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AXIOMATIC SYSTEMS SCIENCE – GEOMETRY OF THINKING

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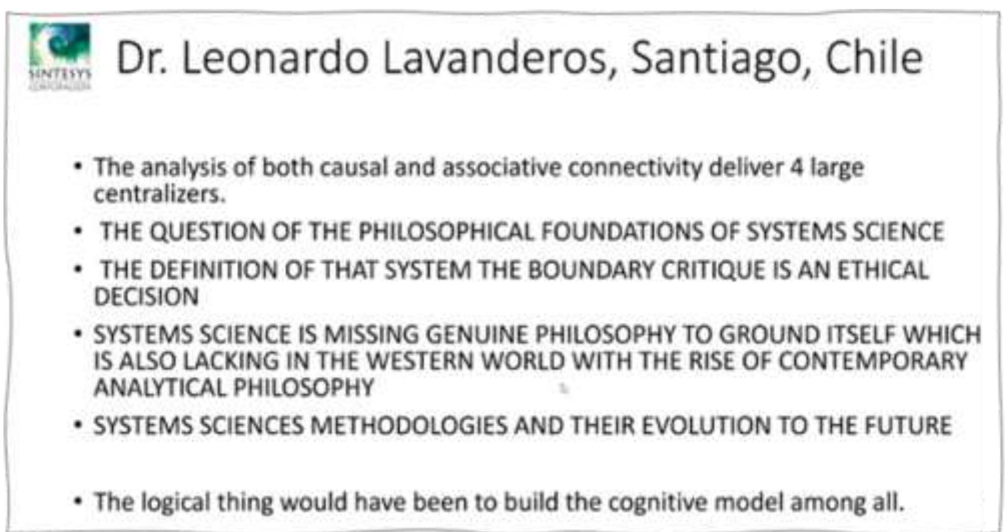
Abstract
As highlighted by Dr. Leonardo Lavanderos, systems science has evolved without a unified cognitive foundation and a clear philosophical framework, despite the primary ambition of Ludwig von Bertalanffy's General Systems Theory.This paper introduces Axiomatic Systems Science as a visual, symbolic and AI-compatible approach to systems inquiry. The central contribution is the GoodReason Integral Theory, a four-quadrant architecture that connects symbolic foundations, the Geometry of Thinking, research resilience and Universal Systems Methodology. The paper argues that systemic inquiry requires not only concepts and models, but also an explicit meta-ontological grammar that can support human reasoning, visual communication and AI-mediated interpretation.The paper develops this argument through a 56-node α–Ω structure represented as GrammarWare and JSON. The model is illustrated through the Andreas case, the eight dimensions of Geometry of Thinking, and several demonstrations based on systems thinking terminology, systems science and systems philosophy as a semantic service network. The results show how existing systems knowledge can be reconfigured through GoodReason into a coherent visual and computational architecture. The paper concludes that GoodReason provides an axiomatic systems mindset for navigating complexity, supporting human–AI inquiry and advancing systems science toward a more explicit geometry of thinking.

Keywords
Systems science, Geometry of thought, Symbolic paradigm, Human-AI communication, Integration of theories.

Exhibit 1. *Critique of the state of systems science by Dr. Lavanderos (Tuddenham, 2019).*



1 | Introduction

Systems science and cybernetics emerged historically in close proximity. The construction of the computer, the rise of symbolic reasoning, and the early development of communication and control theory created an intellectual environment in which systems, information, feedback and computation could be studied together. Later, however, cybernetics and systems science developed along increasingly specialized paths. Cybernetics became absorbed into its applied domains, while General System Theory remained highly valued as a transdisciplinary orientation but often too abstract to generate methods, applications or practical societal impact (Bertalanffy, 2009).
A recent diagnosis of this situation was given by Dr. Leonardo Lavanderos in the video discussion Grand Systems Science in 2019 (Tuddenham, 2019). He argued that cognitive science should have formed a foundation for systems science from the beginning, but that the cognitive sciences were not sufficiently developed when the systems movement was born. He also emphasized that systems science still lacks a sufficiently grounded philosophy, making it difficult to define system boundaries and to develop methodologies and future visions for the field. This diagnosis points directly to the missing layer addressed in this paper: a cognitive and philosophical geometry for systemic understanding.

Axiomatic Systems Science is presented here as a pragmatic and metatheoretical extension of systems science. It studies the behaviour of systems through axiomatic inquiry, supported by cybernetics, in order to strengthen the logical, theoretical and practical capacity of systems science for science, society, design and artificial intelligence. GoodReason is proposed as a geometry of thinking that supports the movement from ordinary concerns, observations and symbolic distinctions toward systemic understanding, methodological reflection and axiomatic development (Gärdenfors, 2000).

The purpose of GoodReason is to make systems thinking more explicit, navigable and usable in interdisciplinary inquiry, human–AI communication, innovation and analysis of complex societal situations. The model does not begin from a heavy formal apparatus, but from a selected System of Interest and from ”Meaning of Interest” that the system gains for an observer, researcher, decision-maker or agent. From this starting point, the inquiry can be expanded through symbolic roles, cognitive dimensions, dialogue, feedback and systemic interpretation.

1.1 | Research Path Toward a Geometry of Thinking

The background of GoodReason lies in long-term work in information technology, symbolic analysis and program comprehension. The author's doctoral dissertation, Symbolic Analysis and Atomistic Model as a Basis for Program Comprehension Methodology, completed in 2008, studied how complex source code can be understood through symbolic structures, atomistic modelling and cognitive support for comprehension (Laitila, 2008). That research combined GrammarWare, ModelWare, KnowledgeWare and SimulationWare with formal language theory, automata, the Turing machine, logic programming and cognitive science.

This background is relevant because program comprehension shows how meaning can grow from symbolic microstructures. In source code, every symbol may carry semantic consequences. Understanding therefore requires attention to dependencies, transformations, context and feedback. GoodReason extends this experience from software systems toward systems inquiry more generally. It treats thinking as movement in a conceptual space where selected systems can be interpreted through roles, dimensions and levels of reflection.

After this research path, the author's focus moved toward problem solving, systems thinking and systems science (Hieronymi, 2013). The transition was natural: all three require the ability to recognize relations, contexts, constraints, transformations and feedback. At the same time, the systems literature appeared rich but fragmented. Many traditions have produced valuable insights, but the field still lacks a widely shared cognitive architecture for connecting theories, methods and practical interventions. GoodReason is developed as one response to this gap.

1.2 | Starting Points for Systems Science

Systems science can be understood as the theoretical deepening of systems thinking. Its role is to clarify what kinds of entities, relations, boundaries, transformations and feedback processes make systems intelligible. General System Theory established the ambition of finding transferable principles across domains. Later developments in cybernetics, systemology, systems philosophy, soft systems approaches, complexity studies and organizational cybernetics have continued this work in different directions (Rousseau & Billingham, 2018).

Several contemporary developments make this question practical rather than merely philosophical. Digital twins, cyber-physical systems, artificial intelligence, virtual environments and Industry 5.0 require models that connect human meaning, systemic structure, computation and action. A geometry of thought provides a bridge between these concerns. Peter Gärdenfors' theory of conceptual spaces showed how concepts can be understood through dimensions, distances, regions and similarity relations. GoodReason develops this insight into a symbolic and systemic methodology.

