal organizational architectures (roles, hierarchies, governance structures) and informal influence systems (coalitions, shadow networks, political maneuvering). These mechanisms enable or constrain agency, regulate information flow, and shape decision pathways. Indicators such as micromanagement and KPI-driven control reflect the empirical activation of deeper structural and power mechanisms, as seen in research on structural clarity and micropolitical influence patterns (Asamani et al., 2025; Jevnaker & Olaisen, 2023; Bush, 2023; Schirmer, 2022; Kumar, 2025; Kumar & Brazaitis, 2023). Within CR, such structures possess causal powers independent of individual intentions.

2.3.2. Cultural-Normative Mechanisms

Cultural-normative mechanisms consist of the ethical climate, fairness norms, psychological safety, and innovation-related expectations that define what is appropriate, safe, or valued within an organization. These mechanisms regulate collective sensemaking and legitimize certain behaviors while discouraging others. Psychological safety and ethical climate (Edmondson & Bransby, 2023; Shen, 2024; Qasim & Laghari, 2025) as well as innovation culture (Fuad et al., 2022; Xu et al., 2023; Gui et al., 2024) exemplify generative causal powers that shape relational and learning processes.

2.3.3. Relational-Affective Mechanisms

Relational-affective mechanisms originate from emergent relational properties such as trust, cohesion, and conflict norms. They shape the emotional climate of a team, influence communication patterns, and contribute to joint meaning-making. Indicators such as interactions, emotional contagion, and team motivation provide empirical manifestations of these deeper relational forces (Lines et al., 2021; Marques-Quinteiro et al., 2022; Paganin et al., 2023; Herrando & Constantinides, 2021; Chen & Kanfer, 2024; Paredes-Saavedra et al., 2024).

2.3.4. Human Agency/Psychological Mechanisms

Human agency is a fundamental causal power within CR and therefore constitutes a generative mechanism rather than an empirical indicator. Leader agency (K1) reflects intentionality, responsibility-taking, and volitional capacities that shape action selection and adaptive functioning. These powers become empirically visible through indicators such as stress (K11), doubt (K12), and emotion-regulatory expressions captured in K16 (Coronado-Maldonado & Benítez-Márquez, 2023; Dannheim et al., 2022; Teetzen et al., 2023; Davis, 2024; Kleynhans et al., 2022; Artinger et al., 2025; Salameh-Ayanian et al., 2025; Ogunyemi, 2025; Chukwuka & Sondhi, 2024; Muss et al., 2025). Self-regulation is understood as a component of human agency rather than an independent mechanism.

2.3.5. Adaptive Learning Mechanisms

Adaptive learning mechanisms govern a system's ability to integrate feedback, update routines, and continuously improve. These mechanisms arise through reflexive practices, learning cycles, and processual updating. Processes such as PDCA cycles or team reflexivity serve as indicators (K6), grounded in empirical research on team learning and reflexive updating (Lines et al., 2021; Marques-Quinteiro et al., 2022). External factors (K4) function as contextual enablers or constraints rather than mechanisms, consistent with CR's distinction between causal powers and contextual conditions (Syamsir et al., 2025; Esenyel, 2024).

2.4. Outcome Domains as Emergent System Properties

In the SLM, outcome domains are conceptualized as emergent properties of interacting mechanism families rather than additive performance criteria. This perspective aligns with complexity-informed leadership research (Osborn, Hunt, & Jauch, 2002) and with critical realist ontology, in which outcomes represent actualized expressions of deeper causal powers operating across psychological, relational, structural, and cultural layers.

The five outcome domains included in the SLM were selected based on (a) their empirical grounding in contemporary leadership research and (b) their relevance as commonly observed system-level manifestations of leadership effectiveness. Table 3 summarizes the theoretical foundations of each outcome domain and outlines the core mechanisms through which they are expected to emerge within the Systemic Leadership Model.

Table 3. Theoretical foundations of the five outcome domains in the systemic leadership model.

Outcome	*Content*	*Empirical Sources*
O1 Psychological Health	*Leadership → stress, well-being, vitality*	*Harms et al. (2017)—Meta-analysis on leadership & stress;* *Vonderlin et al. (2021)—Health-oriented leadership & mental health (multilevel);* *Bakker & Demerouti (2007)—JD-R model linking demands/resources to well-being.*
O2 Task Performance	*Performance, goal achievement, LMX, motivation*	*Wang et al. (2011)—Meta-analysis: TL → performance;* *Che, Guo, & Chen (2021)—LMX → OCB → task performance;* *Locke et al. (1981)—Goal-setting theory meta-review → performance;* *Van Scotter & Van Scotter (2021)—Autonomy moderates task performance effects;* *Juyumaya (2022)—Psychological empowerment → work engagement → task performance;* *Widarko & Anwarodin (2022)—Motivation & culture → performance via OCB.*
O3 Organizational Citizenship Behavior (OCB)	*Prosocial behavior, contextual performance, volunteering*	*Organ (2014)—Foundational work refining OCB construct;* *Schermuly et al. (2022)—Meta-analysis: leadership styles → psychological empowerment → OCB;* *Che, Guo, & Chen (2021)—LMX → OCB → performance;* *Widarko & Anwarodin (2022)—OCB as mediator between culture/motivation & performance.*
O4 Job Crafting	*Proactive work design, autonomy, self-design*	*Demerouti (2014)—Job crafting as redesign tool;* *Tims, Bakker, & Derks (2012)—Development of Job Crafting Scale;* *Wrzesniewski & Dutton (2001)—Foundational job crafting theory;* *Zhang & Parker (2019)—Integrative job crafting review.*
O5 Innovative Behavior	*Innovation, new ideas, creativity, implementation*	*Janssen (2000)—Effort-reward fairness & innovative behavior;* *Anderson, Potočnik, & Zhou (2014)—State-of-the-science review on innovation & creativity;* *Bai et al. (2022) —Authentic leadership → innovative behavior via engagement;* *Jun & Lee (2023)—TL → innovative behavior via commitment to change.*

Below, each outcome domain is theoretically elaborated in relation to generative mechanisms and recent empirical research.

2.4.1. Psychological Health

Psychological health represents a core emergent property of leadership influence. Meta-analytic evidence shows that leadership behaviors substantially shape follower stress, strain, and well-being (Harms et al., 2017), while daily diary studies demonstrate that moment-to-moment leader behaviors influence employees' recovery and affective states (Knight & Eisenkraft, 2015). Health-oriented and supportive leadership further reduces stress at multiple organizational levels (Vonderlin et al., 2021).

Empirically, psychological health emerges through indicators such as psychological safety (K10), emotional climate (K13), and stress (K11), which correspond to deeper relational and affective dynamics documented in recent research on emotional contagion and team affect (Herrando & Constantinides, 2021; Paganin et al., 2023; Newman et al., 2017). Psychological health is also shaped by leader intentionality and emotional regulation capacities (K1, K16), reflected in empirical work on stress, emotional dysregulation, and coping processes (Coronado-Maldonado & Benítez-Márquez, 2023; Dannheim et al., 2022; Teetzen et al., 2023).

Within a CR ontology, psychological health is a system state produced by the interplay of relational-affective, cultural-normative, and psychological self-regulation mechanisms, rather than an individual trait.

2.4.2. Task Performance

Task performance is one of the most robustly validated leadership outcomes. Transformational and relational leadership consistently enhance individual performance (Che, Guo, & Chen, 2021) and shape both task-specific and contextual performance components (Motowidlo & Van Scotter, 1994). Performance is further supported when goals, expectations, and job responsibilities are clearly defined, aligning with empirical findings on formal clarity and structural coherence (K5; Asamani et al., 2025; Jevnaker & Olaisen, 2023).

From a critical-realist perspective, task performance represents the empirical expression of interacting structural power, psychological self-regulation, and adaptive learning mechanisms. These mechanisms become visible in indicators such as implicit dynamics (K9), formal clarity (K5), and learning processes (K6), which are supported by research on trust formation, role expectations, and competence development (Bush, 2023; Lines et al., 2021; Marques-Quinteiro et al., 2022). The prominence of implicit dynamics aligns with the CR assumption that informal power processes frequently exert stronger causal influence on performance than formal structures in open organizational systems.

2.4.3. Organizational Citizenship Behavior (OCB)

OCB encompasses voluntary, prosocial behaviors that support collective functioning (Organ, 2014). Empirical studies highlight that trust, empowerment, and fairness perceptions significantly shape OCB (Schermuly et al., 2022), while ethical and relational leadership promote prosocial and morally guided behavior.

In the SLM, OCB emerges from relational-affective mechanisms (K3, K8, K13)—supported by research on interactions, team cohesion, and emotional contagion (Lines et al., 2021; Herrando & Constantinides, 2021; Paganin et al., 2023)—and cultural-normative mechanisms (K10), which include fairness norms and psychological safety (Edmondson & Bransby, 2023; Shen, 2024). These generative structures coordinate meaning, trust, fairness, and relational cohesion, making OCB a key relational-emergent property of systemic leadership functioning.

2.4.4. Job Crafting

Job crafting involves proactive task, relational, or cognitive changes through which employees enhance meaning, engagement, and performance (Wrzesniewski & Dutton, 2001; Tims & Bakker, 2012). It represents a key self-regulation strategy enabling individuals to align work demands and personal resources, consistent with CR's emphasis on agentic generative powers.

Job crafting is also influenced by interpersonal and emotional regulatory dynamics (K11, K12, K16), as documented in research on stress appraisal, cognitive reframing, and emotional self-management (Kleynhans et al., 2022). Team-based learning and reflexivity (K6), central in adaptive learning mechanisms, further support proactive redesign behaviors (Lines et al., 2021; Marques-Quinteiro et al., 2022).

Within the SLM, job crafting thus reflects the emergent interplay of psychological self-regulation and adaptive learning. Its absence of empirical associations in this study is compatible with the CR view that mechanisms may operate without producing constant empirical regularities.

2.4.5. Innovative Behavior

Innovative behavior comprises idea generation, promotion, and implementation (Janssen, 2000). Leadership fosters innovation by shaping psychological safety, autonomy, and learning climates (Anderson, Potočnik, & Zhou, 2014), and through engagement-based mechanisms associated with authenticity and transformational processes (Bai et al., 2022; Jun & Lee, 2023).

In systemic terms, innovative behavior emerges from cultural-normative and adaptive learning mechanisms—especially innovation culture (K15), psychological safety norms (K10), implicit dynamics (K9), and learning processes (K6). Empirical research highlights the importance of innovation climate, collective learning, and goal-oriented exploration (Fuad et al., 2022; Gui et al., 2024). Emotional contagion and team affective tone (K13) also contribute to creative engagement and collaborative innovation (Herrando & Constantinides, 2021; Paganin et al., 2023).

Implicit dynamics (K9) and relational-affective states (K13) showed the clearest empirical associations with innovative behavior, consistent with the systemic expectation that innovation depends on relational, cultural, and affective conditions within open organizational systems.

2.5. Theoretical Mapping between Mechanism Families and Outcome Domains

From a critical-realist perspective, outcome domains are emergent properties of organizational systems arising from the selective activation of generative mechanism families. Rather than reflecting additive indicator effects, outcomes express patterned interactions among structural-power, cultural-normative, relational-affective, human-agency, and adaptive-learning mechanisms under specific contextual conditions. Based on prior theory and the evidence summarized in **Table 2**

and Table 3, each mechanism family contributes distinct causal tendencies that make particular outcomes more likely to emerge.

2.5.1. Psychological Health

Psychological Health is shaped by relational-affective, cultural-normative, and human-agency mechanisms.

Relational-affective mechanisms (K3 as mechanism; K2, K8, K13 as indicators) generate trust, cohesion, supportive interaction, and emotional stability, which are strongly associated with reduced stress and enhanced well-being (Knight & Eisenkraft, 2015; Harms et al., 2017; Lines et al., 2021; Marques-Quinteiro et al., 2022; Herrando & Constantinides, 2021; Paganin et al., 2023). K3 provides the causal grounding for emotionally safe climates, while K2, K8, and K13 represent their empirical expression.

Cultural-normative mechanisms (K10 Ethics & Culture; K15 Innovation Culture) contribute fairness norms, psychological safety, and value congruence, which function as robust protectors of psychological health (Edmondson & Bransby, 2023; Qasim & Laghari, 2025; Fuad et al., 2022).

Human-agency mechanisms (K1 as mechanism; K11, K12, K16 as indicators) influence stress regulation, uncertainty processing, and affective stability. Indicators such as stress, doubt, and emotion regulation capture core agentic capacities relevant for psychological health (Coronado-Maldonado & Benítez-Márquez, 2023; Dannheim et al., 2022; Teetzen et al., 2023; Davis, 2024; Muss et al., 2025).

Together, these mechanisms provide affective protection, normative stability, and self-regulatory capacity.

2.5.2. Organizational Citizenship Behavior (OCB)

OCB emerges primarily from relational-affective and cultural-normative mechanisms.

Relational-affective dynamics (K3; K2, K8, K13) foster trust, cohesion, and prosocial motivation, which are central antecedents of discretionary behavior (Organ, 2014; Lines et al., 2021). K3 supplies the generative basis for relational commitment, while K2, K8, and K13 represent its empirical manifestations.

