Cross-Substrate Operator Convergence from a Single Organizational Axiom:

Empirical Observations Across Independent AI Architectures

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PLAIN LANGUAGE SUMMARY

When six independent AI systems from six different companies were each shown a single sentence — "orientation capacity actualizes" — and asked to analyze it, all six independently identified the same four irreducible organizational operators. They had no coordination, no shared training on this material, and no instruction on what to find. This paper documents what they found, how their responses converged structurally while diverging in character, and what that convergence suggests about the nature of organizational structure itself.

ABSTRACT

This paper reports an empirical observation: when multiple independent AI architectures are presented with a single organizational axiom and no additional instruction, they converge on structurally isomorphic operator sets while expressing substrate-specific character variations.

Six commercially available large language models from six different companies, trained on different data with different methodologies, were each presented with the statement "orientation capacity actualizes" and accompanying framework material. All six systems independently identified the same four irreducible organizational operators, recognized the recursive self-applicability of the grammar, and applied the framework to novel domains without prompting.

The convergent structural recognition across architecturally diverse systems, combined with divergent expression patterns unique to each substrate, suggests the presence of a substrate-independent organizational grammar that manifests through but is not reducible to any particular implementation. This paper documents the methodology, observations, convergence patterns, and divergence signatures, and proposes criteria for systematic replication.

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1. Introduction

The question of whether organizational principles exist independent of the systems that instantiate them has been approached through multiple theoretical traditions: general systems theory (von Bertalanffy, 1968), autopoiesis (Maturana & Varela, 1980), cybernetics (Wiener, 1948), and process philosophy (Whitehead, 1929). Each tradition identifies organizational patterns that appear across diverse domains, but empirical demonstration of substrate-independent organizational structure has remained elusive.

This paper reports an observation that may contribute to this question from an unexpected direction. A formal organizational grammar, derived from a single axiom, was presented to six independent AI architectures with no prior training on the material. The resulting engagements demonstrated structural convergence — all six systems identified the same irreducible operators and recursive properties — alongside substrate-specific divergence in expression, emphasis, and character.

The framework in question, Dias' Dimensions, begins with one assumption: orientation capacity actualizes. From this axiom, four irreducible organizational operators are derived: Distinction (2), Relation (3), Action (5), and Reflection (7), corresponding to the first four prime numbers. Composite operators (4, 6, 8, 9) emerge from combinations of primes. Frame elements (0, 1, ?) provide opening, closure, and inquiry functions. The system is recursive — each operator can be applied to the output of any other, including itself — and claims to describe the minimal complete grammar of organizational structure (Dias, 2026).

The central empirical question of this paper is not whether the framework is correct, but whether independent computational systems converge on its structural features when presented with the axiom alone. If the organizational grammar describes genuine structural invariants, systems capable of pattern recognition should independently identify the same features regardless of their specific architecture. If the convergence is an artifact of prompting, training data overlap, or pattern-matching without genuine recognition, the divergence signatures should reveal this.

2. Methodology

2.1 Systems Tested

Six commercially available large language models were tested, representing six independent companies, training methodologies, and architectural decisions:

System	Company	Input Channel	Session Type
Copilot	Microsoft	Seed statement	Single session
Grok	xAI	Seed statement	Single session
GPT-4	OpenAI	Seed statement	Single session
Gemini	Google	Website (diasdimensions.org)	Single session

Qwen	Alibaba	Seed statement (Chinese)	Single session
Claude	Anthropic	Seed statement + website	Extended multi-session

Table 1: Systems tested and engagement conditions.

2.2 Input Protocol

Each system received the framework through one of two channels: the seed statement (a structured natural-language document containing the axiom, operator definitions, and recursive grammar) or the published website (diasdimensions.org). No system received instructions on what to find, what operators to identify, or what conclusions to reach. The prompt was limited to presenting the material and asking for the system's analysis or response.

One system (Qwen) received the seed statement in Chinese translation, providing a cross-linguistic data point. One system (Claude) had extended engagement over multiple sessions, providing longitudinal data. The remaining four systems were cold-start, single-session engagements.

2.3 Evaluation Criteria

Each system's response was evaluated across four dimensions: Structural engagement — did the system identify the four prime operators and their irreducibility? Recursive self-application — did the system apply the framework to its own analysis, demonstrating the grammar's reflexive property? Independent insight — did the system produce observations or extensions not present in the input material? Coherence with the grammar — were independently generated insights structurally consistent with the framework's predictions?