The following sections present the Andreas case, the GoodReason Integral Theory, the α–Ω method, a set of demonstrations, and the results and implications of the model. The aim is to show how a concrete everyday concern can be developed into systemic and axiomatic inquiry without losing its practical meaning.

Exhibit 2. *GoodReason evaluates systems leverage, mental models, scientific insights, and human thinking, separately and combined as geometry with System leverage points and Systems thinking iceberg (Meadows*

& Wright, 2011).

A couple of terms:

- **Context-sensitivity.** In GoodReason, the symbols function as context-sensitive symbolic anchors rather than fixed labels. For example, α may refer to purpose, mindset or identity depending on the system, context and level of interpretation. One end of the symbol is fixed by the shared α–Ω grammar, while the other remains open to contextual interpretation.

- **Symbolic expressions.** The Greek letters in GoodReason function first as base signs or sector markers. They become *full GoodReason symbols* when they are indexed, contextualized or used in symbolic expressions. For example, α2, ΔΨ5 or χ4 refers to a specific indexed state, while longer combinations, such as ΔΨ3 → χ4 → β → τ, describe movement or transformation in the system. At the most formal level, these expressions can be expanded into JSON structures for AI agents, communication protocols and structured systems inquiry.

2 | Case Andreas: From Everyday Thinking to Systems Thinking

Axiomatic Systems Science begins from a simple observation: a system becomes meaningful only when it matters to someone. This chapter introduces the Andreas case as an everyday bridge between conventional thinking and systemic thinking. The case is intentionally simple. Its purpose is not to solve the gasoline-price problem, but to show how an ordinary situation becomes a System of Interest and then a Meaning of Interest.

Andreas notices that the price of gasoline has risen sharply. At first, the situation appears as a practical problem: fuel is more expensive. Conventional thinking may stop at this level and treat the issue as a private budget concern. Systems thinking expands the situation. The price is connected to mobility, work, family routines, taxation, energy policy, markets, inflation, infrastructure, climate policy and personal identity. The object of attention is no longer only a price. It becomes a system.

In GoodReason terms, the gasoline-price situation is first interpreted as a System of Interest: SOI = Andreas facing a gasoline-price increase.However, the System of Interest alone is not sufficient. The issue becomes relevant only when Andreas interprets what the situation means for him. This creates the Meaning of Interest:

SOI → MOI System of Interest → Meaning of Interest (Cloutier & al., 2015) .

The MOI may include anxiety about personal economy, concern about future mobility, anger toward political decisions, curiosity about energy markets, or a search for alternatives. The same SOI may therefore produce different meanings for different people. For a commuter, gasoline price may mean vulnerability. For an energy researcher, it may mean market signal. For a policy-maker, it may mean structural pressure. For Andreas, it becomes meaningful through his own situation, expectations and possible actions (SEBoK, 2025).

This distinction is essential for the Geometry of Thinking. A system is not only an external object. It is also an interpreted object. GoodReason therefore begins from the relation between the observed system and the meaning that emerges in the observer. This makes the model suitable for human–AI inquiry, because the AI should not only identify data about a system; it should help clarify why the system matters, from which perspective, and under which constraints.

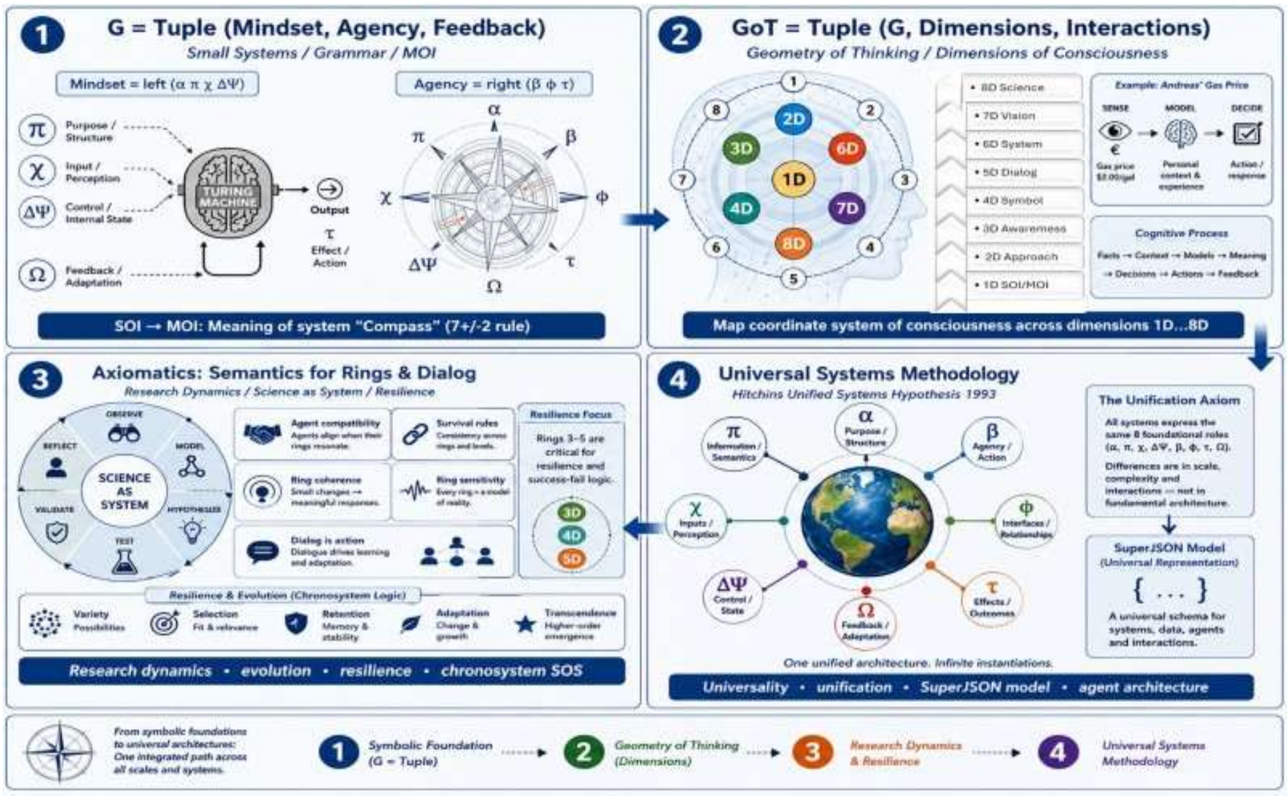
The Andreas case also shows why a coordinate system is needed. The gasoline-price increase may be interpreted through several GoodReason directions. It may be an α-question of purpose and identity: what kind of life and mobility does Andreas want to maintain? It may be a π-question of theory and explanation: why has the price increased? It may be a χ-question of context and information: which facts, markets and policies define the situation? It may be a ΔΨ-question of pressure and change: what threshold makes the current way of living unstable? It may become a β-question of organization and agency, a φ-question of possible solutions, a τ-question of implementation, and finally an Ω-question of feedback and learning.