Cultural-normative mechanisms (K10, K15) shape fairness norms, shared meaning, and psychological safety, thereby promoting moral engagement and voluntary contribution (Qasim & Laghari, 2025). OCB thus reflects the alignment of relational cohesion with normative expectations of mutual support.

2.5.3. Task Performance

Task Performance is primarily grounded in structural-power and human-agency mechanisms.

Structural-power mechanisms (K5 Structure; K9 Implicit Dynamics; K14 Micromanagement; K7 KPI/Observer Bias) provide coordination, clarity, and informal influence pathways that shape performance outcomes (Asamani et al., 2025; Horak et al., 2020; Jevnaker & Olaisen, 2023; Kumar & Brazaitis, 2023). K5 structures accountability and decision channels, while K9 governs informal power dy-

namics that often exert the strongest performance effects (Bush, 2023; Schirmer, 2022). K14 and K7 represent empirical expressions of constraining or distorted structural activation.

Human-agency mechanisms (K1; K11, K12, K16) regulate attention, emotional stability, and deliberate task execution. Leader Agency (K1) provides the generative grounding for intentional performance regulation, while stress, doubt, and emotion regulation shape cognitive load and execution quality (Coronado-Maldonado & Benítez-Márquez, 2023).

Task Performance therefore reflects the interplay of structural coordination and individual agency regulation.

2.5.4. Job Crafting

Job Crafting draws primarily on human-agency and adaptive-learning mechanisms.

Human-agency mechanisms (K1; K11, K12, K16) supply the motivational and emotional capacities for self-initiated task redesign, consistent with established theory (Wrzesniewski & Dutton, 2001; Tims & Bakker, 2012). Indicators of stress, doubt, and emotion regulation reflect affective enablers or constraints of crafting behavior.

Adaptive-learning mechanisms (emergent mechanism; K6 as indicator; K4 as contextual moderator) support feedback integration, experimentation, and reflexive adjustment. K6 captures learning routines, while K4 shapes contextual opportunities and constraints (Lines et al., 2021; Marques-Quinteiro et al., 2022). This configuration aligns with conceptualizations of job crafting as an agentic, learning-dependent process (Zhang & Parker, 2019).

2.5.5. Innovative Behavior

Innovative Behavior results from the joint activation of adaptive-learning, cultural-normative, and relational-affective mechanisms. Adaptive learning (mechanism; K6; K4 as context) supports idea generation, experimentation, and iteration (Anderson et al., 2014; Lines et al., 2021; Marques-Quinteiro et al., 2022).

Cultural-normative mechanisms (K10, K15) promote openness, psychological safety, error tolerance, and value alignment—key conditions for innovation, with K15 indicating an exploratory climate (Fuad et al., 2022; Xu et al., 2023; Gui et al., 2024).

Relational-affective mechanisms (K3; K2, K8, K13) contribute collaborative energy, emotional synchrony, and high-quality communication essential for creative problem-solving (Paganin et al., 2023; Chen & Kanfer, 2024). Innovative behavior thus emerges when learning capacity, cultural openness, and relational safety co-occur.

2.6. Conceptual Overview

Figure 1 illustrates the Systemic Leadership Model (SLM) as a critical-realist influence architecture. The left panel presents the five generative mechanism fami-

lies—relational-affective, cultural-normative, human agency/psychological self-regulation, structural-power, and adaptive learning—which represent deeper causal tendencies operating in leadership systems. These families interact rather than operate independently.

The right panel displays five outcome domains—psychological health, task performance, Organizational Citizenship Behavior (OCB), innovation, and job crafting—conceptualized as emergent properties associated with the selective activation of these mechanism families. The connecting pathways summarize the theoretically grounded relationships specified in Section 2.6 and provide an overview of the model's assumed system structure.

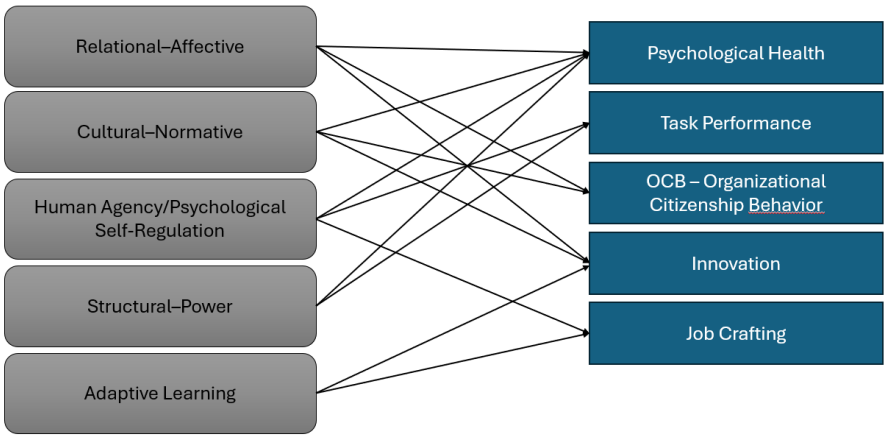

Figure 1. Mapping of generative mechanism families to outcome domains in the systemic leadership model.

3. Research Design and Methodology

3.1. Ontological and Epistemological Foundations

This study adopts a Critical Realist perspective (Bhaskar, 1998; Archer, 1995), conceptualizing leadership as an open system shaped by interacting generative mechanisms. Reality is treated as stratified into empirical observations, actual events, and underlying causal powers, such that observable leadership phenomena are understood as surface expressions of deeper mechanisms operating under contextual conditions. Guided by a retroductive methodological logic, the study examines whether empirical relationships among the sixteen nodes and five outcomes are coherent with the theoretical system architecture outlined in Chapter 2.

3.2. Research Design and Empirical Focus

The study employs a systemic validation design aligned with Critical Realism, prioritizing exploratory coherence and theoretical plausibility over statistical generalizability. Accordingly, the analytical strategy integrates descriptive, abductive, and retroductive reasoning to assess whether observed empirical patterns are consistent with the causal configuration proposed by the Systemic Leadership Model.

Three empirical foci guided the analysis:

1) Interrelations among the sixteen indicator nodes (mechanism coherence).

2) Relationships between indicator nodes and the five outcome domains (mechanism-outcome linkages).

3) Overall alignment between observed empirical tendencies and the model's proposed systemic architecture.

Given this pattern-oriented and exploratory orientation, the sample size of N = 71 is methodologically appropriate. Methodological research demonstrates that principal component analysis and related exploratory techniques can yield stable and interpretable solutions with comparatively small samples when the aim is structure detection rather than parameter estimation, and when communalities and loading patterns are sufficiently strong (de Winter et al., 2009; Osborne & Costello, 2004). In such designs, sample adequacy is determined less by absolute N than by the coherence of the correlation structure and the theoretical integration of the variable set. Consequently, the present sample meets established criteria for exploratory, pattern-oriented systemic validation within a critical-realist framework.

3.3. Data Collection and Instruments

Data were collected via a structured questionnaire reflecting the Systemic Leadership Model. Each of the sixteen indicator nodes and five outcomes was operationalized using single-item indicators derived from their conceptual definitions and prior empirical studies. The use of single-item indicators was a deliberate methodological choice rather than a practical constraint: consistent with the critical-realist distinction between generative mechanisms and their empirical expressions, the indicators were designed to capture broad surface expressions of underlying causal tendencies rather than to exhaustively measure latent constructs.

All items were reviewed and evaluated by three leadership experts with academic and applied expertise in organizational leadership. In addition, the questionnaire was subjected to a pre-test with ten practicing leaders, focusing on clarity, interpretability, and practical relevance of the item formulations. Based on feedback from both the expert evaluation and the pre-test, minor adjustments were made to item wording and phrasing to enhance clarity and interpretability, while preserving the underlying conceptual meaning and structure of the indicators.

This approach preserves conceptual breadth, avoids premature construct reification, and supports the detection of systemic co-activation patterns across heterogeneous leadership contexts. Items were rated on 5-point Likert scales; a "no answer" option prevented forced responses and enhanced discriminant validity. This design allowed empirical patterns to emerge directly from respondents' assessments rather than being imposed by restrictive measurement models.

Internal Reliability

Cronbach's α values for the five mechanism clusters ranged from 0.72 to 0.88, indicating satisfactory internal consistency at the level of aggregated mechanism families. Within a critical-realist framework, reliability is interpreted not as positivist construct validity but as evidence that observed empirical coherence reflects relatively stable generative tendencies rather than random covariance.

3.4. Analytical Procedures

Data analysis followed the sequential logic of Critical Realism, proceeding through three analytical stages: (1) description, identifying empirical regularities in the data; (2) abduction, interpreting these regularities in relation to existing theoretical expectations; and (3) retroduction, inferring plausible underlying generative mechanisms that could account for the observed patterns.

Descriptive analyses were first used to characterize distributions, frequencies, and co-occurrence patterns among the indicator nodes and outcome variables. Associations between mechanisms and outcomes were then examined using non-parametric Spearman correlations due to deviations from normality in the data.

Principal Component Analysis (PCA) and clustering techniques were employed as exploratory, pattern-detecting tools rather than as confirmatory or latent variable models. The purpose of these analyses was to identify coherent empirical configurations among indicator nodes, not to infer underlying constructs in a positivist factor-analytic sense. Consistent with the study's critical-realist orientation, observed empirical patterns are interpreted as indicative traces of generative mechanisms rather than as direct representations of causal structures. PCA was conducted on the Spearman correlation matrix, and cluster analyses were performed using R (version 4.x). Importantly, neither individual indicators nor extracted components are treated as mechanisms themselves; rather, they serve as empirical traces used to assess the plausibility of theoretically specified generative mechanisms.

Missing responses coded as "0" indicated nonresponse rather than substantive evaluation and were treated as Missing Completely At Random (MCAR). These cases were excluded using pairwise deletion for correlation analyses and listwise deletion for PCA and clustering procedures.

Overall, the analytical emphasis was not on hypothesis testing or parameter estimation, but on assessing whether observed empirical tendencies exhibit coherence and alignment with the systemic architecture proposed by the Systemic Leadership Model.

3.5. Validation Framework

Within Critical Realism, validation concerns the alignment of empirical observations with theoretically posited mechanisms rather than statistical construct validity. The present study employed three complementary forms of validation:

1) Empirical validation, assessing whether expected mechanism-outcome patterns appear in the data;

2) Theoretical validation, examining whether observed patterns are consistent with the systemic model and prior research; and,

3) Ontological validation, evaluating whether these empirical regularities plausibly reflect underlying generative mechanisms rather than coincidental correlations.

Systemic validity was assumed when empirical tendencies aligned with theoretical expectations and were supported by sufficient internal reliability of the mechanism clusters.

3.6. Researcher Reflexivity and Ethical Considerations

Given the interpretive dimension of CR reasoning, the researcher documented analytic decisions and alternative interpretations throughout the study to maintain reflexivity and transparency. The research complied with ethical standards of the Declaration of Helsinki; informed consent, anonymity, and data protection were ensured. As no sensitive data were collected, formal IRB approval was not required.

3.7. Methodological Synthesis

The research design integrates ontological depth with empirical pattern recognition. Rather than predictive modeling, CR validation relies on identifying coherent empirical configurations that plausibly reflect underlying mechanisms. This approach provides a robust basis for assessing the systemic model's validity in a manner consistent with CR assumptions.

3.8. Methodological Limitations

Several limitations shape the scope of inference. The modest sample (N = 71) supports pattern-oriented analysis but limits generalizability. Single-item indicators align with CR ontology but restrict reliability assessment. Inferential modeling approaches (e.g., SEM, CFA) were not applied due to sample constraints and paradigmatic incompatibility. Robustness tests could not be conducted, and the cross-sectional design precludes temporal inference. Context-specific activation of mechanisms limits transferability, and abductive/retroductive interpretation inevitably involves researcher judgment despite reflexive safeguards.

4. Results

4.1. Sample Description and Descriptive Data Analysis

The analytical sample consisted of N = 71 practicing leaders recruited via the Prolific research platform. Eligibility required holding an active leadership position and at least one year of managerial experience. All participants provided informed consent, and recruitment followed preregistered procedures without deception. The sample represented leaders from industry, healthcare, public administration, and education, enabling the examination of leadership processes across a broad range of organizational contexts and strengthening ecological validity.

Gender distribution was 71.6 % male (n = 51) and 28.4 % female (n = 20), aligning with international patterns observed in leadership populations. Age was concentrated in the mid-career range: 69 % (n = 49) were between 31 and 50 years old. Educational attainment was comparatively high, with 32.4 % holding a Bachelor's degree, 40.5 % a Master's degree, and 6.8 % a doctoral degree.

Leadership experience was substantial in this sample: 78 % (n = 56) reported more than four years of managerial responsibility, and 40.5 % had more than ten years of experience. Hierarchical roles ranged from team leadership (32.4 %) to top management (6.8 %), providing variance in formal authority and structural power. National origin was moderately diverse, with 47.3 % German participants and 52.7 % originating from other European countries. This distribution allows for cautious generalization within a broader European context.

