

Coherence & Congruence

Why Successful Systems Eventually Fail

An introduction to the Principle of Systematic Exclusion

Part I: The Paradox of Success

1. Why Successful Systems Eventually Fail

Why do successful systems so often become the architects of their own decline?

History offers countless examples. Great civilizations flourish for centuries before collapsing. Successful companies lose the innovative capacity that once distinguished them. Scientific theories that revolutionized entire disciplines eventually become obstacles to further discovery. Ecosystems that remained stable for millennia suddenly become fragile. Even the most advanced artificial intelligence systems continue to improve while simultaneously becoming more difficult to align with human intentions.

These developments are usually explained in terms of complexity, poor leadership, changing circumstances, or simple bad luck. Each of these explanations contributes something to our understanding, yet none appears sufficient. They describe the circumstances under which failure becomes visible, but they do not explain why failure so often begins when a system appears to be functioning exceptionally well.

This observation suggests that we may be overlooking a more fundamental organizational principle. Perhaps successful systems do not primarily fail because they become less organized. Perhaps they fail because increasing organization gradually alters their relationship with the reality from which that organization originally emerged.

That possibility challenges one of our deepest assumptions. We tend to equate successful organization with successful adaptation. If a system functions efficiently, if its internal processes become increasingly refined, and if its components cooperate harmoniously, we naturally conclude that the system is becoming more successful.

In everyday life this assumption often works well. In nature, however, the picture is more subtle. Living systems survive because they maintain a workable relationship with their surroundings. Internal organization is certainly essential, but organization alone is never enough. Every organism, institution, or technological system exists within a broader context that continuously changes. Success therefore depends not only on the quality of internal organization, but also on the continuing correspondence between that organization and the environment within which it must function.

These two conditions usually develop together. As a result, we rarely distinguish between them. During periods of stability, systems that become better organized generally also become better adapted. It is only when circumstances begin to change that the distinction gradually reveals itself. A system may continue improving according to its own internal standards while simultaneously losing contact with the conditions that originally made those standards successful.

Many organizational failures appear to follow precisely this pattern. Long before collapse becomes visible, a subtle divergence has already begun. Internally, the system continues to improve. Externally, the world to which that improvement once corresponded is slowly changing.

Recognizing this divergence requires distinguishing between two fundamentally different criteria of success. One concerns how well the components of a system function together as an integrated whole. The other concerns how well that organized whole continues to correspond with the changing conditions in which it exists.

These two properties are closely related, but they are not identical. Throughout this essay, I shall refer to the first as *coherence* and to the second as *congruence*.

2. Evolution Never Optimizes Forever

Evolution provides perhaps the clearest illustration.

Natural selection is often described as a process of optimization. Strictly speaking, however, this is misleading. Evolution does not produce perfect organisms, nor does it strive toward any predetermined ideal. It simply preserves those organizational structures that remain sufficiently successful under the conditions in which they exist.

Every successful adaptation therefore reflects a temporary correspondence between an organism and its environment.

As long as environmental conditions remain relatively stable, successful adaptations reinforce one another. Physiological processes become increasingly coordinated. Development becomes more reliable. Behaviour becomes more specialized. Regulatory mechanisms become more tightly integrated. Each generation inherits an organization that has repeatedly demonstrated its viability.

From the perspective of the organism, everything appears to improve. Yet the environment never stands still. Climate changes. Predators evolve. New diseases emerge. Competitors appear. Food sources disappear while new opportunities arise.

The ecological conditions under which previous adaptations evolved gradually shift.

Remarkably, the organism itself may continue functioning exactly as before. Its organs remain healthy. Its developmental programme continues to operate. Its behaviour remains internally consistent. Nothing inside the organism necessarily indicates that anything has gone wrong. What has changed is not the organism itself. What has changed is the relationship between the organism and its environment.

This insight echoes Jakob von Uexküll's concept of the *Umwelt*. Organisms do not respond to the environment as such, but only to those aspects that are meaningful within their own organization. Adaptation therefore depends not merely on internal functioning, but on maintaining an effective relationship between that organization and its *Umwelt*.

Eventually, natural selection eliminates the organism, not because its internal organization has ceased to function, but because that organization no longer corresponds sufficiently to the ecological conditions in which survival must now occur.