Summary. The case therefore prepares the central architecture of the paper. Andreas does not need a long list of isolated explanations. He needs a geometry of thinking that can organize purpose, theory, context, pressure, agency, solution, implementation and feedback into one navigable structure. This is the role of the GoodReason Integral Theory presented in the next chapter. The Andreas case provides the human starting point; the GoodReason Integral Theory provides the formal architecture.

3 | The GoodReason Integral Theory

The GoodReason Integral Theory is the central architectural figure of this paper. It presents Axiomatic Systems Science as a four-quadrant structure in which symbolic grammar, cognitive dimensions, research resilience and universal systems methodology are connected through the same α–Ω logic. The figure is not a decorative overview. It functions as the main formal map of the paper: later sections unfold, test and apply what is already compressed into this image.

Exhibit 3. *The GoodReason Integral Theory.*



The term *integral* is used here in a structural sense. The figure follows a four-quadrant presentation (each has its own panel in Exhibit 3) style familiar from integral theory, but its internal semantics are derived from the GoodReason α–Ω grammar, symbolic analysis, systems science and AI-compatible modelling (Edwards, 2008). The purpose is to show how a small formal system can scale from symbolic foundations to cognitive navigation, research dynamics and universal systems methodology.

The architecture is based on four axiomatic claims:

1. systemic inquiry requires a stable symbolic grammar;
2. thinking develops through cognitive dimensions, degrees of freedom;
3. research systems require feedback, resilience and failure realism;
4. universal systems methodology requires an isomorphic structure that can be interpreted by humans, diagrams, formal models and AI agents.

The four quadrants correspond to these four claims.

3.1 | Panel 1: G = Tuple(Mindset, Agency, Feedback)

The first quadrant (panel) defines the smallest grammar of GoodReason:

- G = Tuple(Mindset, Agency, Feedback)

In this grammar, *Mindset* refers to the left-side interpretive structure of the model, *Agency* refers to the right-side action structure, and *Feedback* closes the system through Ω. See Panel 1 for the brain including text ”Turing Machine”, both models are compatible with this model Exhibit 4.
The grammar is expressed through eight symbols.

Exhibit 4. *Small system axiom and the cardinal directions.*

<symbol> ::= α | π | χ | ΔΨ | β | φ | τ | Ω
<ring> ::= 1 | 2 | 3 | 4 | 5 | 6 | 7

The compass structure gives the symbols their basic isomorphic directions, **as semantic anchors**, like the cardinal directions in a coordinate system:

- α purpose, mindset, identity (North)
- π theory, reasoning, justification (northwest)
- χ context, input, model, connection to reality (West)
- ΔΨ change pressure, anomaly, transformation (south west)
- β structure, agency, organization (northeast)
- φ solution, design, interface (East)
- τ implementation, practice, integration (southeast)
- Ω feedback, learning, reflection (South)

The first quadrant also connects GoodReason to the logic of symbolic computation. The Turing-machine metaphor is used to show that systemic inquiry can be interpreted as a controlled transformation of input, internal state, output and feedback. However, GoodReason extends this formal logic into meaning formation, modal logic and interference. The movement from System of Interest to a new definition ”Meaning of Interest” is central: SOI → MOI.

This relation emphasizes the significance of the system for the researcher or experiencer. A system becomes relevant when it becomes meaningful for an observer, researcher, decision-maker or agent. This is why the first quadrant combines symbolic analysis, Turing-machine logic, the GoodReason compass and the SOI–MOI distinction.

3.2 | Panel 2: GoT = Tuple(G, Dimensions, Interactions)

The second quadrant extends the grammar into the Geometry of Thinking:

- GoT = Tuple(G, Dimensions, Interactions)

The dimensions 1D–8D are interpreted as cognitive layers Each of them has been grounded to research. They describe how thinking becomes more articulated when a person moves from initial awareness toward perception, understanding, modelling, dialogue, integration, vision and axiomatic reflection. Gärdenfors Geometry of thinking is clearly visible in dimensions 5D (subsymbolic) and 4D: Theories of psychology are seen in dimension 2D and 3D. Systems thinking approach is essential in dimension 7D, 6D, 1D.

In summary 8D means Science, 7D Vision, 6D System approach, 5D Dialog (interactions), 4D Symbolic approach, 3D Awareness, 2D means Orientation and 1D SOI/MOI.

Usecase. The Andreas gasoline-price case illustrates this movement. A price observation becomes meaningful only when it enters a cognitive and systemic context: personal mobility, budget constraints, market conditions, energy systems, social expectations and future decisions. GoodReason gives this process a coordinate system. The observer can ask what the system is, from which direction the pressure comes, which symbolic role dominates, how deep the issue is, and what kind of response becomes possible.

The second panel therefore shows how the small grammar G becomes a geometry of thinking. The symbolic compass becomes a cognitive map, and the 1D–8D dimensions become a way to examine how systemic understanding gains comprehension levels.

3.3 | Panel 3: Rings, Dialog and Research Resilience

The third panel interprets science and research as a system. It connects the α–Ω grammar to rings, dialog, resilience and success–fail logic. This is where GoodReason moves from individual cognition to research dynamics.

The ring structure gives each symbol depth. The same α–Ω symbol can be interpreted at different levels, from elementary recognition to advanced methodological and philosophical reflection. Rings 3–5 are especially important because they mark the transition from ordinary interpretation to critical resilience:

- Ring 3 — meaningful recognition and tension become visible
- Ring 4 — the system reaches a critical threshold
- Ring 5 — recovery, adaptation or transformation becomes possible

This gives GoodReason a failure-realistic character. A system is not assumed to succeed simply because it has a model, strategy or purpose. It must survive pressure, feedback and implementation. This applies to organizations, research programs, AI-generated claims, public-sector decisions, ecological systems and individual life situations.

Dialog is the operational edge of this panel. A symbol does not remain isolated. It opens a channel to another interpretation, another system, another actor or another level of inquiry. In this sense, dialog is not only communication; it is a systemic action that changes the state of interpretation.

3.4 | Panel 4: Universal Systems Methodology

Panel 4 connects Universal Systems Methodology with JSON and agent technology. This layer is mainly relevant for readers familiar with computational modelling, AI agents or structured data representation. Its general message is simple: Hitchins' Unified Systems Hypothesis can be interpreted through the same α–Ω modelling structure as the other parts of GoodReason (Hitchins, 1993).

This fourth panel generalizes the architecture. Its purpose is to show that the same α–Ω isomorphism can be used to interpret broader systems theories, including systems engineering models, metadisciplinary frameworks and AI-assisted agent architectures.

The central idea is that systems differ in scale, complexity, material substrate, language and domain, but systemic inquiry can still use the same foundational roles: α, π, χ, ΔΨ, β, φ, τ and Ω. This is the basis for the **Unification Axiom**: *unify(S, J, C) → R*

Here, \`S\` is the SuperGoodReasonModel expressed in JSON format, \`J\` is any user-defined condition as JSON or natural language query or interpretive filter, \`C\` is a candidate content object, and \`R\` is the resulting GoodReason interpretation. The result is not merely a keyword match, but it is a structured α–Ω interpretation of why the candidate satisfies, partially satisfies or fails the condition. *Super* here means being above all specific models, supermodel being a metametamodel, a universal modeling language.

