



Ecosystemic Warfare

Toward a New Conceptual Framework for Understanding 21st-Century Conflicts

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Ecosystemic Warfare (GECO) is introduced as an integrative conceptual framework to address the hybrid and multi-domain complexity of contemporary conflicts, overcoming the limitations of classical strategic paradigms. Based on complexity sciences, this model analyzes the non-linear interaction of diverse actors across interconnected domains.

APORTES PARA EL DEBATE

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ABSTRACT

Contemporary conflicts exhibit a systemic, multi-domain, and adaptive hybrid complexity that classical strategic paradigms and current doctrinal frameworks fail to explain adequately. This article introduces **Ecosystemic Warfare (ECOW)** as an integrative conceptual framework grounded in complexity sciences, complex adaptive systems theory, network theory, and polemology. ECOW conceptualizes conflict as a complex adaptive ecosystem wherein heterogeneous state, non-state, and hybrid actors interact non-linearly across intertwined domains (physical, cyber, cognitive, economic, informational, among others), generating emergent properties that cannot be predicted by analyzing individual components. The article identifies the structural limitations of existing frameworks, establishes the foundational principles of ECOW through ten theoretical propositions, and outlines a future research agenda oriented toward doctrinal modernization—with particular relevance for Defense Systems operating under severe budgetary constraints.

KEYWORDS: Ecosystemic Warfare, complex adaptive systems, multi-domain operations, cognitive warfare, strategic theory, national defense, Argentina.

1. INTRODUCTION

THE CONFLICT THAT THEORY CANNOT EXPLAIN

On February 24, 2022, the world witnessed a conflict that defied any neat categorization. Russia's full-scale invasion of Ukraine combined World War I-style artillery bombardments with drones, satellite-guided munitions, real-time Open-Source Intelligence (OSINT) gathered from smartphones, coordinated information operations targeting audiences across three continents, financial sanctions weaponized as strategic instruments, and a cognitive battle waged simultaneously on TikTok feeds, within the UN Security Council, and inside the Ukrainian collective psyche. No existing theory fully captured what was unfolding.

This is not an isolated phenomenon. The Hamas attack of October 7, 2023, demonstrated how a non-state actor can exploit cognitive vulnerabilities in a technologically superior adversary, leveraging operational simplicity against sophisticated intelligence architectures (Freedman, 2017). The Houthi campaigns in the Red Sea revealed how

commercially available drone and missile technology, combined with strategic messaging, can constrict global maritime trade. Gray zone operations conducted by China in the South China Sea and by Russia within European information spaces continue to erode the conceptual boundary between peace and war without crossing the threshold of declared, formal conflict.

More recently, the 2025–2026 U.S.–Iran war (examined in detail in Section 4) has demonstrated that even the most operationally sophisticated kinetic campaign in history generates ecosystemic cascades that no strike plan can contain. There, what was framed as a counter-proliferation operation transformed, within days, into a global energy crisis, a regional war involving six Arab states, and a planetary contest for legitimacy and escalation.

These conflicts share a structural characteristic: they are systemic, non-linear, multi-domain, and adaptive. They involve heterogeneous constellations of actors—state armed forces, irregular forces, private military companies, algorithmic systems, multinational corporations, and civilian populations—interact simultaneously across physical, cyber, cognitive, economic, informational, and normative-legal domains. Actions within one domain generate cascading effects in others in ways that classical strategic theory was never designed to model. This theoretical deficit carries direct operational consequences. Defense planners are forced to aggregate fragmented frameworks—patching together a bit of hybrid warfare doctrine here, some cyber defense guidance there, and a layer of information operations on top—without a coherent systemic logic to govern their interdependencies, thereby running the risk of **strategic dispersion**. For nations operating under severe budgetary constraints like Argentina, whose defense expenditure has steadily decayed over four decades to a meager 0.55% of GDP, this conceptual fragmentation translates directly into operational inefficiency that material resources alone cannot offset.

This article introduces **Ecosystemic Warfare - ECOW (GECO, by its Spanish acronym)** as a response to this deficit. ECOW is not a new label for existing concepts; it is a theoretical reframing that treats conflict as a complex adaptive ecosystem. It rigorously draws upon complexity sciences, systems theory, network analysis, and polemology to construct an integrative framework capable of explaining what existing paradigms, both individually and collectively, cannot.

The article is structured as follows. Section 2 defines ECOW and establishes its conceptual boundaries. Section 3 diagnoses the structural limitations of current frameworks. Section 4 presents the foundational theoretical propositions of ECOW. Section 5 identifies future research implications and priorities. Accordingly, the purpose is not to exhaustively map the theory—which is the task of the full doctoral dissertation currently underway—but to plant the conceptual seed with sufficient rigor to stimulate academic and doctrinal engagement within our Armed Forces.