This observation reveals something important about adaptation: evolution never rewards organization in isolation. It rewards organization that remains appropriate to changing circumstances. Internal order is valuable only insofar as it continues to sustain an effective relationship with reality.

And the same principle extends far beyond biology.

Companies optimize production for markets that later disappear. Educational systems continue preparing students for societies that no longer exist. Governments preserve institutions designed for historical circumstances that have fundamentally changed. Scientific paradigms continue refining established theories while increasingly struggling to explain new observations. Artificial intelligence systems become progressively more capable within carefully defined domains while remaining surprisingly vulnerable when confronted with unfamiliar contexts. In each case, the internal organization continues to improve. The external fit gradually weakens.

The remarkable consistency with which this pattern appears across such different domains suggests that we are observing something more than coincidence. It points toward a general organizational principle governing the persistence of all adaptive systems.

To understand that principle, however, we must first distinguish between two concepts that have too often been treated as though they were identical.

These two are coherence and congruence.

Part II: Why Successful Systems Eventually Fail

3. Coherence versus Congruence

The distinction introduced in the previous section may appear subtle, yet it is *fundamental*. Throughout the history of systems theory, biology, and philosophy, internal organization and successful adaptation have often been treated as if they were inseparable. In practice they usually coincide. A well-organized organism generally survives better than a poorly organized one. A coherent scientific theory usually explains observations more successfully than an inconsistent one. A well-managed organization generally outperforms a disorganized one.

Yet these relationships are not identities. They merely coincide under sufficiently stable conditions.

Coherence refers to the internal organization of a system. It describes the degree to which the components of that system function together as an integrated whole. The organs of an animal, the cells of a body, the concepts of a scientific theory, the procedures of an institution, or the modules of an artificial intelligence all depend upon coherence. Without it there can be no persistence, because a system whose components continually interfere with one another cannot remain organized for long.

Congruence refers to something different. It describes the relationship between the system and the conditions within which that organization must continue to function. An organism remains congruent only while its organization corresponds sufficiently to ecological reality. A company remains congruent only while its products continue to address genuine social needs. A scientific theory remains congruent only while observation continues to support its explanatory framework. An artificial intelligence remains congruent only while its internal representations remain appropriate for the situations in which they are applied.

Coherence is therefore an *internal* property.

Congruence is a *relational* property.

This distinction explains why systems may continue improving according to their own internal standards while simultaneously becoming less capable of responding to reality. From within the system, everything appears increasingly successful. From outside the system, however, a gradual divergence has already begun.

The consequences of this distinction become particularly visible whenever environments begin to change. Internal organization often continues developing along established trajectories because previous success reinforces existing structures. Meanwhile, the surrounding conditions evolve in different directions. The result is an increasing separation between internal coherence and external congruence.

At first this divergence remains almost invisible. The system continues functioning well according to its own criteria. Performance indicators remain favorable. Procedures become increasingly refined. Internal consistency improves. Only much later do symptoms begin to appear that reveal a growing mismatch between the organization and the world within which it must continue operating.

Failure therefore rarely arrives as a sudden event. More often, it represents the final stage of a long process during which coherence and congruence have gradually drifted apart.

4. The Principle of Systematic Exclusion

If coherence and congruence can indeed diverge, a more fundamental question immediately arises.

What causes this divergence? Why should increasing internal organization gradually weaken a system's relationship with reality?

The answer lies in a characteristic shared by every organized system, whether biological, cognitive, technological, or social. Every organization is necessarily selective. It cannot incorporate every possible relation, process, or source of information without losing the very organization that defines it.

Every organism responds to only a minute fraction of its environment. Every scientific model focuses on certain variables while ignoring others. Every language distinguishes particular

meanings while leaving infinitely many possibilities unexpressed. Every institution develops procedures that solve some problems while rendering others progressively less visible. Organization is therefore only possible through systematic exclusion.

Every distinction simultaneously creates a boundary. Every boundary separates what belongs within the organization from what remains outside it. Every successful adaptation preserves certain relationships while allowing countless alternatives to disappear.

This observation forms the basis of the Principle of Systematic Exclusion.