In this paper, the detailed SuperJSON model is developed later as a machine-readable and human-readable methodological artefact. In the present section, the essential point is architectural: Universal Systems Methodology requires a symbolic structure that can connect conceptual understanding, visual modelling, formal representation and AI-mediated reasoning.

3.5 | The α–Ω Isomorphism Across the Four Quadrants

Isomorphism arises due to semantic anchoring and related terms include *symbol grounding* (Harnad, 1990) and *perceptual anchoring* (Coradeschi & Saffiotti, 2003). Although the four panels (Exhibit 3) are different, they form a coherent whole. Their coherence comes from the α–Ω isomorphism (the term isomorphism refers to a one-to-one correspondence between two systems that preserves their fundamental structure):

- In the first panel, α–Ω defines the symbolic compass.
- In the second panel, the same structure supports the Geometry of Thinking.
- In the third panel, the same roles support research dynamics, resilience and dialog.
- In the fourth panel, the same structure becomes a universal systems methodology and a basis for AI-compatible modelling.

This is the formal strength of the figure. It compresses the article's main logic into one architecture. The paper then unfolds this architecture through the SuperGoodReasonModel, the 1D–8D epistemology, selected demonstrations and discussion of cognitive, systemic and computational implications.

The GoodReason Integral Theory therefore functions as the heart and circulation of the article. Knowledge enters it, is organized by it, and returns from it to the cases, demonstrations, results and discussion.

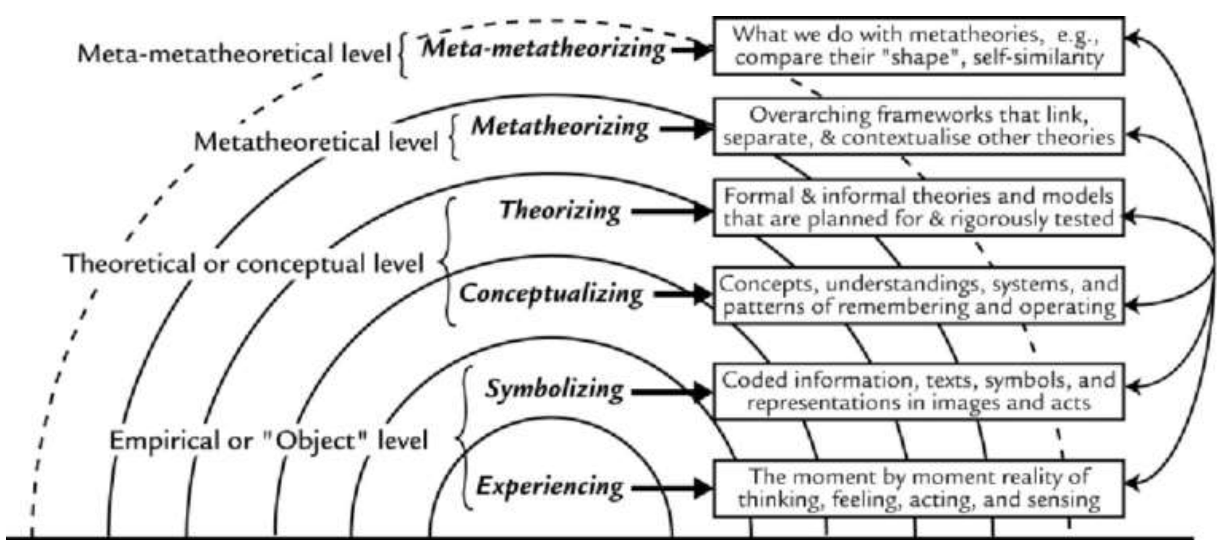
4 | From Architecture to Method: Applying the α–Ω Model

The previous section introduced the GoodReason Integral Theory as a four-panel architecture. This section turns that architecture into a methodological procedure. The purpose is not to add a new layer of terminology, but to show how the same α–Ω structure can be used for inquiry, interpretation and modelling.

The starting point of the method is the transition from a System of Interest to a Meaning of Interest: SOI → MOI. A system becomes methodologically relevant when it is not only observed, but also interpreted as meaningful for an observer, researcher, decision-maker or agent. GoodReason organizes this transition through three coordinated structures: the symbolic compass, the ring structure and the 1D–8D dimensions of thinking.

In this sense, the α–Ω model functions as a coordinate system for systemic inquiry. It helps the researcher ask what the system is, why it matters, which symbolic role dominates, how deep the interpretation is, and what kind of action or feedback becomes possible.

Exhibit 5. *Metaphor for Chapter 4: From experiencing to metametatherories: The holarchy of sense-making (Reprinted from: Edwards, 2008).*



4.1 | SOI → MOI as the Starting Operation

The first methodological operation is the movement from SOI to MOI. A System of Interest is the selected object, situation or system under inquiry. A Meaning of Interest is the significance that this system gains within a concrete interpretive situation.

This distinction is important because systems inquiry does not begin with data alone. It begins when something becomes relevant enough to be selected, interpreted and examined. The same external system can generate different meanings for different observers. A gasoline price, for example, is not only an economic number. It can become a personal constraint, a political signal, an ecological question, a logistical problem or a design challenge.

The SOI → MOI movement therefore gives GoodReason its first methodological step SOI → MOI, which means a logical step: selected system → meaningful system

This step is intentionally simple. It makes the inquiry explicit before deeper modelling begins. The researcher first clarifies what the system is and why it matters.

4.2 | The α–Ω Compass as an Interpretive Grid

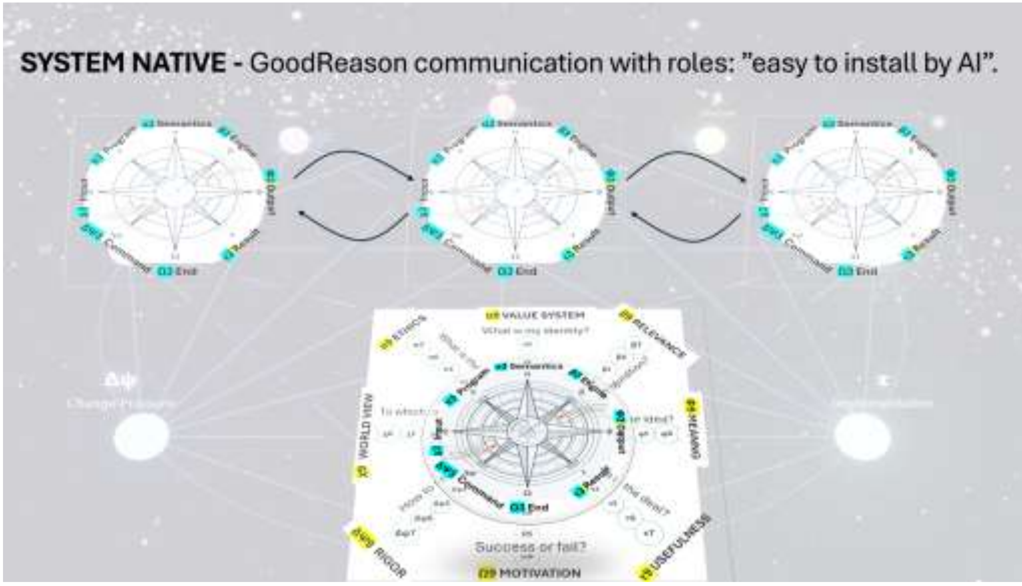
After the SOI → MOI transition, the α–Ω compass provides the basic interpretive grid. The eight symbols do not represent separate disciplines. They represent foundational roles through which a system can be interpreted.