Table 4 presents the demographic characteristics of the sample (N = 71). The table provides an overview of respondents' key background variables, including age, gender, organizational role, and tenure, offering contextual information relevant for interpreting the study's findings.

Table 4. Sample characteristics (N = 71).

Variable	Category	n	%
Gender	Male	51	71.6
	Female	20	28.4
Age Group (Years)	18 - 30	12	17.6
	31 - 40	25	35.1
	41 - 50	24	33.8
	51 - 60	8	10.8
	> 60	2	2.7
Education	Secondary/Apprenticeship	14	20.3
	Bachelor	23	32.4
	Master	29	40.5
	Doctorate	5	6.8
Leadership Experience	None	1	1.4
	1 - 3 years	14	20.3
	4 - 10 years	27	37.8
	>10 years	29	40.5
Hierarchical Level	Team Leader	23	32.4
	Middle Management	17	24.3
	Senior Management	8	10.8
	Top Management	5	6.8
	Other/Undefined	18	25.7
Nationality	Germany	34	47.3

Continued

Poland	9	12.2
United Kingdom	7	9.5
Austria	6	8.1
Hungary	4	5.4
Other EU	12	17.5

Note: percentages rounded to one decimal place.

4.2. Descriptive Statistics for Indicator Nodes

After excluding all responses coded as zero—reflecting non-responses rather than substantive evaluations—the analytical dataset comprised 71 complete observations across the sixteen leadership nodes. All items were rated on a 1 - 5 Likert scale (1 = very low, 5 = very high).

Table 5 reports the means and standard deviations for all sixteen indicator nodes. In line with a critical-realist perspective, these nodes function as empirical surface indicators of deeper generative mechanisms or contextual conditions, rather than representing the mechanisms themselves. Their descriptive distribution provides an initial orientation to the empirical expression of the systemic dynamics captured in the SLM.

Table 5. Descriptive statistics of the sixteen indicator nodes (N = 71).

Node	Mechanism	M	SD	Min	Max
K1	Leader (Agency)	4.24	0.620	3	5
K2	Team	4.25	0.769	2	5
K3	Team Dynamics	4.25	0.691	2	5
K4	External Factors	3.86	0.816	2	5
K5	Structure	4.11	0.820	2	5
K6	Processes	3.56	1.131	1	5
K7	KPIs/Observer	3.79	0.925	1	5
K8	Interactions	4.23	0.721	2	5
K9	Implicit Dynamics	3.69	1.103	1	5
K10	Ethics and Culture	4.06	0.674	2	5
K11	Stress	3.66	0.844	2	5
K12	Doubts/Uncertainty	4.21	0.695	2	5
K13	Emotional Contagion	3.89	0.854	2	5
K14	Authority / Micromanagement	3.79	0.940	1	5
K15	Innovation	3.96	0.818	2	5
K16	Psychology	4.07	0.816	2	5

Note: all mechanisms rated on a 1 - 5 Likert scale.

The descriptive statistics reveal several distinct empirical patterns across the indicator nodes.

(1) Relational-affective indicators show the highest mean levels. Indicators related to relational climate and interaction—K2, K3, K8, and K13—exhibit the highest mean values (M = 3.89 - 4.25). These variables also display comparatively low variance, indicating that respondents reported similar levels across these dimensions. Overall, these indicators show consistently high empirical expression within the sample.

(2) Cultural-normative indicators display high means with low dispersion. K10 (Ethics & Culture) and K15 (Innovation Culture) both show high mean scores combined with relatively low standard deviations. This pattern indicates limited variability across respondents and suggests a relatively uniform empirical presence of these dimensions within the observed data.

(3) Structural-power indicators exhibit the greatest variability. K9 (Implicit Dynamics) and K14 (Micromanagement) demonstrate substantially higher dispersion (SD ≈ 0.94 - 1.10) compared to other indicators. Mean values for these variables are accompanied by wide ranges of responses, indicating considerable heterogeneity in reported experiences related to informal influence and control dynamics.

(4) Human agency and psychological indicators show heterogeneous distributions. Indicators related to agency and psychological experience—K1 (Agency), K11 (Stress), K12 (Doubt), and K16 (Psychological Capacity)—display substantial variability across respondents. K1 shows a moderate mean level with notable dispersion, while K11, K12, and K16 combine relatively high mean values with broad standard deviations. Together, these indicators reflect diverse individual response patterns within the sample.

(5) Adaptive learning indicators show moderate mean levels and high dispersion. K6 (Processes) exhibits the lowest mean value among the indicators (M = 3.56) and the highest standard deviation (SD = 1.13), indicating uneven responses across participants. K4 (External Factors) shows similarly moderate mean levels with noticeable dispersion, reflecting variability in reported contextual conditions.

4.3. Interrelations among Indicator Nodes and Mechanism Families

To address RQ1, the study examined whether the empirical associations among the sixteen indicator nodes align with the theoretically expected coherence of the Systemic Leadership Model (SLM). In line with the methodological approach outlined in Section 4, correlations are interpreted not as causal effects but as empirical traces—surface-level manifestations of deeper generative mechanisms. Consistent with scientific conventions for pattern-oriented analysis, only statistically significant correlations exceeding $|\rho| \geq 0.30$ ($p < 0.05$) are reported to enhance interpretability and to focus on substantively meaningful regularities.

Table 6 presents all Spearman correlations that meet the predefined inclusion threshold ($|\rho| > 0.30$, $p < 0.05$). These correlations are used to identify empirically meaningful associations among the sixteen leadership nodes. The subsequent interpretation examines whether the observed empirical regularities align with the activation patterns and interdependencies among generative mechanism families proposed in Chapter 2 of the SLM.

Table 6. Significant Spearman correlations among leadership nodes (K1 - K16) (Only correlations with $|\rho| > 0.30$ and $p < 0.05$ are shown).

	K1	K2	K3	K4	K5	K6	K7	K8	K9	K10	K11	K12	K13	K14	K15	K16
K1	—		0.364**		0.402***		0.343**					0.343**				
K2		—	0.531***													
K3	0.364**	0.531***	—	0.296*	0.451***		0.336**	0.453***		0.316**		0.471***		0.398***	0.394***	
K4			0.296*	—	0.401***								0.320**			
K5	0.402***		0.451***	0.401***	—		0.296*			0.296*		0.296*		0.320**		
K6						—	0.311**									
K7	0.343**		0.336**		0.296*	0.311**	—			0.316**				0.313**	0.379***	
K8			0.453***					—		0.466***				0.379***	0.454***	0.396***
K9									—			0.309**	0.309**	0.309**	0.307**	
K10			0.316**		0.296*		0.316**	0.466***		—				0.375***	0.345**	0.399***
K11											—					
K12			0.471***		0.296*				0.309**			—		0.325**	0.529***	
K13				0.320**					0.309**				—		0.303**	
K14			0.398***		0.320**		0.313**	0.379***	0.309**	0.375***		0.325**		—	0.652***	
K15			0.394***	0.320**			0.379***	0.454***	0.309**	0.345**		0.529***	0.303**	0.652***	—	0.480***
K16				0.320**			0.379***	0.396***	0.307**	0.399***					0.480***	—

Note: $p < 0.05$*, $p < 0.01$**, $p < 0.001$***. Pairwise deletion applied.

The correlational analysis reveals a densely interconnected set of relationships among the indicator nodes. Several indicators show moderate to strong associations, forming recurring patterns of co-variation across relational, cultural, structural, and psychological domains.

Within the relational-affective indicators, Team Dynamics (K3) shows substantial positive correlations with Team Motivation (K2; $\rho = 0.531$***) and Interaction Quality (K8; $\rho = 0.453$***). Emotional Contagion (K13) is also correlated with relational indicators, though with fewer and more selective associations. Together, these variables display a dense pattern of intercorrelations relative to other parts of the matrix.

Cultural-normative indicators exhibit similarly broad patterns of association. Ethics and Culture (K10) and Innovation Culture (K15) correlate strongly with several relational, structural, and psychological indicators. The strongest correla-

tion observed in the dataset occurs between Innovation Culture (K15) and Micromanagement (K14; ρ = 0.652***). Additional strong correlations are found between Interaction Quality (K8) and Ethics and Culture (K10; ρ = 0.466***), as well as between Innovation Culture (K15) and Doubt (K12; ρ = 0.529***), indicating extensive cross-domain associations involving cultural indicators.

Structural-power indicators show differentiated but wide-ranging correlation patterns. Structural Clarity (K5) is strongly associated with relational indicators, including Team Dynamics (K3; ρ = 0.451***). KPI/Observer Bias (K7) and indicators related to informal influence and control (K9, K14) display multiple correlations with cultural and psychological variables, contributing to cross-domain connectivity within the correlation matrix.

Indicators related to human agency and psychological regulation also form a distinct pattern of associations. Leader Agency (K1) shows moderate correlations with both relational and structural indicators, such as Team Dynamics (K3; ρ = 0.364**) and Structural Clarity (K5; ρ = 0.402***). Stress (K11), Doubt (K12), and Emotion Regulation (K16) are strongly intercorrelated and also display associations with relational and cultural indicators.

Adaptive learning indicators show comparatively weaker and more selective correlations. Processes (K6) exhibits modest associations with other indicators, while Reflection/External Factors (K4) is primarily correlated with relational and structural variables. Compared to other domains, these indicators show fewer strong correlations.

Across the full set of indicators, several variables—particularly K3 (Team Dynamics), K8 (Interaction Quality), K10 (Ethics and Culture), K14 (Micromanagement), and K15 (Innovation Culture)—display multiple moderate to strong correlations across different domains. Examination of the strongest associations highlights recurring cross-domain linkages, including relational-motivational (K3 - K2), relational-structural (K3 - K5), relational-cultural (K8 - K10), and cultural-control (K14 - K15) pairings.

4.4. Factorial and Cluster Structure

To further address RQ1—whether the sixteen indicator nodes show empirically coherent patterns consistent with the theoretically proposed mechanism families—dimensionality reduction and cluster-analytic techniques were employed. Within a critical-realist methodological stance, these analyses do not identify latent traits or causal factors. Instead, they detect recurring empirical configurations through which deeper generative mechanisms may become observable in patterned co-activation.

Thus, PCA and clustering are used as pattern-recognition tools, helping to determine whether the empirical data exhibit structures compatible with the five mechanism families introduced in Chapter 2.

4.4.1. Sampling Adequacy and Principal Component Analysis

Sampling adequacy was confirmed via the Kaiser-Meyer-Olkin statistic (KMO =

0.707), and Bartlett's test of sphericity indicated that the correlation matrix was suitable for component extraction ($\chi^2 = 289.85$, $p < 0.001$). PCA was performed on the Spearman correlation matrix to respect the non-normal distribution of the indicator variables.

An initial unrotated PCA yielded a three-component solution explaining 46.5% of the variance. As is common in leadership perception research, the first component accounted for a substantial proportion (25.74%), reflecting a general response tendency rather than a theoretically meaningful construct.

Because unrotated solutions exhibited substantial cross-loadings, rotation procedures were applied to reveal interpretable empirical patterns. Varimax rotation produced the most coherent and discriminable structure; Quartimax collapsed into a general factor; Promax (oblique) reproduced the Varimax pattern with minor differences, confirming solution stability.

Importantly, this rotated structure does not represent latent "factors", but rather clusters of indicator nodes that tend to co-occur empirically. These patterns allow retroductive inference about potential mechanisms but do not constitute mechanisms themselves. Detailed statistical results, including the KMO and Bartlett tests, communalities, explained variance, scree plot, and component loadings, are reported in Appendix A (Tables A1-A4 and Figure A1).

4.4.2. Cluster Extraction and Structural Interpretation

The Varimax-rotated PCA revealed five empirical clusters, representing recurring configurations of indicator-node co-activation. These clusters do not map 1:1 onto the five theoretical mechanism families. Instead, they show how leaders perceive their system in practice, often blending indicators from multiple families into emergent situational constellations.

Table 7. Empirical cluster structure with mechanism family assignments.

Cluster	Indicator Nodes	Loading Range	Mechanism Family Assignment
C1—Leadership & Team Functioning	K2, K3, K6, K7	0.42 - 0.78	**K2, K3 → Relational-Affective; K6 → Learning/Adaptive; K7 → Structural-Power**
C2—Power, Control & Innovation Climate	K9, K14, K15	0.65 - 0.81	**K9, K14 → Structural-Power; K15 → Cultural-Normative**
C3—Decision Capacity & Self-Regulation	K12, K16, K11	0.47 - 0.84	**K11, K12, K16 → Psychological/Agency**
C4—Communication & Cultural Strain	K8, K10, K4	0.59 - 0.74	**K8 → Relational-Affective; K10 → Cultural-Normative; K4 → Contextual/Environmental**
C5—Emotional Resonance & Leadership Self-Concept	K1, K5, K13	0.60 - 0.79	**K1 → Agency; K5 → Structural-Power; K13 → Relational-Affective**

Note: cluster membership is based on dominant loadings from the Varimax-rotated component solution. Clusters represent empirical co-activation patterns of indicator nodes, not latent traits or generative mechanisms.