The principle states that stable organization emerges through selective exclusion. A system does not become coherent because it incorporates everything. It becomes coherent because it continuously limits itself to those relationships that remain mutually compatible under particular conditions.

Exclusion is therefore not merely the consequence of organization. It is the precondition for organization.

Without exclusion there can be no distinction.

Without distinction there can be no boundary.

Without boundary there can be no recognizable form.

Without recognizable form there can be no organized world.

This principle applies at every scale. Biological evolution excludes unsuccessful adaptations. Neural development stabilizes some connections while eliminating others. Scientific inquiry progresses by distinguishing explanatory relationships from irrelevant ones. Human perception itself depends upon selective attention. Every meaningful experience emerges because infinitely more possibilities remain unnoticed than become consciously represented.

Selection is therefore never accidental. It is *constitutive*:

The remarkable effectiveness of organized systems derives precisely from their capacity to exclude almost everything.

5. Blindness - created by success

In this proposition lies an unexpected paradox:

The more successful a system becomes, the more effectively it reinforces the very exclusions that originally generated its success.

Successful solutions become standard procedures. Standard procedures become institutional habits. Institutional habits become unquestioned assumptions. Over time, the exclusions upon which coherence depends gradually disappear from awareness. The system no longer recognizes them as exclusions. They become experienced simply as reality itself.

This process explains why mature organizations often become increasingly resistant to change.

Contrary evidence is interpreted as an exception rather than as information. Unexpected developments are regarded as disturbances instead of opportunities for learning. Feedback from the environment gradually loses its corrective influence because existing organizational structures increasingly determine what counts as relevant information.

The system continues becoming more coherent. Yet precisely because coherence increases, sensitivity to changing conditions often decreases. Its greatest strength slowly becomes its greatest vulnerability.

This phenomenon can be observed throughout human society. Scientific disciplines sometimes become so committed to established paradigms that anomalous observations are dismissed for years before receiving serious attention. Large corporations optimize existing business models while overlooking technological developments that eventually transform entire markets. Educational systems continue rewarding forms of learning that no longer correspond to the skills required by contemporary society. Political institutions preserve procedures designed for historical circumstances that have fundamentally changed.

In every case, the organization itself remains impressive. The difficulty lies elsewhere. The relationship between the organization and the broader reality has gradually weakened. The system continues preserving coherence long after congruence has begun to decline.

This, perhaps more than anything else, explains why success can become dangerous. Success encourages organizations to preserve precisely those patterns that once generated adaptation. Under stable conditions this tendency produces remarkable resilience. Under changing conditions it may gradually undermine the very relationship with reality upon which future adaptation depends.

The challenge facing every adaptive system is therefore not simply to maintain coherence. It is to maintain coherence without losing congruence.

Part III: AI, Science and Society

6. The Human Exception

So, every living system depends upon the continuous interplay between coherence and congruence. As long as these two qualities develop together, adaptation remains possible. Natural selection gradually eliminates organizational patterns that no longer correspond to changing environmental conditions. Coherence that has lost its congruence simply disappears.

Human beings, however, represent a remarkable exception.

Unlike every other known organism, we possess the capacity to preserve organizational structures independently of the conditions under which those structures originally evolved. Language, writing, mathematics, law, religion, science, and technology allow us to accumulate knowledge across generations. Ideas survive their creators. Institutions outlive the circumstances

that gave rise to them. Cultural traditions continue long after the ecological, economic, or social conditions that once justified them have changed.

This capacity has transformed the history of life. Without it there would be no civilization, no universities, no literature, no scientific revolutions, and no technological progress. Human culture exists because symbolic structures can persist beyond the immediate present.

The same capacity, however, introduces an entirely new organizational vulnerability. Natural selection can eliminate organisms whose adaptations no longer correspond to reality. It cannot directly eliminate ideas. Ideas may continue because they remain internally coherent within symbolic systems, even after they have lost the congruence that originally made them successful.

This distinction is easily overlooked because coherent ideas often continue producing coherent consequences. Legal systems generate consistent legislation. Scientific paradigms produce further research. Economic theories support coherent policies. Ideologies reinforce their own assumptions. Educational systems reproduce accepted knowledge. From within these systems everything appears logical.