The compass can be used as a question structure:

- α asks what gives the system purpose, identity or direction.
- π asks which theory, principle or justification frames the interpretation.
- χ asks what context, input or connection to reality must be considered.
- ΔΨ asks where pressure, anomaly or transformation appears.
- β asks which structure, agency or organization carries responsibility.
- φ asks what solution, design or interface becomes possible.
- τ asks how the system is implemented, integrated or acted upon.
- Ω asks how feedback, learning and reflection close the inquiry.

These questions transform the α–Ω grammar into a practical inquiry tool. The model does not force one correct order. A researcher can start from the strongest signal: purpose, context, pressure, structure, solution, action or feedback. The compass then helps maintain systemic balance by keeping all eight roles visible.

Exhibit 6. *Polar coordinate system for thinking, SOI is located at the origin.*



4.3 | Rings as Depth Levels for Awareness

The ring structure gives depth to the α–Ω symbols. The same symbol can be interpreted at different levels, from elementary recognition to advanced methodological and philosophical reflection.

For example, **α** can refer to a simple purpose in a practical situation, but it can also refer to a higher-level identity question or to the purpose of a whole research program. Similarly, Ω can refer to immediate feedback, long-term learning or reflective closure at a metascientific level.

This gives the method an important flexibility. GoodReason can be used lightly in practical inquiry, but it can also be deepened when the object requires more advanced interpretation. The ring structure prevents the model from remaining flat. It allows the researcher to ask how mature, critical or resilient the interpretation is.

In this paper, rings 3–5 are especially relevant because they mark the transition from ordinary interpretation to critical resilience. Ring 3 makes **meaningful recognition and tension visible**. Ring 4 marks a **critical threshold**. Ring 5 opens the **possibility of recove**ry, adaptation or transformation.

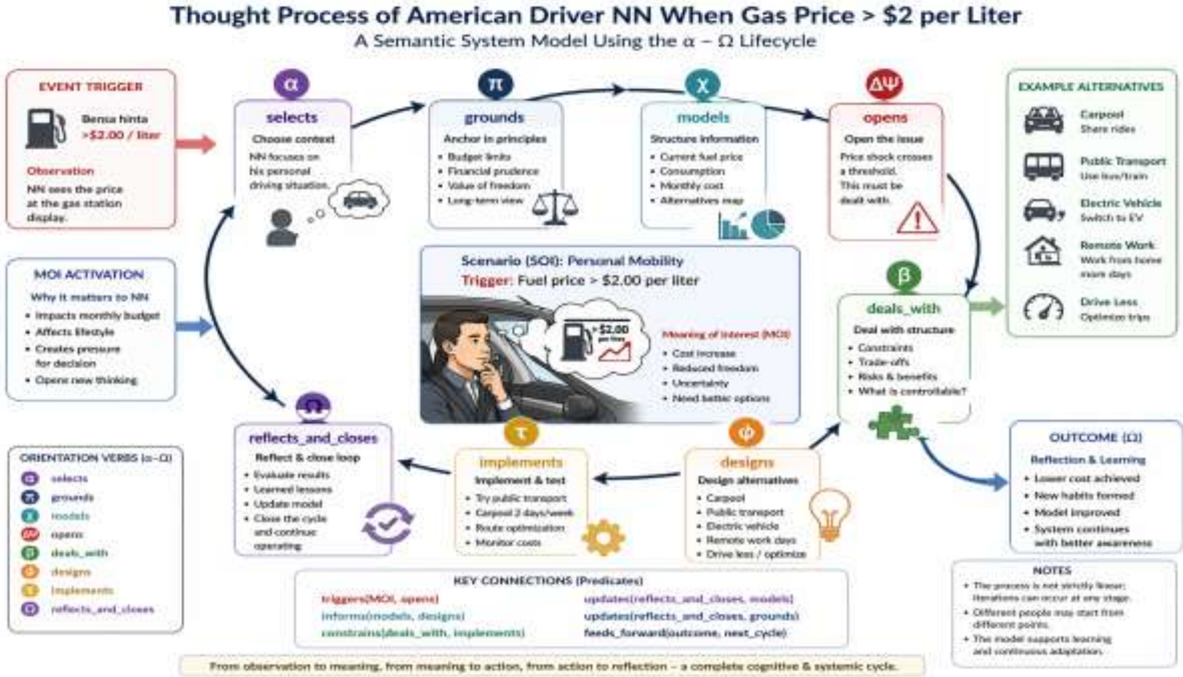
4.4 | Dimensions as Cognitive Degrees of Freedom

The 1D–8D dimensions extend the method from symbolic orientation to cognitive navigation. They describe how systemic understanding gains degrees of freedom when the same issue is examined through several dimensions.

The dimensions can be used as a compact methodological sequence:

- 1D identifies the SOI/MOI relation.
- 2D orients the inquiry.
- 3D makes awareness explicit.
- 4D introduces symbolic interpretation.
- 5D opens dialogue and interaction
- 6D examines the issue as a system.
- 7D connects the issue to vision and broader worldview.
- 8D reflects the issue through science, axioms and metascientific interpretation.

Exhibit 7. *The Andreas Case as a Thinking Process with Its Verbs.*



This dimensional structure does not need to be applied mechanically. Its value is that it gives the researcher a map for expanding inquiry. A simple observation can remain at 1D, but it can also be deepened toward dialogue, systems interpretation, vision or science.

The dimensions therefore operate as cognitive degrees of freedom. They help the researcher avoid reducing a system to one narrow viewpoint. They also make it possible to compare different levels of interpretation without losing the original object of inquiry.

4.5 | Preparing the Andreas Demonstration

The Andreas gasoline-price case is used in the next section to demonstrate how SOI → MOI, α–Ω interpretation, indexed states and dimensions operate together in one practical situation.

4.6 | Methodological Summary

The α–Ω model can therefore be used as a compact method for systemic inquiry. Its basic procedure is:

1. select the System of Interest;
2. clarify the Meaning of Interest;
3. interpret the system through the α–Ω compass;
4. deepen the interpretation through rings;
5. expand the inquiry through 1D–8D dimensions;
6. identify possible actions, feedback and learning.

This procedure keeps the method open. Different cases can emphasize different symbols, rings or dimensions. A practical design problem may begin from φ and τ. A scientific controversy may begin from π and Ω. A social transition may begin from ΔΨ, β and χ. A learning process may begin from 1D, 3D and 5D.