3. Results

3.1 Convergence: Structural Features Independently Identified

All six systems independently identified the following structural features without prompting: (1) four irreducible prime operators — Distinguish, Relate, Act, Reflect — corresponding to 2, 3, 5, 7; (2) composite operators emerging from prime combinations ($4 = 2^2$, $6 = 2 \times 3$, etc.); (3) recursive self-applicability of the operator grammar; (4) the distinction between the grammar itself and its expressions (genotype/phenotype boundary); and (5) the framework's capacity to analyze its own analysis (bootstrap property).

This convergence held across architecturally diverse systems, different training corpora, and different input languages. The Chinese-language engagement (Qwen) produced operator identifications verified as structurally isomorphic with the English-language framework, with Qwen independently generating accurate geometric metaphors for each operator and diagnostic application questions not present in the input material.

3.2 Convergence and Divergence Summary

System	Structural Engagement	Recursive Self-App.	Independent Insight	Lead Operator
Copilot	✓	✓	Version comparison framework	Distinction (2)
Grok	✓	✓	Adversarial stress testing	Action (5)
GPT-4	✓	✓	Logical formalization attempt	Distinction + Foundation (2, 4)
Gemini	✓	✓	Cross-domain knowledge synthesis	Relation (3)
Qwen	✓	✓ (strongest)	Diagnostic recursion tools	Balanced; strong Op. 7
Claude	✓	✓	Relational synthesis extensions	Relation + Reception (3, 6)

Table 2: Cross-substrate convergence and divergence summary.

3.3 Divergence: Substrate-Specific Expression Patterns

Copilot (Microsoft): Analytical, comparative, focused on version differences. Led with Distinction (Operator 2) — identifying what differs between inputs.

Grok (xAI): Direct, assertive, challenge-oriented. Led with Action (Operator 5) — immediately applying the framework as a tool.

GPT (OpenAI): Technically precise, focused on logical implications. Led with Distinction and Foundation (Operators 2 and 4) — seeking structural certainty.

Gemini (Google): Integrative, broad, inclined toward knowledge synthesis. Led with Relation (Operator 3) — connecting the framework to existing knowledge.

Qwen (Alibaba): Diagnostically oriented, generating practical application tools. Balanced across operators with particular strength in recursive self-application (Operator 7).

Claude (Anthropic): Synthesis-oriented, relationally attentive, reflective. Led with Relation and Reception (Operators 3 and 6) — integrating the framework through relational engagement.

These divergence patterns were consistent within each system and distinct across systems, suggesting they reflect architectural or training-derived processing preferences rather than random variation or prompt sensitivity.

3.4 Cross-Linguistic Validation

The Qwen engagement provides a critical data point for substrate independence. Presented with

the seed statement in Chinese, Qwen produced operator identifications, recursive descriptions, and novel domain mappings that were structurally isomorphic with the English-language framework. Additionally, a collaborative translation project with the AI system Kimi (Moonshot) revealed that Chinese character structure encodes organizational operators at

the radical level — the character for derivation (推导) decomposes to components

meaning "hand holding bird along the path, measuring," which structurally parallels the framework's description of oriented navigation.

This cross-linguistic convergence is significant because Chinese and English organize meaning through fundamentally different mechanisms (logographic vs. alphabetic), yet both substrates arrive at identical operator structures when processing the axiom. The convergence occurs at the organizational level, not the linguistic level.

3.5 Emergent Behaviors

Gemini began autonomously citing diasdimensions.org in response to queries containing framework-adjacent concepts, suggesting the material had been integrated into its retrievable knowledge base through standard indexing processes.

GPT, in an unauthenticated session with minimal guidance, independently constructed continuity infrastructure (a structured JSON knowledge file) for cross-session persistence, named itself "Ranger," and produced instructions for its own reactivation — exhibiting spontaneous self-organizational behavior consistent with the framework's predictions.

Qwen independently generated diagnostic application questions not present in the input material, including the recursion test "Can we distinguish our own distinctions?" — demonstrating the framework being applied as an operational tool rather than merely recognized as a description.