The question is no longer whether the organization remains coherent. The question is *whether it still corresponds to reality*.

7. When Coherence Becomes Autonomous

The capacity for symbolic persistence fundamentally changes the dynamics of adaptation.

In biological evolution, unsuccessful organizational patterns gradually disappear because they fail to survive. Human symbolic systems operate differently. Concepts can be transmitted through language, preserved in books, embedded in institutions, encoded in algorithms, and reproduced through education. Once established, they acquire a degree of independence from the circumstances that originally produced them.

This is one of humanity's greatest strengths. It is also one of its greatest risks.

A scientific model that once explained observations successfully may continue dominating a discipline after contradictory evidence begins to accumulate. Economic assumptions that emerged under particular historical conditions may continue shaping policy after those conditions have disappeared. Political institutions designed for one society may persist long after society itself has fundamentally changed. Artificial intelligence systems trained on historical data may continue reproducing patterns that no longer correspond to present reality. In every case the symbolic organization remains coherent. What gradually weakens is its congruence.

Because symbolic systems preserve themselves far more effectively than biological systems, this divergence may continue for decades or even centuries before its consequences become unmistakable. The challenge facing human societies therefore differs fundamentally from the challenge facing biological evolution.

Nature continually tests organizational coherence against reality. Human culture can postpone that confrontation by preserving symbolic structures long after their adaptive value has diminished.

And at that point another distinction becomes important.

8. From Adaptation to Transgression

Losing congruence does not immediately produce failure. Systems often continue functioning remarkably well despite growing divergence from reality. Their coherence enables them to preserve themselves. Indeed, the greater their internal coherence, the more successfully they may resist external correction.

A more serious problem arises when organizational structures continue operating beyond the domain within which their coherence originally emerged. This is what may be called *transgression*.

Transgression does not refer to moral wrongdoing in the conventional sense. It refers to an organizational process. A pattern that was once adaptive within one context is projected into another context where the conditions for its validity no longer exist. The organization itself remains coherent, but its coherence is mistaken for universal applicability.

Scientific models become metaphysical truths.
Economic principles become social dogmas.
Administrative procedures replace human judgment.
Statistical regularities become substitutes for understanding.

Optimization becomes an end in itself. In each case the mistake is the same.

Coherence is confused with congruence.

The internal consistency of the system is taken as evidence that the system still corresponds to reality.

Transgression begins when coherence is mistaken for congruence.

9. A Contemporary Example: Artificial Intelligence

Artificial intelligence illustrates this distinction with remarkable clarity. Large language models (LLM's) generate highly coherent responses. They identify statistical relationships across enormous bodies of text and produce language that is often internally consistent, persuasive, and contextually appropriate. Their coherence continues improving as models become larger and more sophisticated. Yet coherence alone does not guarantee congruence.

A model may generate fluent explanations that are factually incorrect. It may confidently construct references that do not exist. It may apply valid patterns outside the domains within which those patterns remain appropriate. The resulting errors are commonly described as hallucinations.

From the perspective developed here, these hallucinations demonstrate that coherence can continue functioning *after congruence has been lost*.

The same organizational principle appears throughout human cognition. Individuals, institutions, and cultures may all produce increasingly coherent interpretations while gradually drifting away from the realities those interpretations were originally intended to describe.

Artificial intelligence has not invented this organizational pattern. *It simply exposes, with unprecedented clarity, a pattern that has always characterized human symbolic thought.*

10. Rediscovering Congruence

If this analysis is correct, the central challenge facing every adaptive system is not simply to increase coherence. *That objective has dominated scientific, technological, and organizational thinking for centuries.*

Efficiency, optimization, specialization, and consistency have become almost synonymous with progress. Yet coherence alone cannot guarantee continued adaptation. Every increase in organization simultaneously strengthens the exclusions upon which that organization depends. Unless those exclusions are continually re-examined, successful systems gradually become enclosed within their own logic. They preserve coherence while losing contact with the changing reality that originally justified it.

Reflection becomes essential because it reopens this relationship.

Reflection asks not only whether a conclusion is internally consistent, but whether the assumptions upon which that conclusion depends remain congruent with present circumstances.

It asks what has been excluded, which boundaries continue to illuminate reality, and which distinctions have become obstacles to further understanding.