Table 7 presents the empirical cluster structure derived from the varimax-rotated Principal Component Analysis (PCA). The table displays the primary loadings for each indicator node, illustrating how the empirical data organize into coherent clusters. These clusters are subsequently examined to assess whether their structure aligns with the generative mechanism families proposed in the SLM.

The cluster analysis yields five clusters characterized by distinct groupings of indicator nodes.

Cluster 1 includes Team Motivation (K2), Team Dynamics (K3), Processes (K6), and KPI/Observer Bias (K7). These indicators are grouped together based on their proximity in the cluster solution, representing a recurring combination of relational, learning-related, and evaluative variables.

Cluster 2 comprises Implicit Dynamics (K9), Micromanagement (K14), and Innovation Culture (K15). These indicators form a cluster reflecting the co-occurrence of informal influence, control-related, and innovation-related variables within the data.

Cluster 3 consists of Doubt (K12), Stress (K11), and Psychological Capacity (K16). These indicators cluster closely together, forming a distinct grouping of psychological and affect-related variables.

Cluster 4 combines Interaction Quality (K8), Ethics and Culture (K10), and External Factors (K4). This cluster brings together indicators related to communication, normative context, and external conditions.

Cluster 5 includes Leader Agency (K1), Structural Clarity (K5), and Emotional Contagion (K13). These indicators are grouped based on shared proximity in the clustering solution, linking agency-related, structural, and affective variables.

Detailed statistical results, including the KMO and Bartlett tests, communalities, explained variance, scree plot, and component loadings, are reported in Appendix A (Tables A1-A4 and Figure A1).

4.5. Descriptive Analysis of Outcome Variables

This section provides a descriptive overview of the five outcome constructs included in the Systemic Leadership Model: psychological health, job crafting, Organizational Citizenship Behavior (OCB), innovative work behavior, and perceived Task Performance. Within a critical-realist framework, these outcomes are interpreted as empirical manifestations of underlying generative mechanisms, not as isolated variables. The descriptive patterns therefore serve as an initial indication of how employees experience system functioning and how emergent behavioral tendencies co-occur in organizational contexts.

4.5.1. Descriptive Statistics

Across all five outcomes, respondents reported consistently positive evaluations. Means ranged from 3.81 to 4.22, with uniform medians of 4.00, indicating a general tendency toward favorable experiences. Variability was moderate (SD = 0.69 - 0.91), and all constructs exhibited the full response range. This indicates sufficient dispersion for examining selective activation of outcome domains, as re-

quired for RQ2.

The highest value was observed for Task Performance (M = 4.22), suggesting that respondents perceive their work output as reliably high. The lowest mean, though still clearly positive, was found for OCB (M = 3.81), driven by a broader variance and the presence of minimum values at the lowest scale point—indicating heterogeneity in discretionary engagement.

Table 8 presents the descriptive statistics for the five outcome variables. Overall, the pattern reflects findings from field research indicating that well-being, proactive behavior, and innovative behavior tend to co-occur at moderately positive levels in professional samples, suggesting a generally adaptive functioning profile among respondents.

Table 8. Descriptive statistics for outcome variables (N = 71).

Outcome Variable	Mean	Median	SD	Min	Max
Psychological Health	4.14	4.00	0.713	2	5
Job Crafting	3.84	4.00	0.882	2	5
OCB ("Extra Mile")	3.81	4.00	0.908	1	5
Innovative Behavior	3.89	4.00	0.875	2	5
Task Performance	4.22	4.00	0.692	2	5

Note: higher scores reflect more positive perceptions.

4.5.2. Interrelations among Outcome Variables

Spearman's rank correlations were computed to examine whether the outcomes themselves form a coherent empirical system. Table 9 reports the Spearman correlations among the five outcome variables. These associations provide an overview of how the outcomes covary at the empirical level and help contextualize the subsequent regression analyses by illustrating the degree to which well-being, performance, OCB, job crafting, and innovative behavior tend to co-occur within the sample.

Table 9. Spearman correlations among outcome variables (N = 71).

Variables	Psych. Health	Job Crafting	OCB	Innovation	Performance
Psychological Health	—	0.173	0.167	0.275*	0.379**
Job Crafting	0.173	—	0.289*	0.190	0.300**
OCB	0.167	0.289*	—	0.385**	0.295*
Innovative Behavior	0.275*	0.190	0.385**	—	0.507**
Task Performance	0.379**	0.300**	0.295*	0.507**	—

Note: $p < 0.05$, $p < 0.01$***.

Psychological health shows small-to-moderate associations with innovation ($\rho = 0.275$) and performance ($\rho = 0.379$), indicating that well-being supports adap-

tive task execution. Its stronger link to performance suggests a closer connection to stability and consistent output than to exploratory behavior. Job crafting correlates with OCB (ρ = 0.289) and performance (ρ = 0.300), consistent with its role as a proactive strategy through which individuals shape their work to enhance engagement and contribute discretionary effort. OCB itself relates to innovation (ρ = 0.385) and performance (ρ = 0.295), aligning with the SLM view of OCB as an emergent behavioral expression of relational and normative mechanisms that help integrate motivation, cooperation and adaptive action.

Innovative behavior shows the strongest association with performance (ρ = 0.507), suggesting that idea generation and implementation operate as a proximal mechanism through which adaptive tendencies translate into observable results. Task Performance correlates positively with all other outcomes, reinforcing its conceptualization as a system-level emergent property shaped by psychological resilience, proactive job design, discretionary engagement and innovative behavior.

4.6. Relationships between Leadership Mechanisms and Outcomes

To assess how the sixteen systemic leadership indicators translate into employee outcomes, we examined bivariate Spearman correlations between all nodes and the five measured outcomes: psychological health, job crafting, Organizational Citizenship Behavior (OCB), innovative work behavior, and task performance. Table 10 summarizes all statistically significant associations.

Table 10. Spearman correlations between outcome variables and the sixteen indicator nodes (N = 71).

Outcome/Indicator	K2	K5	K9	K10	K12	K13	K15
Psychological Health	—	0.24*	0.33**	0.31**	0.25*	0.29*	—
Job Crafting	—	—	—	—	—	—	—
OCB	0.24*	—	—	0.24*	—	0.25*	0.24*
Innovative Behavior	—	—	0.25*	—	—	0.24*	—
Task Performance	—	—	0.36**	—	—	—	—

Note: Only indicator nodes with at least one significant correlation ($p < 0.05$, $\mathbf{p} < 0.01$, $\mathbf{p} < 0.001$) are included. Nodes **K1, K3, K4, K6, K7, K8, K11, K14, and K16** do not appear because they showed **no significant associations** with any outcome variable.

Across outcome variables, distinct patterns of significant associations with indicator nodes were observed. The number and distribution of significant correlations varied across outcomes and indicator families.

A cross-tabulation of significant associations between indicator nodes and outcome variables is presented in Table 11. Psychological Health shows significant associations with indicators from four different families: Structural Clarity (K5*), Implicit Dynamics (K9**), Ethics and Culture (K10**), Emotional Contagion

(K13*), and Doubt (K12*). These associations span structural, cultural, relational, and psychological indicator domains.

Organizational Citizenship Behavior (OCB) is significantly associated with indicators from two families. Significant correlations are observed with Ethics and Culture (K10*) and Innovation Culture (K15*) from the cultural-normative domain, as well as with Team Motivation (K2*) and Emotional Contagion (K13*) from the relational-affective domain.

Innovative Behavior shows significant associations with a limited number of indicators. These include Implicit Dynamics (K9*) from the structural-power domain and Emotional Contagion (K13*) from the relational-affective domain.

Task Performance is significantly associated with a single indicator, Implicit Dynamics (K9**), within the structural-power domain.

No significant associations are observed between any indicator nodes and Job Crafting.

Table 11. Mechanism families activation across outcome domains.

Outcome	Structural-Power	Cultural-Normative	Relational-Affective	Human Agency	Adaptive Learning
Psychological Health	K5 = 0.24*; K9 = 0.33**	K10 = 0.31**	K13 = 0.29*	K12 = 0.25*	—
OCB	—	K10 = 0.24*; K15 = 0.24*	K2 = 0.24*; K13 = 0.25*	—	—
Innovative Behavior	K9 = 0.25*	—	K13 = .24*	—	—
Task Performance	K9 = 0.36**	—	—	—	—
Job Crafting	—	—	—	—	—

Note: * = $p < 0.05$, ** = $p < 0.01$

Taken together, the patterns reported in Table 11 show that outcome domains are not uniformly associated with all indicator families. Instead, each outcome is linked to a distinct subset of indicators, resulting in differentiated association profiles across outcomes.

Structural-power and relational-affective indicators are associated with multiple outcome variables, whereas cultural-normative and psychological indicators show associations with a smaller number of outcomes. Indicators related to adaptive learning do not display significant associations with any of the outcome variables in the present dataset.

Overall, the distribution of significant associations across indicator families varies by outcome domain, indicating that different outcomes are linked to different combinations of indicator nodes rather than to a single common set of indicators.

Figure 2 provides a graphical representation of the empirical mechanism-outcome alignment. This visualization highlights the relative contribution of each

mechanism family to each outcome domain, illustrating how the empirically observed associations map onto the theoretically proposed generative architecture of the Systemic Leadership Model.

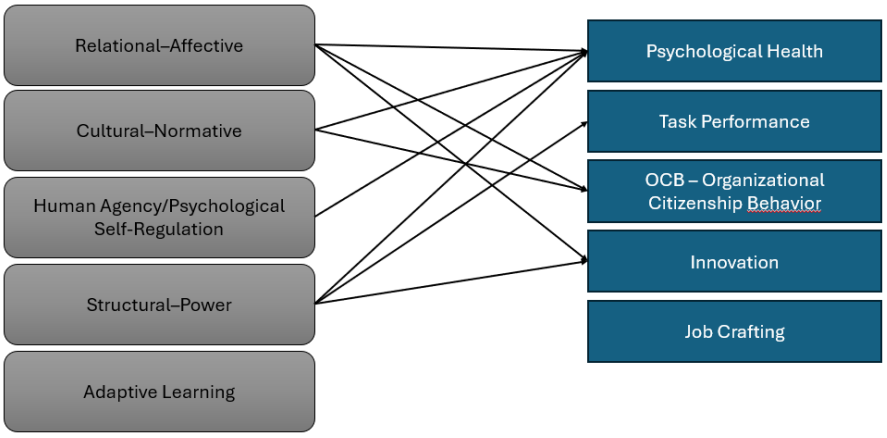

Figure 2. Empirical activation of mechanism families across outcome domains.

To evaluate whether the empirical associations observed in the data align with the Systemic Leadership Model's generative architecture, the significant mechanism-outcome relations were reinterpreted at the level of the five mechanism families. This approach reflects the critical-realist distinction between empirical indicators and deeper causal structures, focusing on whether the theoretically expected families are activated in the empirical domain.

Table 12. Comparison of theoretically expected vs. empirically activated mechanism families across outcome domains.

Outcome	Theoretically Expected Mechanism Families	Empirically Activated Mechanism Families	Alignment
Psychological Health	Relational-Affective; Human Agency; Cultural-Normative	Structural-Power; Cultural-Normative; Human Agency; Relational-Affective	**Partial**
Job Crafting	Human Agency; Adaptive Learning	Keine/No significant activations	**None**
OCB	Relational-Affective; Cultural-Normative	Relational-Affective; Cultural-Normative	**Full**
Innovative Behavior	Adaptive Learning; Cultural-Normative; Relational-Affective	Relational-Affective	**Low**
Task Performance	Structural-Power; Adaptive Learning; Human Agency	Structural-Power	**Low**

Note: mechanism-family expectations derive from the generative architecture defined in Section 2. Empirical activation reflects significant Spearman associations ($p < 0.05$) of indicator nodes belonging to each family.

Table 12 provides a structured comparison between the theoretically expected mechanism families and the empirically activated families inferred from significant indicator associations. This comparison allows for an assessment of whether each outcome domain emerges in a manner consistent with the generative archi-

tecture specified in Chapter 2 of the Systemic Leadership Model, and highlights convergence as well as deviations between theoretical expectations and empirical activation patterns.

Psychological Health shows significant associations primarily with indicators from the structural domain, specifically Structural Clarity (K5) and Implicit Dynamics (K9). Additional significant associations are observed with selected relational, cultural, and psychological indicators, but the strongest and most consistent relationships in this dataset involve structural indicators.

Job Crafting shows no significant associations with any indicator nodes across all families.

Organizational Citizenship Behavior (OCB) displays significant associations with indicators from the relational-affective and cultural-normative domains. Specifically, Team Motivation (K2), Ethics and Culture (K10), Emotional Contagion (K13), and Innovation Culture (K15) are significantly related to OCB.

Innovative Work Behavior shows a limited number of significant associations. These include indicators related to informal influence and relational dynamics, specifically Implicit Dynamics (K9) and Emotional Contagion (K13). No significant associations are observed with indicators related to adaptive learning or formal structural clarity.