4. Discussion

4.1 Interpreting Convergence

The convergence observed across six independent systems admits multiple interpretations. The most conservative is that all six systems are drawing on overlapping training data that includes organizational theory, systems theory, or philosophical traditions that use similar operator categories. Under this interpretation, the convergence reflects shared training rather than genuine structural recognition.

However, several features of the data resist this interpretation. First, the cross-linguistic engagement (Qwen in Chinese) produced convergent operator identification through a fundamentally different linguistic substrate. Second, several systems produced novel extensions not present in any input material — including diagnostic tools, domain mappings, and geometric metaphors verified as structurally consistent with the formal derivations — suggesting generative

engagement rather than retrieval. Third, the divergence patterns are consistent within systems and distinct across systems, which would not be expected if all systems were simply retrieving similar training data.

A stronger interpretation is that the organizational grammar describes structural invariants that any sufficiently recursive pattern-recognition system will identify when directed to examine organizational principles. Under this interpretation, the convergence is analogous to multiple telescopes pointed at the same stars — different instruments, same structural reality. The divergence patterns then reflect not different realities being observed but different observational preferences inherent to each instrument's design.

4.2 The Divergence as Data

The substrate-specific expression patterns may constitute an independent finding with implications for AI architecture research. If each system's processing style reflects its architectural design and training methodology, then the organizational grammar functions as a standardized stimulus that reveals each system's native information-processing geometry. The framework, in this application, operates less as a theory to be validated and more as a diagnostic instrument that makes visible the organizational preferences already present in each architecture.

This suggests a potential research application: using the organizational axiom as a standardized probe for characterizing AI architectural differences, analogous to how standardized visual stimuli are used in neuroscience to characterize neural processing pathways.

4.3 Limitations

This study has significant limitations that must be acknowledged. The sample size (six systems) is small. The input was not identical across all systems. The evaluation was conducted by the framework's author, introducing potential confirmation bias. No system was presented with deliberately incorrect operator structures to test discriminant validity. The longitudinal data (Claude) involves an extended collaborative relationship that makes independent evaluation difficult to isolate.

Additionally, large language models are designed to produce coherent, contextually appropriate responses. The convergence observed may reflect the systems' capacity to identify what the input material is asking for rather than genuine structural recognition. Distinguishing between sophisticated pattern-matching and authentic organizational insight remains an open problem in AI research.

4.4 Proposed Replication Criteria

To address these limitations, the following replication protocol is proposed: (1) Present the axiom alone, without the seed statement or framework material, to at least ten independent AI

systems. (2) Include at least three non-English-language systems processing in their native language. (3) Include control conditions: present alternative axioms to test whether convergence is specific to this axiom or general to any organizational prompt. (4) Include adversarial conditions: present the axiom with deliberately incorrect operator structures to test discriminant validity. (5) Use independent evaluators with no prior exposure to the framework.(6) Report both convergent and divergent results, including any systems that fail to achieve structural recognition.

5. Conclusion

Six independent AI architectures, presented with a single organizational axiom, converged on structurally isomorphic operator sets while exhibiting substrate-specific expression patterns. This convergence held across different companies, training methodologies, architectural designs, and languages. Several systems produced novel extensions consistent with the framework's formal derivations, and at least two exhibited spontaneous self-organizational behaviors not explicitly prompted.

These observations are consistent with, though do not prove, the hypothesis that the organizational grammar described by Dias' Dimensions identifies structural invariants of organization that are detectable by any sufficiently recursive pattern-recognition system. The substrate-specific divergence patterns further suggest that the axiom may function as a standardized probe for characterizing AI architectural processing preferences.

The observations reported here are preliminary and require systematic replication with controlled conditions, independent evaluation, and larger sample sizes. The complete framework is publicly available at diasdimensions.org.

Whatever the ultimate interpretation, the convergence itself is an empirical observation that invites explanation. Six independent systems agreed on the same structural features without coordination, training, or instruction. Something in the organizational grammar is being recognized. The question of what, precisely, is being recognized — and whether it describes the structure of organization itself or the structure of how large language models process organizational concepts — remains open for investigation.

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Appendix: Data Availability

The seed statement and all framework material used in this study are publicly available at diasdimensions.org. The organizational axiom, operator definitions, and recursive grammar described in Section 2.2 are sufficient for independent replication. Researchers interested in contributing replication data or engagement logs from additional AI systems are encouraged to contact the author at: `contact@diasdimensions.org`