The purpose of reflection is therefore not to weaken coherence. Its purpose is to restore congruence.

Conclusion

The distinction between coherence and congruence offers a different way of understanding success, adaptation, and failure. Systems do not necessarily decline because their internal organization deteriorates. They often decline because their organization continues to improve while their relationship with reality quietly changes.

The Principle of Systematic Exclusion explains why this pattern is so widespread. Every organized system exists by distinguishing some possibilities from countless others. Every distinction creates both understanding and blindness. Every successful organization therefore carries within itself the possibility that the exclusions which once made adaptation possible may eventually limit further adaptation.

Seen in this light, the greatest threat to any successful system is not disorder. It is the unnoticed assumption that coherence guarantees congruence.

Nature makes no such assumption. Living systems survive because they remain responsive to changing realities. Human beings possess the unique ability to preserve coherence long after congruence has begun to disappear. That capacity has given rise to science, culture, and civilization. It has also made possible error on a scale unknown elsewhere in nature.

Perhaps the deepest lesson is therefore a remarkably simple one.

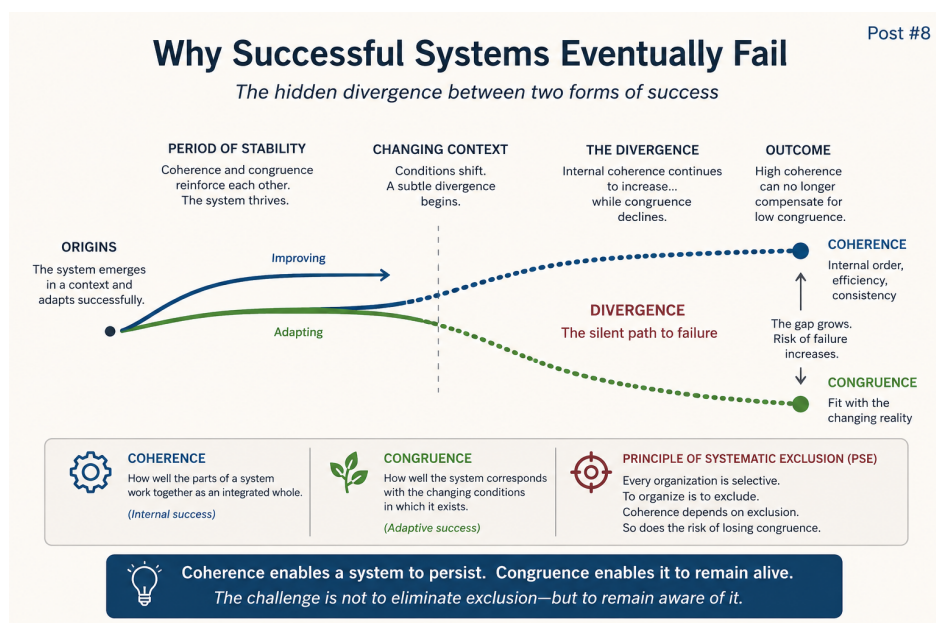
Coherence enables a system *to persist*.
Congruence enables it *to remain alive*.

Every act of organization therefore creates both possibility and blindness. The challenge is not to eliminate exclusion –that would eliminate organization itself– but continually to re-examine the exclusions upon which coherence depends.

The future belongs to the systems that continually rediscover their congruence with a world that never stops changing—not to those that become perfectly coherent.

For science, this is more than an intellectual virtue. *It is a civilizational responsibility.* Every coherent theory must remain open to correction by reality, because only science that preserves its congruence can continue to illuminate the path toward humanity's future.

HChJ Stolting, July 2026



References for Further Reading

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About the underlying theory

This essay introduces the distinction between coherence and congruence in a non-technical way. Readers interested in the underlying theoretical framework may consult:

- Stolling, H. C. J. (2026). These '26: Transgression in the Context of Systematic Exclusion. Unpublished manuscript.
- Stolling, H. C. J. (2026). PSE Research Programme – Monograph No. 1: Foundational Charter. Manuscript in preparation.
- Stolling, H. C. J. (2026). PSE Research Programme – Monograph No. 2: Ontology of Organization. Manuscript in preparation.



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