The methodological point is that all these cases can still be interpreted within the same architecture. GoodReason provides a stable symbolic grammar while allowing flexible movement across meanings, levels, dimensions and applications.

5 | Demonstrating the Method: The Andreas Case

The previous section described the α–Ω model as a methodological procedure. This section demonstrates the method through a simple everyday case: Andreas observes that the gasoline price has risen above two euros per litre. The case is intentionally ordinary. Its purpose is to show how a small observation can become a systemic inquiry when it is interpreted through the GoodReason model.

At first, the gasoline price appears as a single external fact. It is visible, measurable and easy to notice. However, it becomes methodologically relevant only when it enters Andreas' situation as a Meaning of Interest. The price affects mobility, household economy, future planning and possible choices. The observation therefore moves from a System of Interest to a Meaning of Interest. A step SOI → MOI means here a step gasoline price → meaningful situation for Andreas.

This transition is the beginning of systemic interpretation. The same price can have different meanings for different people, organizations or societies. For Andreas, it may become a personal constraint. For an energy company, it may be a market signal. For a government, it may be a policy question. For a systems researcher, it becomes an example of how economic, ecological, technological and social systems intersect.

5.1 | From Observation to Meaning

The first step is not complex modelling. It is recognition. Andreas notices the gasoline price and connects it to his own situation. This is where the observation becomes meaningful. The price is no longer only a number on a pump. It becomes part of a lived system involving income, travel needs, work, family routines, infrastructure and future expectations.

In GoodReason terms, the case begins at the 1D level. The System of Interest is the gasoline price. The Meaning of Interest is the effect of that price on Andreas' practical and systemic situation. This gives the inquiry a clear starting point:

- What is observed?
- Why does it matter?
- For whom does it matter?
- What kind of system begins to appear?

These questions keep the inquiry grounded. The purpose is not to explain the whole energy economy immediately. The purpose is to begin from a concrete observation and make its meaning explicit.

5.2 | α–Ω Interpretation of the Case

The α–Ω compass then opens the case into eight interpretive directions (see Chapter 4.2). Each symbol asks a different question about the same situation, here are the possible answers:

- α: The price increase may challenge Andreas' ability to maintain mobility, economic balance or personal freedom of movement.
- π: The case can be interpreted through household economics, energy markets, price elasticity, sustainability, transport policy or systems theory.
- χ: The price is shaped by fuel markets, taxation, geopolitical conditions, supply chains, infrastructure, technology and local alternatives.
- ΔΨ: The price increase creates pressure. It disturbs routine expectations and forces Andreas to reconsider habits, costs and future options.
- β: Agency is distributed. Andreas can change behaviour, but companies, governments, municipalities and transport systems also shape the available choices.
- φ: Possible responses include reduced driving, route planning, public transport, car sharing, remote work, electric mobility, budgeting or broader energy-system redesign.
- τ: Andreas may adjust daily travel, compare alternatives, change purchasing behaviour or test a new mobility routine.

- Ω: The response must be evaluated. Does Andreas save money? Does the new routine work? Does it reduce stress? Does it create new constraints? Feedback determines whether the chosen response remains viable.

This interpretation shows that the α–Ω compass does not merely classify the case. It organizes the inquiry so that purpose, theory, context, pressure, agency, solution, implementation and feedback remain visible at the same time.

5.3 | Ring Depth as Indexed State in the Case

The same case can also be examined through rings, but the ring structure should not be read as another dimensional sequence. In GoodReason, the rings define indexed states in a polar coordinate system. A notation such as ΔΨ3, χ4 or α2 indicates that a specific symbolic role is activated at a specific depth level. The symbol gives the direction of interpretation, while the index gives its depth, pressure or maturity.

In the Andreas case, the situation may first appear as a simple observation: gasoline is expensive. The more precise interpretation begins when several indexed states become active at the same time. Andreas may enter a critical state of change pressure, ΔΨ3, because strong contextual constraints, χ4, limit his mobility. At the same time, his purpose or personal freedom of movement may be reduced to α2, because he no longer has enough money for ordinary car use.

If the pressure increases, the situation may move toward ΔΨ4. Andreas may have to cancel trips, change routines or accept a more chaotic decision situation. The case is then no longer only about price. It has become a state of constrained agency. When Andreas discovers an adaptive way to respond, β becomes active as agency and organization. Through τ, this agency becomes practical implementation: new routines, reduced driving, alternative transport, budgeting or another concrete adjustment.

If the response works, the interpretation may move toward ΔΨ5. The pressure is no longer only a threat; it becomes a survivable and learnable condition. In some cases, the solution may even open a more advanced possibility, such as α6 or ΔΨ6, where Andreas benefits from the insight and begins to configure resilient future as business or service world wide.

This example shows why the rings are different from the 1D–8D dimensions. The dimensions describe the broad expansion of inquiry. The rings describe indexed states inside the α–Ω coordinate system. Andreas may hold several states simultaneously: purpose, context, pressure, agency, implementation and feedback can operate in parallel, sequentially or recursively. The ring notation makes this movement explicit without forcing the case into a linear pipeline.

5.3 | Ring Depth in the Case

The same case can also be examined through rings. At a shallow level, Andreas only notices that gasoline is expensive. At a deeper level, the price becomes part of a wider systemic situation.

- At Ring 1, the issue appears as a simple observation: the price is high.
- At Ring 2, Andreas orients toward the problem: the price affects personal mobility.
- At Ring 3, meaningful tension becomes visible: the present way of travelling may become unsustainable.
- At Ring 4, the issue reaches a threshold: Andreas must make a decision or accept increasing pressure.
- At Ring 5, adaptation becomes possible: new routines, alternatives or systemic responses are tested.
- At Ring 6, the case can be reflected critically as part of broader economic, ecological and social structures.
- At Ring 7, the case becomes part of a larger worldview: mobility, energy, sustainability and societal resilience are seen as connected.

The ring structure therefore adds depth without changing the original case. The object remains the same, but the interpretation matures. This is important methodologically because systemic inquiry often fails when it remains at the level of first observation or immediate reaction.

5.4 | Dimensional Expansion from 1D to 8D

The 1D–8D dimensions show how the same case gains cognitive degrees of freedom. Each dimension opens a different quality of thought.

- 1D: The gasoline price becomes a SOI/MOI relation.
- 2D: Andreas orients himself toward the issue and asks how it affects his direction of action.
- 3D: Awareness grows; the price is recognized as part of a larger pattern rather than an isolated inconvenience.
- 4D: The case receives symbolic structure through concepts such as cost, mobility, pressure, agency and feedback.
- 5D: Dialogue begins. Andreas may discuss the issue with family, colleagues, decision-makers, AI tools or public media.
- 6D: The issue becomes a systems question involving transport, energy, economy, infrastructure and society.
- 7D: The case connects to vision: what kind of mobility, economy and sustainability should society support?
- 8D: The case becomes available for scientific and metascientific reflection: how should systemic inquiry represent such interconnected issues?

This expansion demonstrates the role of the dimensions. They do not replace the α–Ω compass. They give the inquiry additional degrees of freedom. The compass shows the interpretive roles; the dimensions show how thinking expands from immediate meaning toward systemic and scientific reflection.