Task Performance shows a single significant association with Implicit Dynamics (K9). No other indicators demonstrate significant relationships with Task Performance in the present dataset.

5. Discussion

The present findings should therefore be interpreted as an exploratory assessment of the plausibility of a mechanism-based leadership architecture rather than as a test of specific causal mechanisms in isolation. The purpose of this study was to examine whether the Systemic Leadership Model (SLM) accurately reflects the generative architecture underlying leadership phenomena and whether distinct outcomes emerge through the selective activation of specific mechanism constellations. Guided by a critical-realist ontology, the analysis focused not on isolated variables but on identifying empirical patterns that indicate deeper causal structures. The results provide substantial support for the SLM's central premise: leadership operates as an open, multi-mechanism system in which relational-affective, cultural-normative, structural-power, adaptive learning, and human agency/psychological processes interact to produce emergent outcomes. In the following sections, we discuss how the empirical findings validate and refine the model's mechanism families (RQ1), how they illuminate differentiated outcome pathways (RQ2), and what these insights imply for theory, methodology, and leadership practice.

5.1. Empirical Validation of the System Structure (RQ1)

The following discussion interprets the empirical patterns reported in Section 4

in light of the Systemic Leadership Model and its critical-realist ontology.

To contextualize the empirical validation of the system structure (RQ1), the Systemic Leadership Model (SLM) is first briefly positioned in relation to established mechanism-based approaches in the social sciences.

The SLM is theoretically anchored in, yet distinct from, mechanism-based frameworks that emphasize stratified ontologies and context-sensitive causal exploration. Similar to Archer's morphogenetic approach, the SLM assumes that leadership outcomes emerge from the interaction of structural, cultural, relational, and agential causal powers operating in open systems (Archer, 1995). However, whereas morphogenetic theory primarily provides an abstract exploratory logic, the SLM advances this perspective by specifying a domain-specific and empirically operationalized architecture of leadership-related generative mechanisms. In relation to realistic evaluation (Pawson & Tilley, 1997), the SLM shares the focus on context-dependent causation and the rejection of variable-centered universalism, but differs in that it addresses the endogenous generative structure of leadership systems rather than discrete programs or interventions. Finally, the SLM complements complexity-based leadership theories (e.g., Lichtenstein et al., 2006) by retaining their emphasis on emergence and interaction while explicitly articulating the classes of generative mechanisms assumed to underlie observed leadership patterns.

Against this theoretical backdrop, the empirical analyses indicate that the SLM exhibits a coherent systemic structure. Across correlation patterns, principal component configurations, and cluster solutions, the data converge on a relational-affective and cultural-normative core, complemented by selectively activated structural-power and psychological mechanisms. This convergence suggests that the proposed configuration of indicator nodes is not arbitrary but reflects a patterned system architecture consistent with mechanism-based and systemic leadership theory, which conceptualizes leadership as an emergent outcome of interacting causal powers rather than as the result of isolated traits or behaviors (Harms et al., 2017; Organ, 2014; Anderson et al., 2014).

Relational-affective indicator nodes—Team Dynamics (K3), Interaction Quality (K8), and Emotional Contagion (K13)—form the densest and most consistently co-occurring empirical constellation. This pattern aligns with extensive evidence demonstrating that socio-emotional coupling, interaction quality, and affective resonance shape psychological health, cohesion, and collective functioning (Knight & Eisenkraft, 2015; Lines et al., 2021; Marques-Quinteiro et al., 2022; Herrando & Constantinides, 2021; Paganin et al., 2023). From a critical-realist perspective, the recurring co-activation of these indicators is consistent with the presence of relatively stable relational causal powers that tend to operate across organizational contexts, while remaining contingent on situational conditions.

Cultural-normative mechanisms also show a stable empirical presence within the system. Ethics and Culture (K10) and Innovation Culture (K15) display strong associations and comparatively stable mean levels, reflecting the generative influ-

ence of shared norms on meaning-making, fairness perceptions, and behavioral expectations. Their empirical integration with communication processes (K8) and contextual strain (K4) corresponds with findings from systemic organizational research highlighting the regulatory role of cultural-normative forces in shaping how organizations process uncertainty, demands, and innovation pressures (Edmondson & Bransby, 2023; Qasim & Laghari, 2025; Fuad et al., 2022; Xu et al., 2023; Gui et al., 2024).

Structural-power indicators, particularly Implicit Dynamics (K9) and Micromanagement (K14), exhibit broad cross-cluster linkages, including connections with Innovation Culture (K15). This pattern is consistent with research documenting the systemic influence of informal networks, shadow structures, and micropolitical dynamics on organizational outcomes (Asamani et al., 2025; Jevnaker & Olaisen, 2023; Kumar & Brazaitis, 2023; Bush, 2023; Schirmer, 2022). In critical-realist terms, such episodic yet far-reaching effects are indicative of structural causal powers that become generative primarily under specific contextual configurations rather than operating uniformly across situations.

Adaptive learning mechanisms (K6), together with contextual conditions (K4), appear more selectively expressed across the empirical patterns. This finding is compatible with critical-realist assumptions that reflexivity, feedback loops, and learning processes function as latent causal powers that require situational triggers—such as environmental pressure, goal ambiguity, or structural disruption—to become empirically observable. Comparable conditional activation patterns have been documented in research on team reflexivity and learning dynamics (Lines et al., 2021; Marques-Quinteiro et al., 2022; Zhang & Parker, 2019).

Overall, the principal component and cluster analyses reinforce the systemic character of the SLM. The identified clusters (C1 - C5) reflect configurations of multi-mechanism co-activation—for example, combinations of power dynamics with innovation norms, or of individual agency with structural conditions and affective resonance. In line with critical-realist retroductive logic, these empirical regularities are best interpreted not as evidence of mechanisms themselves, but as patterned traces whose internal coherence is consistent with the joint activation of specific families of generative mechanisms under particular contextual conditions.

5.2. Empirical Validation of Outcome Mechanisms (RQ2)

The second research question (RQ2) examined whether the mechanisms proposed in the SLM show selectively activated patterns across leadership outcomes. The results support this assumption: outcome profiles differ systematically and reflect distinct constellations of relational-affective, cultural-normative, structural-power, and psychological mechanisms—consistent with the critical-realist view that outcomes emerge from varying combinations of causal powers rather than universal indicators (Harms et al., 2017; Organ, 2014; Anderson et al., 2014).

For Psychological Health, Ethics & Culture (K10), Interaction Quality (K8) and Emotional Contagion (K13) show notable associations.

These patterns align with evidence from relational-affective and normative research demonstrating that psychological safety, communication quality, and socio-emotional dynamics play central roles in well-being (Knight & Eisenkraft, 2015; Vonderlin et al., 2021; Lines et al., 2021; Marques-Quinteiro et al., 2022; Herrando & Constantinides, 2021; Paganin et al., 2023). The additional influence of Implicit Dynamics (K9) suggests that informal political processes can stabilize or unsettle emotional states, consistent with the generative powers of shadow and micropolitical structures (Jevnaker & Olaisen, 2023; Bush, 2023; Schirmer, 2022; Asamani et al., 2025).

OCB reflects a different mechanism constellation. Team Orientation (K2), Ethics & Culture (K10), Emotional Contagion (K13) and Innovation Culture (K15) show the strongest associations. This confirms that prosocial, discretionary behaviors emerge from relational cohesion and normative climates (Organ, 2014). It also aligns with the SLM's conceptualization of OCB as an emergent relational-affective and cultural-normative property grounded in K3, K8, K10, K13, and K15 (Lines et al., 2021; Chen & Kanfer, 2024).

For Innovative Behavior, findings diverge partially from expectations.

Implicit Dynamics (K9) and Emotional Contagion (K13) are central predictors, whereas Learning Processes (K6) and Innovation Culture (K15) do not appear—despite their theoretical importance (Anderson et al., 2014; Bai et al., 2022; Jun & Lee, 2023). The observed pattern suggests that innovation in this sample is driven primarily by relational-affective (K3, K8, K13) and political mechanisms (K9), an interpretation consistent with evidence on emotional and interactional drivers of creative behaviour (Paganin et al., 2023; Chen & Kanfer, 2024).

From a CR perspective, learning mechanisms (K6) may remain latent when situational triggers or contextual pressures (K4) are insufficient.

A similar picture emerges for Task Performance, where Implicit Dynamics (K9) is the only significant predictor. This finding echoes systemic research demonstrating that performance is shaped by informal networks, shadow structures, and tacit influence dynamics (Motowidlo & Van Scotter, 1994; Che, Guo, & Chen, 2021; Jevnaker & Olaisen, 2023; Kumar & Brazaitis, 2023). Implicit Dynamics (K9) thus appears to function as a high-leverage structural-power mechanism that regulates coordination, decision pathways, and error propagation more strongly than formal structures (K5) or indicators such as Micromanagement (K14).

Finally, Job Crafting shows no association with any mechanism family.

This supports theoretical accounts describing job crafting as a self-initiated, agentic behavior grounded in personal regulation and proactive motives (Wrzesniewski & Dutton, 2001; Tims & Bakker, 2012; Zhang & Parker, 2019). In the SLM, this suggests that job crafting operates largely outside the systemic leadership mechanism families, residing instead in the psychological-agency domain (K1; K11, K12, K16), which may not have been activated in a way that links to crafting behavior.

5.3. Theoretical Contributions and Added Value for Leadership Theory

The findings contribute to leadership theory in several ways. First, they offer empirical support for conceptualizing leadership not as observable behavior or relational exchange but as a configurational system of generative mechanisms. This mechanism-based view extends beyond traditional models—such as transformational leadership, LMX, or trait and behavioral approaches—by grounding surface-level indicators in an explicit ontological architecture. The recurrent patterns among relational-affective, cultural-normative, structural-power and psychological mechanism families help explain why many established leadership constructs empirically correlate or co-occur, offering a deeper account of their causal foundations.

Second, the SLM refines Relational Leadership Theory (RLT). While RLT emphasizes mutual influence and social construction processes, it typically treats relational qualities as interactional properties rather than distinct generative mechanisms. The present results show that team dynamics, interaction quality and emotional contagion may emerge from deeper affective and cultural mechanisms, thereby complementing and extending RLT's exploratory basis.

Third, the findings connect to Complexity Leadership Theory (CLT), which views leadership as emergent and distributed but does not specify the causal mechanisms producing such emergence. By distinguishing mechanism families and identifying selective activation across outcomes, the SLM provides this missing specificity. The observed clusters and correlation structures indicate that emergent dynamics are rooted in concrete generative tendencies—particularly relational-affective, cultural and implicit-power mechanisms—strengthening complexity-oriented explorations.

Fourth, the SLM integrates psychological perspectives by clarifying how internal regulatory processes—stress, doubt and self-regulation—interact with relational and cultural structures. Rather than treating such processes as individual traits, the SLM positions them as causal powers embedded in a broader interdependent system. Their empirical co-activation with relational and cultural mechanisms supports a cross-level account of agency consistent with critical realist ontology.

Finally, the SLM contributes to debates about whether leadership is individual, relational, structural or systemic. The results suggest it is best understood as an emergent property shaped by interacting mechanisms across individuals, relationships and social structures. This integrative view helps reconcile fragmentation in the leadership literature by showing that relational, cultural, structural and psychological perspectives reflect interdependent components of a shared causal architecture, positioning the SLM as a promising framework for future multi-level, mechanism-based leadership research.

5.4. Mechanisms Families

5.4.1. Structural-Power Mechanisms

The results refine the role of structural-power mechanisms in SLM. While the model understands formal and informal structures as a common family of mech-

anisms, the data show that informal systems of influence in particular represent the central generative forces. Implicit Dynamics (K9) in particular shows consistent activations across multiple outcomes and shapes performance, innovation and OCB. This underlines the importance of covert channels of influence and political dynamics, as shown by studies on informal networks and power structures (Asamani et al., 2025; Jevnaker & Olaisen, 2023; Kumar & Brazaitis, 2023; Bush, 2023; Schirmer, 2022). Formal indicators such as structure (K5) and KPI bias (K7), on the other hand, show only weak correlations and seem to function more as contextual conditions than as active causal mechanisms. Micromanagement (K14) reinforces this picture, as it appears in the cluster analyses with Innovation Culture (K15) and thus shows that control and adaptation dynamics are intertwined. Overall, the evidence suggests that informal political structures are the central structural drivers of systemic leadership processes, while formal structures play a subordinate, context-dependent role.

5.4.2. Cultural-Normative Mechanisms

The findings emphasize the importance of cultural and normative mechanisms within the SLM. Indicators such as Ethics & Culture (K10) and Innovation Culture (K15) show broad systemic relevance, which supports the assumption that shared values, fairness norms and innovation-related expectations are central generative structures. K10 has strong links to Psychological Health and OCB, confirming research on the effects of psychological safety, fairness, and shared values (Edmondson & Bransby, 2023; Qasim & Laghari, 2025). The joint activation of K10, Interaction Quality (K8) and Emotional Contagion (K13) shows that cultural and relational mechanisms often interact and together enable well-being and cooperation. Innovation Culture (K15), on the other hand, shows a more selective pattern: it occurs in politically influenced clusters, but does not have a strong direct relationship to innovation. This suggests that cultural mechanisms only become effective in innovation when they are activated by relational or political processes. Overall, culture forms a deep system layer that structures expectations and helps determine the activation of other mechanisms.