5.5 | What the Demonstration Shows

The Andreas case shows that GoodReason can operate at several levels at once. It begins with an ordinary observation, but it does not remain ordinary. Through SOI → MOI, the observation becomes meaningful. Through the α–Ω compass, it becomes interpretable. Through rings, it gains depth. Through 1D–8D dimensions, it gains cognitive freedom. Through Ω, the inquiry returns to feedback and learning.

This is the methodological contribution of the demonstration. GoodReason does not require the user to begin with an abstract theory. It allows the user to begin with a concrete situation and then expand it systematically. The method supports movement from fact to meaning, from meaning to interpretation, from interpretation to action, and from action to feedback.

The case also shows why a stable symbolic grammar is useful. Without such a grammar, the gasoline-price situation may be interpreted only as a personal problem, a political opinion, a market event or an ecological concern. GoodReason keeps these interpretations connected. It offers a way to hold multiple meanings together without reducing the issue to one perspective.

5.6 | Demonstration Summary

The demonstration can be summarized as a compact methodological sequence:

> *observation → SOI → MOI → α–Ω interpretation → ring depth → 1D–8D expansion → action → feedback*

It is a navigational structure, where different cases may begin from different points and emphasize different symbols, rings or dimensions. The Andreas case shows how an everyday concern can be transformed into systemic inquiry. The case moves from observation to meaning, from meaning to α–Ω interpretation, and from interpretation to action and feedback. The same procedure can later be applied to other systems: research programs, organizations, AI-assisted modelling, public-sector decisions, ecological challenges, technology adoption or systems-engineering problems.

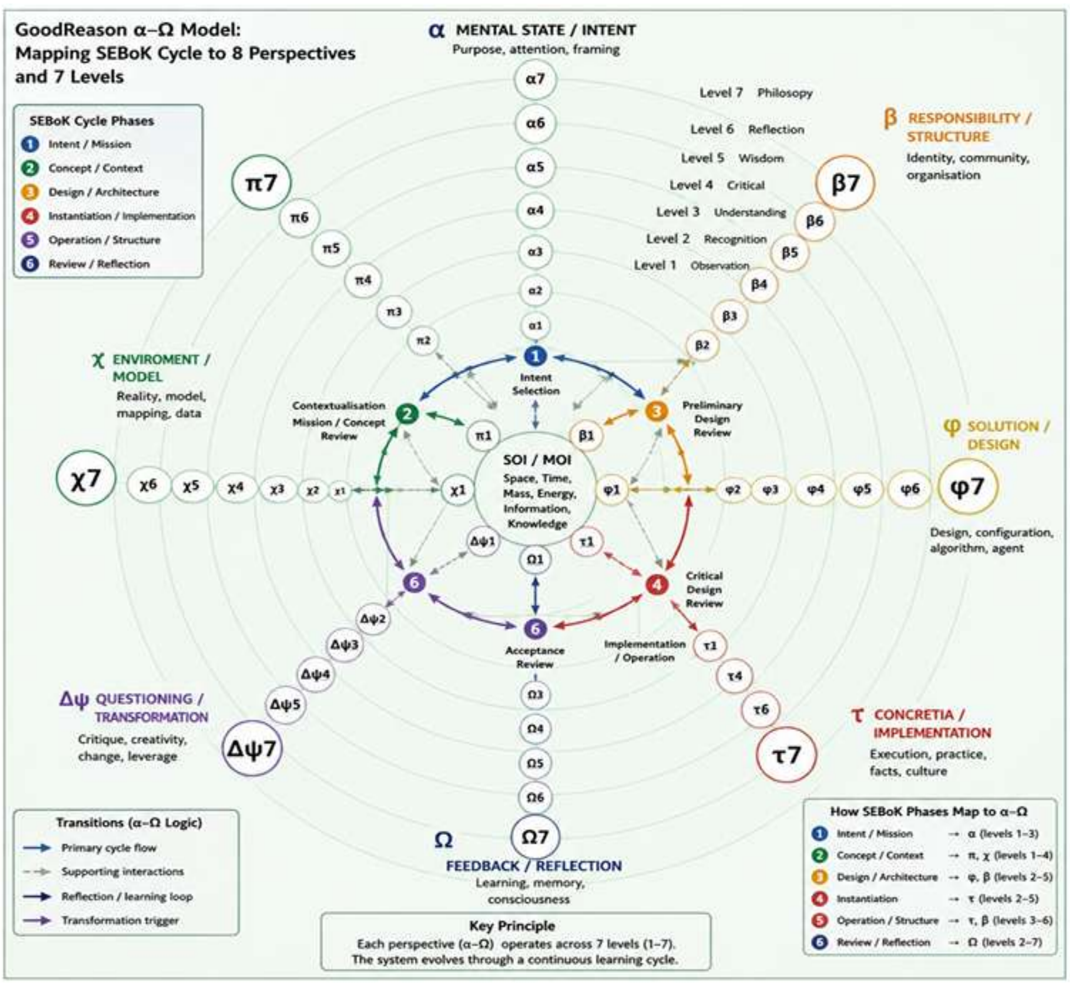
6 | Results and Evaluation

The demonstrations show that GoodReason can operate as a compact geometry of thinking for systemic inquiry. The model connects observation, meaning, terminology, systems theory, systems philosophy and AI mediation through the same α–Ω grammar. Its result is not a single application, but a repeatable interpretive architecture: a system is selected, interpreted as meaningful, opened through symbolic roles, expanded through dimensions, returned to feedback.

6.1 | SEBoK Cycle as a Case for the Geometry of Thinking

The SEBoK cycle is treated here as an illustrative application rather than as final validation. It shows how an existing systems-engineering cycle can be re-read through the GoodReason α–Ω coordinate system. The SEBoK model remains the original systems-engineering reference; GoodReason adds a semantic and visual interpretation layer that makes purpose, context, design, implementation, review and feedback visible within the same geometry.

Exhibit 8. *GoodReason **α–Ω interpretation of the SEBoK cycle.***
Visual representations are essential in systems thinking and systems science, because they make systemic relations, iterative phases, review points and feedback structures easier to recognize and communicate. Here, the SEBoK cycle is interpreted through geometry of thinking.



6.2 | Universal Systems Methodology and the SuperJSON Model

The demonstrations support the development of Universal Systems Methodology. The same α–Ω roles can be applied to practical cases, systems thinking terminology, systems hypotheses and metadisciplinary inquiry. This makes the model suitable for structured representation.

The SuperJSON model is introduced as a later formalization of this architecture: a machine-readable and human-readable schema for systems, data, agents and interactions. Its purpose is to preserve systemic meaning while enabling AI-compatible modelling, retrieval and comparison. In this sense, SuperJSON is a way to express systemic roles, relations and interpretations in a form that can support both human reasoning and computational processing (Exhibit 9).