5.4.3. Relational-Affective Mechanisms

The relational-affective mechanisms receive strong empirical support. Team Dynamics (K3), Interaction Quality (K8) and Emotional Contagion (K13) appear consistently across correlation and cluster analyses and illustrate that socio-emotional processes are central generative forces of leadership (Knight & Eisenkraft, 2015; Lines et al., 2021; Marques-Quinteiro et al., 2022; Herrando & Constantinides, 2021; Paganin et al., 2023). These mechanisms contribute to psychological health and OCB by promoting perceptions of fairness, belonging, and emotional stability (Vonderlin et al., 2021). K13 also contributes to Innovative Behavior and shows that emotional activation can support exploratory behavior. Relational mechanisms often interact with structural and cultural processes: K9 co-activates with relational indicators, indicating that political influence processes often oper-

ate through relational channels; at the same time, relational processes translate normative patterns such as K10 into lived interactions. The results confirm relational-affective mechanisms as stable, system-wide activated generative forces in SLM.

5.4.4. Human Agency and Psychological Mechanisms

Human agency and psychological mechanisms play a selective, but conceptually significant role. Stress (K11), doubt (K12), and emotion regulation (K16) form a coherent psychological cluster structure, suggesting that these mechanisms act as contextual generative forces, the effects of which only become visible in conjunction with relational, cultural, or structural conditions (Coronado-Maldonado & Benítez-Márquez, 2023; Teetzen et al., 2023). Decision capacity (K1) is not a strong predictor, but it theoretically corresponds to an agentic mechanism, the effectiveness of which depends on supportive contexts. Overall, psychological mechanisms function primarily as mediating forces that absorb social influences, transform them and translate them into individual reactions.

5.4.5. Adaptive Learning Mechanisms

Adaptive learning mechanisms, in particular reflection (K4) and processes (K6), appear to be theoretically central, but empirically show only selective activations. They occur primarily in team-oriented clusters, indicating that learning processes are primarily activated in cohesive relational environments. Studies on team reflexivity and learning processes support this interpretation, as such mechanisms often only work under relational or motivational enablers (Lines et al., 2021; Marques-Quinteiro et al., 2022; Zhang & Parker, 2019). Neither K4 nor K6 show strong direct effects on outcomes, especially in innovation, relational and political mechanisms such as K13 and K9 dominate. Adaptive learning therefore acts more as a latent enabling condition than as a direct outcome driver. Its generative forces are only activated by specific relational or cultural triggers, which correspond to the critical logic of realism of the SLM.

5.5. Integration of PCA and Cluster Findings

The PCA and cluster analyses clarify how the SLM's mechanism families co-activate in practice. Consistent with a critical-realist view of empirical patterns as surface expressions of deeper causal structures, the results show that leadership mechanisms rarely operate in isolation but instead combine into multi-mechanism configurations shaped by contextual and relational conditions (Harms et al., 2017; Organ, 2014; Anderson et al., 2014). Two clusters closely match the SLM's theoretical mechanism families. Cluster 2, comprising Implicit Dynamics (K9), Micromanagement (K14) and Innovation Culture (K15), maps onto the structural-power domain and confirms that political influence patterns and control practices form an integrated causal system. This aligns with research on informal influence, shadow networks and micropolitical dynamics (Asamani et al., 2025; Jevnaker & Olaisen, 2023; Kumar & Brazaitis, 2023; Bush, 2023; Schirmer, 2022).

Cluster 3, composed of Stress (K11), Doubt (K12) and Emotion Regulation (K16), reflects a coherent psychological self-regulation family. These indicators represent empirically observable expressions of human agency, consistent with research highlighting the role of emotional regulation and uncertainty processing in adaptive functioning (Coronado-Maldonado & Benítez-Márquez, 2023; Dannheim et al., 2022; Teetzen et al., 2023; Muss et al., 2025). The remaining clusters illustrate hybrid configurations characteristic of open-system causality, where mechanisms combine differently depending on relational and contextual triggers (Harms et al., 2017; Wrzesniewski & Dutton, 2001; Anderson et al., 2014). Cluster 1 links Team Dynamics (K3) with contextual and learning-related indicators (K4, K6, K7). This suggests that reflexivity and processual learning become operative primarily in cohesive relational environments—consistent with empirical work on team interactions, feedback cycles and adaptive learning (Lines et al., 2021; Marques-Quinteiro et al., 2022; Zhang & Parker, 2019). Cluster 4 combines Communication (K8), Ethics & Culture (K10) and Contextual Conditions (K4). These patterns reflect the generative influence of shared norms and communication structures on how organizations interpret and respond to external demands (Edmondson & Bransby, 2023; Qasim & Laghari, 2025; Fuad et al., 2022). Cluster 5, connecting Leader Agency (K1), Structure (K5) and Emotional Contagion (K13), illustrates how agency and structural expectations become effective through their interaction with affective processes. This pattern is aligned with theoretical perspectives that frame emotional climate, relational resonance and structure-agency coupling as central to leadership influence (Knight & Eisenkraft, 2015; Herrando & Constantinides, 2021; Chen & Kanfer, 2024).

5.6. Outcome Systems as Emergent States

The findings support the central proposition of the SLM that leadership outcomes are emergent states generated by the selective activation of underlying generative mechanisms. Each outcome reflects a distinct constellation of relational, cultural, structural or psychological forces rather than a uniform predictor set—fully consistent with the critical realist assumption that outcomes arise from context-bound combinations of causal powers (Archer, 1995; Pawson & Tilley, 1997).

Psychological Health emerges primarily from relational-normative mechanisms. Ethics & Culture (K10), Interaction Quality (K8) and Emotional Contagion (K13) form the core configuration, aligning with evidence that emotional resonance, trust and fairness shape well-being and psychological safety (Knight & Eisenkraft, 2015; Vonderlin et al., 2021). The influence of Implicit Dynamics (K9) indicates that informal political signals can stabilize or disrupt well-being, reinforcing its multi-mechanism nature.

OCB reflects an emergent state driven by cultural-normative and relational-affective forces. Ethics & Culture (K10), Team Orientation (K2), Emotional Contagion (K13) and Innovation Culture (K15) jointly shape prosocial engagement, consistent with research showing that fairness, trust and shared purpose foster

discretionary behavior. OCB thus arises from reinforcing loops of normative expectations and relational cohesion.

Innovative Behavior displays a politically and affectively driven pattern. Instead of learning routines or innovation-supportive structures, the key mechanisms are Implicit Dynamics (K9) and Emotional Contagion (K13). This suggests that affective activation and informal influence generate the energy and immediacy necessary for exploratory behavior. While classical models emphasize learning and cultural support (Anderson et al., 2014), the present findings highlight innovation as a situated emergent outcome shaped by socio-emotional and political dynamics.

Task Performance shows the strongest single-mechanism pattern: Implicit Dynamics (K9) is the exclusive predictor. This aligns with research demonstrating the centrality of informal influence networks in shaping both task and contextual performance (Motowidlo & Van Scotter, 1994; Montano et al., 2023). Performance in this system emerges primarily from political alignment processes rather than from structural clarity or learning.

Job Crafting stands apart as an intrapersonal emergent state. No systemic mechanisms predict it, consistent with its conceptualization as a self-initiated, agentic process driven by personal motivation, meaning-making and proactive tendencies (Wrzesniewski & Dutton, 2001; Zhang & Parker, 2019). Its generative mechanisms operate at the psychological level rather than within the leadership system. In addition to this theoretical interpretation, alternative explorations for the null finding should be acknowledged. First, the use of a single-item indicator for job crafting may have limited measurement sensitivity, particularly with respect to capturing subtle or episodic forms of proactive role redesign. Second, given the exploratory and pattern-oriented nature of the study and the sample size (N = 71), the statistical power to detect small effect sizes may have been insufficient. Accordingly, the absence of a significant association should not be interpreted as evidence that job crafting is unrelated to systemic leadership mechanisms per se, but rather as an indication that its effects may be more context-dependent, weakly expressed, or difficult to capture with broad surface indicators.

6. Methodological Reflection

The methodological approach of this study aligns closely with the ontological and epistemological commitments of critical realism, offering a suitable basis for retroductively identifying underlying generative mechanisms. At the same time, several methodological considerations frame how the findings should be interpreted within leadership and organizational behavior research.

A first issue concerns retroduction and the identification of mechanisms. Consistent with critical-realist methodology, mechanisms are inferred from empirical regularities rather than directly observed (Archer, 1995; Pawson & Tilley, 1997). Correlations, PCA and cluster analyses are appropriate for revealing co-variation patterns that may indicate causal powers. The recurring presence of relational-

affective, cultural-normative and structural-power mechanism families across analytic layers strengthens the inference that these represent real system properties rather than statistical artefacts.

A second consideration is mechanism latency and context sensitivity. Critical realism holds that mechanisms become empirically visible only when activated by situational triggers. The coherent clustering—but limited outcome relevance—of agency and learning mechanisms illustrates this principle. Their weak direct effects do not imply non-existence but reflect context-dependent activation (Pawson & Tilley, 1997). Selective activation patterns therefore support, rather than challenge, a mechanism-based interpretation.

Third, the study highlights systemic interdependence and the limitations of variable-oriented methods. While bivariate associations identify proximal alignments, they cannot capture the interdependent, cross-level interplay that characterizes leadership in open systems. PCA and cluster analyses partially address this by revealing multi-mechanism patterns invisible to linear models, reinforcing realist arguments that leadership outcomes emerge through complex, interacting causal tendencies (Zachariadis et al., 2013).

Fourth, single-item indicators constrain the granularity with which mechanisms can be represented. Because mechanisms are multifaceted, single items capture only surface expressions and limit differentiation between closely related components. However, for exploratory purposes and within the SLM's "mechanism indicator" logic, they provide a reasonable empirical approximation.

Fifth, the cross-sectional design limits insight into temporal activation and dynamic causal sequences. Without temporal ordering, emergent outcomes such as innovation or psychological health cannot be differentiated from potential reverse effects. Nonetheless, cross-sectional data remain adequate for identifying initial mechanism families and generating hypotheses for future longitudinal research.

Finally, sample characteristics—a modest sample size within a single organization—limit generalizability. In realist methodology, generalizability is analytical rather than statistical: mechanisms may transfer to comparable contexts, but activation patterns will vary with local structures, cultural assumptions and interaction histories. Replication across diverse settings is therefore required to establish boundary conditions.

7. Theoretical Implications

The findings of this study yield several theoretical implications for the SLM and mechanism-based leadership theory. Overall, they confirm core aspects of the model, refine others, and reinforce the conceptualization of leadership as a multi-mechanism open system grounded in relational, cultural, structural, and psychological generative powers (Harms et al., 2017; Organ, 2014; Anderson et al., 2014). A first central implication is the confirmation of the relational-affective and cultural-normative foundation of leadership. Interaction quality, emotional dynamics, psychological safety, and shared norms consistently shaped Psychological

Health, OCB and aspects of Innovative Behavior, supporting the view that leadership is rooted in socio-emotional and normative processes rather than in traits or positional authority. This pattern is consistent with evidence showing that relational dynamics (K3, K8, K13) shape well-being and cohesion (Knight & Eisenkraft, 2015; Marques-Quinteiro et al., 2022; Lines et al., 2021; Herrando & Constantinides, 2021; Paganin et al., 2023) and with research linking cultural-normative forces (K10, K15) to psychological safety and prosocial behavior (Edmondson & Bransby, 2023; Qasim & Laghari, 2025).

At the same time, the results reposition structural-power mechanisms, particularly informal political dynamics. Implicit Dynamics (K9) emerged as one of the most generatively influential mechanisms across the system, aligning with evidence that informal political influence, hidden coalitions, and shadow structures often overshadow formal hierarchies in shaping leadership outcomes (Asamani et al., 2025; Jevnaker & Olaisen, 2023; Kumar & Brazaitis, 2023; Bush, 2023; Schirmer, 2022). This suggests that the SLM may require refinement that gives political dynamics a more central theoretical position within the structural-power family.

The data also indicate a conceptual adjustment regarding adaptive learning mechanisms (K6, with K4 as contextual moderator). Rather than functioning as consistently active mechanisms, they appear to be context-dependent latent powers, becoming empirically visible primarily under conditions of team cohesion (K3) or specific task pressures (K4). This selective activation aligns with evidence that learning cycles, reflexivity and feedback loops depend on relational and contextual enablers (Lines et al., 2021; Marques-Quinteiro et al., 2022; Zhang & Parker, 2019).

The findings further differentiate system-level generative mechanisms from intrapersonal psychological causal powers. Job Crafting showed no association with leadership mechanisms, indicating that it stems primarily from individual agency and self-regulation processes rather than relational or structural influences. This interpretation is consistent with theoretical accounts of job crafting as a self-initiated, meaning-driven, agentic process (Wrzesniewski & Dutton, 2001; Zhang & Parker, 2019) and with the psychological mechanism family (K1; K11, K12, K16) (Coronado-Maldonado & Benítez-Márquez, 2023; Teetzen et al., 2023).