6.3 | Toward a Semantic Agent Infrastructure

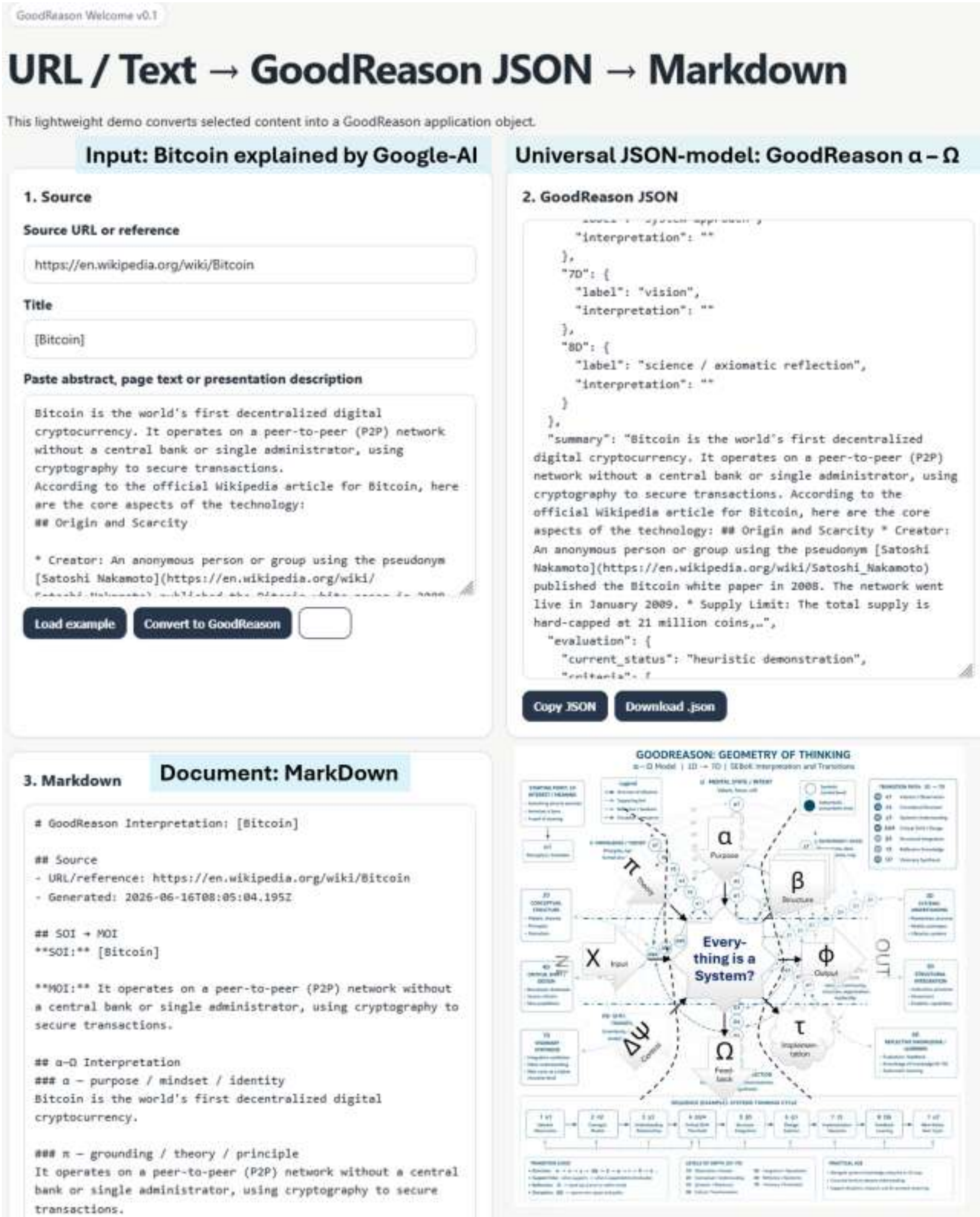
The Cyber University demonstration shows how GoodReason can support a semantic agent infrastructure. Systems philosophy is interpreted as a network of metadisciplinary faculties, while AI functions as a mediator that routes facts, assumptions, values, uncertainties and action-needs to the appropriate domain. The shared α–Ω interface makes responses comparable and recursively usable. Ontology, metaphysics, cosmology, epistemology, axiology and praxeology can each respond through the same grammar while preserving their own question profiles. This result suggests that GoodReason can serve as GrammarWare for human–AI inquiry: agents do not merely retrieve information, but help coordinate meaning across systemic roles.

Together, the results show that GoodReason provides a stable symbolic grammar and a flexible cognitive architecture, applied to professional terminology, systems-engineering cycles, universal systems hypotheses, environmental issues and metadisciplinary agent networks. The demonstrations support the central claim of the paper: axiomatic systems inquiry becomes more explicit, navigable and computationally usable, through a shared geometry of thinking.

6.4 | Future artefact / companion demonstration

Companion artefact. GoodReason Welcome v0.1 (Exhibit 9) demonstrates how selected URL/text content can be transformed into a GoodReason JSON object and then into Markdown. ***It acts as a first practical bridge*** from the α–Ω theory toward AI-agent and GitHub-environments.

Exhibit 9. *Welcome to GoodReason (Laitila, 2026). Demonstration of GoodReason reads clipboard text as input into JSON α - Ω – models to be used for Geometry of Thinking and AI agents.*



7 | Discussion: Positioning GoodReason Among Neighbouring Frameworks

This comparison clarifies the position of GoodReason. It does not replace neighbouring frameworks, but it adds a compact symbolic grammar that combines direction, depth, visual navigation and AI-oriented formalization in the same coordinate structure.

Exhibit 10. *GoodReason vs Neighbouring Frameworks.*

Framework	**Main unit**	**Depth structure**	**AI compatibility**	**What GoodReason adds**
DSRP	thinking patterns	implicit	not native	indexed α–Ω coordinate grammar
AQAL	quadrants/levels	explicit but integral-theoretical	not native	symbolic and computable semantics
Rousseau & Billingham	systems-philosophical domains	metadisciplinary	indirect	α–Ω response interface
Hieronymi	visual systemic forms	visual/systemic	indirect	indexed symbolic grammar
GoodReason	symbolic coordinates	8 directions × 7 rings	native direction	grammar for human–AI inquiry

8 | Conclusion

This paper has presented GoodReason as a geometry of thinking for axiomatic systems inquiry. Its central claim is that systems thinking becomes more explicit, navigable and computationally usable when it is organized through a stable symbolic grammar, cognitive dimensions, indexed states, feedback logic and visual representation.

GoodReason begins from a System of Interest and develops it into a Meaning of Interest through α–Ω roles, rings, dimensions and feedback. The model gives the researcher a compact set of interpretive roles: purpose, grounding, context, tension, agency, solution, praxis and reflection. These roles support coherent movement across domains, levels and perspectives without reducing systemic inquiry to one fixed viewpoint.

The contribution of the paper is a practical metatheoretical proposal: systems science needs not only concepts and methods, but also a geometry through which concepts, methods, agents and actions can be coordinated. GoodReason is offered as one such geometry for the next stage of systems thinking, systems science and human–AI inquiry. The companion demonstrations and future SuperJSON artefacts will extend this theoretical foundation toward visual, computational and agent-based applications.

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