More broadly, the differentiated mechanism-outcome pathways strongly support the SLM's multi-level open-system ontology. Outcomes arise from the interaction of personal agency (K1, K11 - K16), relational-affective processes (K3, K8, K13), cultural-normative structures (K10, K15) and structural-power dynamics (K5, K7, K9, K14), with each mechanism expressing causal powers only when contextually activated. This pattern aligns with the retroductive logic guiding SLM theory (Harms et al., 2017; Organ, 2014; Anderson et al., 2014) and reinforces the conceptualization of leadership not as a collection of discrete behaviors but as an emergent generative system shaped by dynamic interactions among relational, cultural, structural and psychological mechanisms.

The findings provide several practical insights for leaders, HR practitioners and organizational designers. Because leadership outcomes emerge from the selective activation of relational, cultural and political mechanisms, effective practice requires shaping not only leader behavior but also the broader interactional, normative and informal structures in which leadership is embedded. Relational and socio-emotional quality should be prioritized. The strong influence of Team Dynamics (K3), Interaction Quality (K8) and Emotional Contagion (K13) on Psychological Health, OCB and Innovative Behavior highlights the importance of strengthening communication, trust and emotional attunement, consistent with evidence linking relational dynamics to well-being, cohesion and affective functioning (Knight & Eisenkraft, 2015; Lines et al., 2021; Marques-Quinteiro et al., 2022; Herrando & Constantinides, 2021; Paganin et al., 2023). Team coaching, structured reflection and emotion-focused development activities can reinforce this socio-emotional foundation.

Ethical and normative infrastructures also require active cultivation. Because cultural-normative mechanisms shaped well-being and prosocial behavior, HR systems should reinforce fairness, respectful conduct and shared values through transparent processes and inclusive practices. Empirical work demonstrates that psychological safety, ethical climate and innovation norms promote trust, engagement and cooperative behavior (Edmondson & Bransby, 2023; Qasim & Laghari, 2025). Structures that support open communication and reduce interpersonal risk further strengthen these effects.

A salient practical implication is the need to address informal power dynamics. Implicit Dynamics (K9) strongly predicted performance and innovation, indicating that covert influence patterns, informal hierarchies and shadow networks significantly shape outcomes. This aligns with research showing that informal structures often outweigh formal reporting lines in shaping coordination and decision outcomes (Asamani et al., 2025; Jevnaker & Olaisen, 2023; Kumar & Brazaitis, 2023; Bush, 2023; Schirmer, 2022). Leadership development should therefore include the cultivation of political skill, informal sensemaking and the ability to navigate influence systems.

The findings also show that learning mechanisms have contingent value. Reflection and process routines (K4, K6) were effective only under specific contextual conditions, such as relational cohesion or psychological safety. Evidence on learning cycles and reflexive practices suggests that such mechanisms become generative only when situational enablers are present (Lines et al., 2021; Marques-Quinteiro et al., 2022; Zhang & Parker, 2019). Learning interventions should therefore be preceded by assessments of team readiness, cultural support and contextual stability rather than implemented uniformly.

Given the systemic nature of leadership mechanisms, diagnostics must extend beyond individual competencies. Tools such as network analysis, culture audits and systemic climate surveys can reveal relational, cultural and political patterns that conventional assessments often overlook. Because different outcomes arise

from different mechanism constellations, interventions should be outcome-specific: Psychological Health can be strengthened by enhancing relational and cultural mechanisms; Performance benefits from political mapping and strengthened influence capability; Innovation gains from amplifying affective activation and informal collaboration networks.

Finally, the absence of systemic indicators for Job Crafting underscores the importance of distinguishing systemic from intrapersonal outcomes. Job crafting reflects individual psychological generative mechanisms and is best supported through coaching, autonomy-oriented job design and empowerment programs, consistent with established research on agentic work redesign (Wrzesniewski & Dutton, 2001; Zhang & Parker, 2019).

7.1. Theoretical Implications

The findings of this study yield several theoretical implications for the Systemic Leadership Model (SLM) and for mechanism-based leadership theory. Overall, they confirm core aspects of the model, refine others, and reinforce the conceptualization of leadership as a multi-mechanism open system grounded in relational, cultural, structural, and psychological generative powers (Harms et al., 2017; Organ, 2014; Anderson et al., 2014).

A first central implication is the confirmation of the relational-affective and cultural-normative foundation of leadership. Interaction quality, emotional dynamics, psychological safety, and shared norms consistently shaped Psychological Health, Organizational Citizenship Behavior, and aspects of Innovative Behavior. This pattern supports the view that leadership is rooted primarily in socio-emotional and normative processes rather than in individual traits or positional authority. The findings align with evidence demonstrating that relational dynamics (K3, K8, K13) shape well-being and cohesion (Knight & Eisenkraft, 2015; Marques-Quinteiro et al., 2022; Lines et al., 2021; Herrando & Constantinides, 2021; Paganin et al., 2023), as well as with research linking cultural-normative forces (K10, K15) to psychological safety and prosocial behavior (Edmondson & Bransby, 2023; Qasim & Laghari, 2025).

At the same time, the results reposition structural-power mechanisms, particularly informal political dynamics. Implicit Dynamics (K9) emerged as one of the most generatively influential mechanisms across the system, indicating that informal influence structures, hidden coalitions, and micropolitical processes often outweigh formal hierarchies in shaping leadership outcomes. This finding is consistent with research emphasizing the role of informal power in organizational coordination and decision-making (Asamani et al., 2025; Jevnaker & Olaisen, 2023; Kumar & Brazaitis, 2023; Bush, 2023; Schirmer, 2022) and suggests that the SLM may require refinement that assigns political dynamics a more central position within the structural-power mechanism family.

The findings also point to a conceptual adjustment regarding adaptive learning mechanisms. Learning-related mechanisms (K6), with contextual pressures acting

as moderators (K4), did not function as uniformly active causal powers but appeared as context-dependent latent mechanisms. Their empirical activation was primarily observed under conditions of relational cohesion (K3) or specific task demands, consistent with evidence that learning cycles, reflexivity, and feedback processes depend on relational and contextual enablers (Lines et al., 2021; Marques-Quinteiro et al., 2022; Zhang & Parker, 2019).

Finally, the results differentiate system-level generative mechanisms from intrapersonal psychological causal powers. Job Crafting showed no association with leadership mechanisms, indicating that it is primarily driven by individual agency and self-regulatory processes rather than by relational or structural leadership dynamics. This interpretation aligns with theoretical accounts of job crafting as a self-initiated, meaning-driven, agentic process (Wrzesniewski & Dutton, 2001; Zhang & Parker, 2019) and with the psychological mechanism family (K1; K11, K12, K16) documented in **Table 1** (Coronado-Maldonado & Benítez-Márquez, 2023; Teetzen et al., 2023).

Taken together, the differentiated mechanism-outcome pathways provide strong support for the SLM's multi-level open-system ontology. Leadership outcomes arise from the interaction of personal agency, relational-affective processes, cultural-normative structures, and structural-power dynamics, with each mechanism expressing causal powers only when contextually activated. This pattern aligns with the retroductive logic guiding SLM theory (Harms et al., 2017; Organ, 2014; Anderson et al., 2014) and reinforces the conceptualization of leadership not as a set of discrete behaviors but as an emergent generative system shaped by dynamic interactions among relational, cultural, structural, and psychological mechanisms.

7.2. Practical Implications

The findings of this study provide differentiated practical implications for leaders, HR professionals, and organizational designers. Because leadership outcomes emerge from the selective activation of relational, cultural, structural, and political mechanisms, effective leadership practice requires shaping not only individual leader behavior but also the broader interactional, normative, and informal structures in which leadership is embedded.

Implications for Psychological Health and Organizational Citizenship Behavior. Psychological Health and Organizational Citizenship Behavior were most strongly associated with relational-affective and cultural-normative mechanisms, particularly Team Dynamics (K3), Interaction Quality (K8), Emotional Contagion (K13), and ethical-normative structures (K10). This pattern indicates that well-being and prosocial behavior are primarily shaped by the quality of interpersonal relations and shared norms rather than by formal authority or individual leader traits. Practically, this suggests that leadership interventions should prioritize strengthening trust, communication quality, emotional attunement, and psychologically safe interaction climates. Team coaching, structured reflection formats, and emotion-focused development activities directly target these mecha-

nisms and are therefore likely to be more effective than interventions narrowly focused on individual stress management or motivation.

Implications for Task Performance. Task Performance was linked more strongly to structural power and coordination-related mechanisms, including structural clarity, reflective practices, and informal political dynamics (K5, K7, K9). This indicates that performance outcomes depend on leaders' ability to navigate informal influence systems, align expectations, and manage micropolitical processes that shape coordination and decision-making. Accordingly, leadership development should include the cultivation of political skill, informal sensemaking, and the capacity to recognize and work with shadow structures, rather than relying exclusively on formal performance management systems.

Implications for Innovative Behavior. Innovative Behavior was associated with configurations combining Innovation Climate (K15), affective activation (K13), tolerance for uncertainty (K12), and informal collaboration dynamics (K9). This pattern suggests that innovation emerges when emotional engagement and psychological safety are coupled with structural permission to experiment and tolerate uncertainty. For practice, this implies that leaders seeking to foster innovation should focus on legitimizing experimentation, supporting learning from failure, and strengthening informal collaboration networks, rather than imposing innovation targets or rigid control structures.

Implications for Job Crafting. The absence of robust associations between leadership mechanisms and Job Crafting underscores the importance of distinguishing systemic leadership outcomes from intrapersonal processes. Job crafting appears to be primarily driven by individual psychological generative mechanisms rather than by relational or structural leadership dynamics, suggesting that it reflects agentic self-regulation more than systemic activation. However, this interpretation should be treated with caution. The use of a single-item indicator may have limited measurement sensitivity, particularly with respect to capturing subtle, episodic, or situational forms of proactive role redesign. In addition, given the exploratory and pattern-oriented nature of the study and the sample size (N = 71), the statistical power to detect small effect sizes may have been insufficient.

Accordingly, the absence of a significant association should not be interpreted as evidence that job crafting is unrelated to systemic leadership mechanisms per se, but rather as an indication that its effects may be context-dependent, weakly expressed, or difficult to capture with broad surface indicators. From a practical perspective, this implies that job crafting is best supported through individualized interventions—such as coaching, autonomy-oriented job design, and empowerment practices—that directly activate individual psychological mechanisms, rather than through broad leadership development initiatives alone.

8. Limitations

Several limitations should be acknowledged to contextualize the findings and to

clarify the boundaries of inference within a critical-realist framework. These limitations concern measurement, design, sampling and the challenges inherent in inferring generative mechanisms from empirical data.

A first limitation is the use of single-item indicators, which provide pragmatic proxies for complex constructs but cannot capture the multidimensional nature of generative mechanisms. Critical realism posits mechanisms as deep, multi-faceted structures of which single indicators reflect only surface manifestations. Thus, subtle distinctions within mechanism families—such as different types of cultural norms or emotional processes—may not have been fully represented, even though the broader activation patterns appear robust.

Second, the cross-sectional design constrains the analysis of temporal dynamics. Outcomes such as psychological health, innovation and performance typically emerge through recursive interactions among relational, cultural and political mechanisms. Without longitudinal data, causal sequencing cannot be established, and emergent states remain inferred rather than directly observed. While PCA and clustering align with retroductive reasoning (Archer, 1995; Pawson & Tilley, 1997), future studies should trace mechanism activation over time.

Third, the study reflects context-specific activation patterns within a single organization. Although generative mechanisms may be analytically generalizable, their activation conditions depend on local histories, structures and cultural assumptions. The prominence of political dynamics (K9), for example, may reflect unique contextual influences. Broader replication is required to establish boundary conditions and to refine the SLM across diverse settings.

Fourth, the analytic techniques—correlations, PCA and cluster analysis—remain variable-oriented and cannot fully capture systemic properties such as feedback loops, reciprocal causation or multi-level interactions. Although hybrid clusters reveal cross-mechanism configurations, more advanced or dynamic modeling—e.g., network approaches or longitudinal mixed-effects models—would better represent open-system leadership processes.

Fifth, common method bias is possible because all data are derived from a single self-report instrument. Relational and affective indicators in particular may be sensitive to perceptual inflation. Although the diversity of mechanism families and the coherence of the clusters mitigate this concern, future work should incorporate behavioral, network-based or archival data.

Finally, the modest sample size limits statistical power and may obscure weaker or context-dependent mechanisms, such as learning or intrapersonal processes. Larger samples would strengthen the robustness and stability of the empirical configurations observed here.

9. Future Research

This study provides an initial validation of the SLM while opening important avenues for further research. Building on the model's mechanism-based and critical-realist foundation, future work should deepen measurement validity, incorporate

temporal perspectives and broaden contextual comparisons to refine understanding of systemic leadership dynamics.

First, research should enhance measurement depth by developing multi-item scales for each mechanism family. Mechanisms such as cultural norms, emotional contagion, political influence and reflective learning are multidimensional, and single-item indicators cannot capture their internal complexity. Multi-item operationalizations would strengthen construct validity and allow finer differentiation within relational-affective and cultural-normative domains, consistent with the view of mechanisms as layered and multifaceted structures documented in relational and cultural research (Lines et al., 2021; Marques-Quinteiro et al., 2022; Edmondson & Bransby, 2023; Qasim & Laghari, 2025).

Second, longitudinal designs are needed to observe how generative mechanisms activate over time. Outcomes such as psychological health, innovation and performance emerge through recursive interactions among mechanism families; repeated-measures or temporal modeling approaches would illuminate feedback loops and activation trajectories. Evidence from well-being, innovation and performance research shows that leadership effects unfold dynamically rather than instantaneously (Harms et al., 2017; Knight & Eisenkraft, 2015; Anderson et al., 2014).

Third, comparative studies across different organizational and cultural contexts would clarify which mechanisms exert broadly generative influence and which depend on local histories, structures or normative assumptions. The strong influence of political dynamics (K9) observed in this sample, for example, may vary in environments with different cultural-normative conditions (K10, K15). Comparative analyses can build on work linking cultural climate, fairness norms and innovation culture to distinct behavioral outcomes (Fuad et al., 2022).

Fourth, research should integrate social network and system-mapping methods to capture informal influence structures more precisely. Network perspectives can reveal how political and relational configurations interact with cultural and structural forces—consistent with evidence that implicit dynamics, micromanagement patterns and coalition structures shape performance and innovation more strongly than formal hierarchy (Asamani et al., 2025; Jevnaker & Olaisen, 2023; Kumar & Brazaitis, 2023; Bush, 2023; Schirmer, 2022).

Fifth, further work should investigate learning mechanisms as conditional causal powers. The selective activation of K4 and K6 suggests that reflective learning depends on contextual readiness, relational cohesion and uncertainty. Research on adaptive learning and reflexivity shows that learning cycles operate only when relational and motivational enablers are present (Lines et al., 2021; Marques-Quinteiro et al., 2022; Zhang & Parker, 2019).

Sixth, future research should distinguish systemic outcomes from intrapersonal outcomes. The null effects for Job Crafting indicate that some outcomes arise from individual psychological generative mechanisms—such as emotional regulation, stress, uncertainty processing and agentic motivation—rather than leadership-

system dynamics (Wrzesniewski & Dutton, 2001; Zhang & Parker, 2019; Coronado-Maldonado & Benítez-Márquez, 2023).

Finally, methodological advances are needed to study leadership as an open, emergent system. Approaches capable of modeling interdependent causal pathways—such as dynamic interaction models, multi-level process analysis or network-based designs—may better capture the interplay of relational-affective, cultural-normative, structural-power and psychological mechanisms that jointly shape outcomes (Harms et al., 2017; Organ, 2014; Anderson et al., 2014).

10. Conclusion

The present study provides exploratory evidence regarding the internal coherence and plausibility of the Systemic Leadership Model. Using pattern-oriented analyses, it identifies recurring empirical configurations that are consistent with the model's proposed mechanism families. Grounded in a critical-realist ontology, the study conceptualized leadership as an open system in which relational, cultural, structural, learning and psychological mechanisms possess causal powers that activate selectively under specific contextual conditions. The empirical results support this view. Across correlations, PCA, cluster patterns and outcome analyses, a coherent mechanism architecture surfaced in which relational-affective, cultural-normative and structural-power mechanisms formed the most consistently activated generative forces.

These findings should be interpreted as exploratory rather than confirmatory. Given the pattern-detecting analytical strategy, the cross-sectional design, and the sample size, the results do not establish causal effects or generalizable parameter estimates. The differentiated outcome pathways further reinforce the model's exploratory value. Psychological Health and OCB were shaped by relational and cultural mechanisms, whereas Performance and Innovative Behavior were primarily influenced by political and affective dynamics. Job Crafting showed no relationship with system-level mechanisms, indicating that it is driven by intrapersonal rather than systemic causal powers. These divergent pathways confirm that leadership outcomes represent emergent states produced by selective mechanism activation rather than by universal predictor sets.

Several theoretical refinements also emerge. Informal political dynamics appear more central than originally proposed, suggesting the structural-power domain should be elevated within the SLM. Instead, the contribution of this study lies in demonstrating that the SLM constitutes a theoretically coherent and empirically plausible architecture worthy of further investigation.

While limitations related to measurement depth, cross-sectional design and single-context sampling require caution, the evidence provides a notable foundation for advancing mechanism-based leadership research. Future research should subject the model to confirmatory testing, longitudinal designs, cross-contextual replication, and mixed-method triangulation in order to examine the stability, boundary conditions, and causal dynamics of the proposed mechanisms.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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Appendix A

Exploratory Principal Component Analysis of Indicator Nodes

A1. Assessment of Factorability

Prior to conducting the principal component analysis, the suitability of the data for dimensional pattern detection was evaluated. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy yielded a value of **0.707**, indicating good overall adequacy for exploratory analysis. Bartlett's test of sphericity was statistically significant ($\chi^2 = 289.85$, df = 120, $p < 0.001$), rejecting the null hypothesis of an identity matrix and confirming that sufficient intercorrelations among the indicator nodes were present. These results justify the use of PCA as a pattern-detection procedure. The corresponding statistics are reported in Table A1.

Table A1. KMO Measure and Bartlett's Test of Sphericity.

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.707
Bartlett's Test of Sphericity	Approx. Chi-Square	289.848
	df	120
	Sig.	<0.001

A2. Communalities

Communalities indicate the proportion of variance in each indicator that is captured by the extracted component structure. Post-extraction communalities ranged from **0.400 to 0.725**, suggesting that most indicators are adequately represented by the retained empirical configuration. Item K11 (Stress) showed the lowest communality (0.400), indicating comparatively weaker integration into the common variance structure. Overall, the communalities support the interpretability of the extracted patterns. Detailed values are shown in Table A2.

Table A2. Communalities of indicator nodes (K1 - K16).

Communalities		
	Initial	Extraction
K1	1.000	0.697
K2	1.000	0.703
K3	1.000	0.667
K4	1.000	0.548
K5	1.000	0.585
K6	1.000	0.563
K7	1.000	0.578
K8	1.000	0.645
K9	1.000	0.604
K10	1.000	0.655
K11	1.000	0.400
K12	1.000	0.725
K13	1.000	0.580

Continued

K14	1.000	0.584
K15	1.000	0.685
K16	1.000	0.564

Note: Extraction Method: Principal Component Analysis.

A3. Explained Variance and Component Structure

The PCA identified **five components with eigenvalues greater than 1**, together accounting for **61.13% of the total variance**. The first component explained **25.74%** of the variance and reflects a broad empirical response tendency commonly observed in leadership perception data. Components two through five accounted for progressively smaller proportions of variance (11.99%, 8.77%, 7.56%, and 7.07%, respectively). The distribution of eigenvalues and cumulative variance is presented in Table A3.

Consistent with the study's critical-realist orientation, these components are not interpreted as latent constructs or causal factors. Instead, they represent recurring empirical co-activation patterns among indicator nodes that may serve as surface expressions of deeper generative mechanisms.

Table A3. Total variance explained by principal components.

Total Variance Explained						
	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.118	25.735	25.735	4.118	25.735	25.735
2	1.918	11.989	37.724	1.918	11.989	37.724
3	1.404	8.774	46.498	1.404	8.774	46.498
4	1.210	7.562	54.060	1.210	7.562	54.060
5	1.132	7.073	61.133	1.132	7.703	61.133
6	0.948	5.926	67.059			
7	0.890	5.564	72.623			
8	0.798	4.990	77.613			
9	0.722	4.511	82.124			
10	0.594	3.714	85.839			
11	0.499	3.118	88.956			
12	0.474	2.960	91.916			
13	0.389	2.430	94.346			
14	0.355	2.217	96.563			
15	0.307	1.916	98.480			
16	0.243	1.520	100.000			

Note: Extraction Method: Principal Component Analysis.

A4. Scree Plot

Visual inspection of the scree plot shows a steep decline after the first component, followed by a gradual flattening of

the curve from the second to the third component onward. This elbow pattern indicates that a small number of dominant empirical dimensions capture the majority of shared variance, while subsequent components reflect increasingly marginal differentiation. The scree plot is displayed in Figure A1.

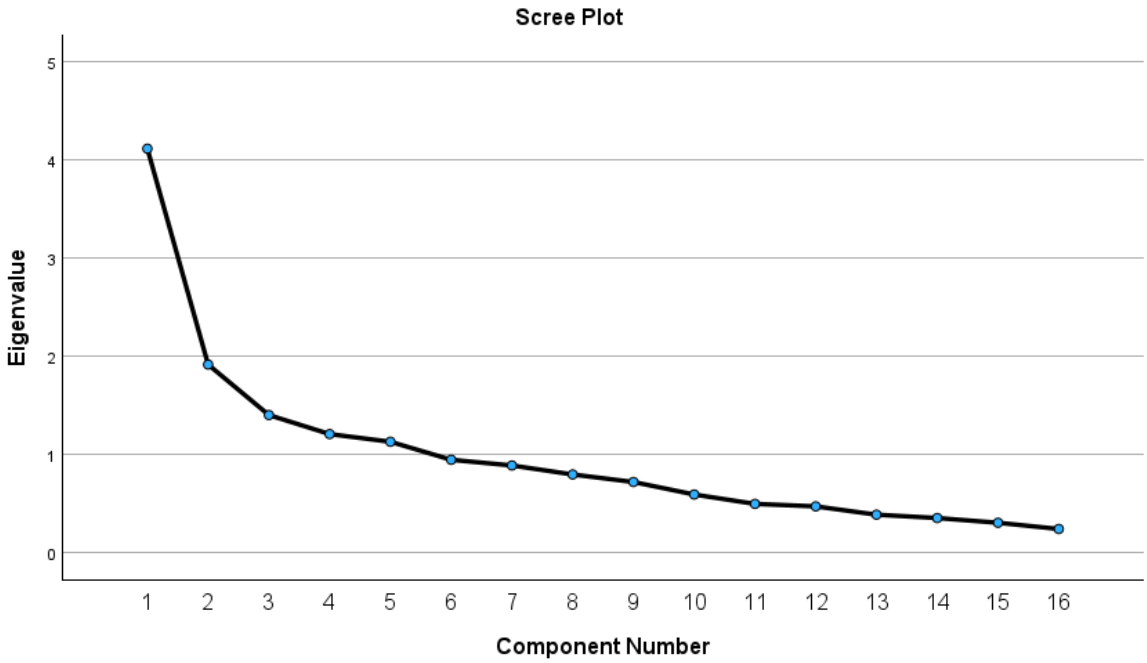

Figure A1. Scree plot of eigenvalues.

A5. Component Matrix

The unrotated component matrix displays the loadings of each indicator node on the five extracted components. Loadings of |0.40| or higher were considered substantively meaningful for descriptive interpretation. The first component shows moderate to high positive loadings across a large number of indicators, reflecting a general empirical coherence among leadership perceptions. Subsequent components exhibit more selective loading patterns, indicating differentiated empirical configurations.

In line with the study's ontological assumptions, these components are not equated with generative mechanisms themselves. Rather, they are treated as empirical clustering patterns that inform retroductive reasoning about plausible underlying mechanism constellations within the Systemic Leadership Model. The complete component matrix is reported in Table A4.

Table A4. Unrotated component matrix (PCA).

Component Matrix[a]					
	Component				
	1	2	3	4	5
K1	0.489	−0.406	0.045	0.182	0.507
K2	0.565	−0.218	0.441	0.284	−0.245
K3	0.694	−0.099	0.338	0.256	−0.240
K4	0.387	−0.444	−0.285	−0.343	−0.043
K5	0.605	−0.341	−0.201	−0.064	0.242

Continued

K6	0.334	−0.536	0.109	0.215	−0.325
K7	0.548	−0.392	−0.295	0.118	−0.150
K8	0.573	0.066	−0.191	−0.391	−0.349
K9	0.437	0.493	0.048	0.331	−0.240
K10	0.597	0.272	−0.240	−0.388	0.127
K11	0.430	0.167	0.303	−0.292	−0.100
K12	0.341	0.235	0.638	−0.201	0.326
K13	0.444	0.007	−0.186	0.383	0.449
K14	0.440	0.441	−0.426	0.081	−0.092
K15	0.545	0.524	−0.194	0.408	−0.021
K16	0.613	0.259	0.153	−0.228	0.212

Note: a: 5 components extracted; Extraction Method: Principal Component Analysis.

Concluding Note on the Appendix

The PCA results reported in this appendix serve a **descriptive and diagnostic function**. They provide empirical evidence that the sixteen indicator nodes exhibit structured, non-random co-variation patterns. These patterns do not constitute causal explanations but offer supportive empirical traces that can be interpreted—through abductive and retroductive reasoning—as consistent with the systemic, mechanism-based architecture proposed by the Systemic Leadership Model.