2. DEFINING ECOSYSTEMIC WARFARE: CONCEPT AND BOUNDARIES

2.1 The Definition

Ecosystemic Warfare (ECOW) is defined as a theoretical framework that conceptualizes 21st-century armed conflict and strategic competition as a complex adaptive ecosystem. It is characterized by the non-linear interaction of heterogeneous actors across intertwined multi-domain spaces, generating emergent systemic properties within a cognitive domain. These properties are neither predictable from the analysis of individual components nor reducible to any single domain of activity.

Three elements of this definition require further elaboration:

- **Analytical Use of the Term Ecosystem:** First, the term "ecosystem" is employed analytically, despite its metaphorical undertones. In a biological sense, an ecosystem consists of diverse species interacting through flows of energy and information, generating system-level properties (stability, resilience, cascading collapse) that transcend any individual organism. The conflict ecosystem operates under an analogous logic: heterogeneous actors interact through flows of information, resources, influence, and narratives, generating emergent conflict dynamics (escalation thresholds, erosion of legitimacy, cognitive radicalization) that cannot be engineered or predicted based on the intentions of any singular actor.
- **Explicit Non-linearity:** Second, the framework is explicitly non-linear. Proportionality and predictability—foundational assumptions of classical strategic planning—are treated as exceptions rather than rules in complex systems. Nineteen individuals armed with box cutters precipitated 9/11, driving over six trillion dollars in U.S. spending and two decades of global conflict. Similarly, the self-immolation of a street vendor in Tunisia in 2011 propagated through networked social systems to overthrow four governments. The strategic significance of an actor or event is no longer determined by its size; its position within the system and the system's proximity to critical thresholds constitute its decisive point.
- **The Cognitive Domain as a Structuring Axis:** Third, the cognitive domain is treated as a structuring domain in its own right—one that shapes and is shaped by all other domains, and which, in many contemporary scenarios, constitutes the decisive ground of confrontation.

2.2 What ESW Is Not

Conceptual precision demands differentiation from adjacent frameworks:

- **ECOW vs. Hybrid Warfare:** ECOW is not simply another name for Hybrid Warfare. Hybrid Warfare (Hoffman, 2007) describes the convergence of

conventional and unconventional instruments—meaning *what* actors do. ECOW explains the underlying systemic dynamics of that convergence, analyzing *why* those instruments interact as they do, *what* emergent properties they generate, and *how* those properties feed back into actor behavior. Hybrid Warfare describes the *what*; ECOW seeks to explain the *how* and the *why*.

- **ECOW vs. Multi-Domain Operations (MDO):** ECOW is not synonymous with Multi-Domain Operations. MDO, as developed by the U.S. Army and NATO (U.S. Department of Defense, 2022), constitutes an operational doctrine aimed at synchronizing effects across physical domains to overcome an adversary's anti-access and area-denial (A2/AD) capabilities. It is fundamentally a framework designed for resource-abundant state armed forces. Conversely, ECOW is a theoretical framework applicable to the full spectrum of actors, domains, and resource configurations. It adopts MDO's insights regarding domain interdependence while extending its analytical scope toward cognitive, normative, and economic dimensions that MDO treats as secondary.
- **ECOW vs. Unrestricted Warfare:** ECOW is not Unrestricted Warfare. The influential work of Qiao Liang and Wang Xiangsui (1999) brilliantly identified the vast array of instruments available in modern conflict. ECOW builds upon this insight but provides what Unrestricted Warfare lacks: a systematic theory of how those instruments interact as components of a complex adaptive system, generating non-linear dynamics and emergent properties that exceed the intentional design of any actor.

3. THE STRUCTURAL INSUFFICIENCY OF EXISTING FRAMEWORKS

3.1 The Classical Heritage

The canon of Western strategic thought (Clausewitz, Sun Tzu, Jomini, Liddell Hart, Beaufre) bequeathed concepts of enduring validity: the primacy of the political (Clausewitz, 2005), the superiority of intelligence and deception over brute force (Sun Tzu, 2004), the value of the indirect approach (Liddell Hart, 1954), and the necessity of a comprehensive strategic vision (Beaufre, 1965). Although these concepts retain long-lasting validity, their frameworks are no longer sufficient.

The Clausewitzian trinity—sophisticated as it was in its original formulation as a dynamic interaction of passion, chance, and reason—was constructed for an era of identifiable state actors, discernible political objectives, and physically localizable centers of gravity. **Ecosystemic conflict dissolves each of these conditions.** Popular passion can be algorithmically manufactured and globally distributed. The chance and probability confronting a military commander multiply exponentially in environments characterized by artificial intelligence, autonomous systems, and domains whose rules of attribution are structurally ambiguous. Furthermore, the political reason of governments must compete

with the strategic agency of non-state actors, platform corporations, and algorithmic governance systems that Clausewitz could never have conceived.

The most consequential empirical anomaly refutes the central Clausewitzian assumption that destroying the enemy's physical forces yields strategic results. The United States won every significant conventional engagement in Vietnam, Afghanistan, and Iraq, yet achieved none of its strategic objectives. Tactical dominance failed to translate into strategic success because the adversary's center of gravity did not reside in its physical forces, but rather in legitimacy, ideological cohesion, and prolonged resistance capacity—emergent systemic properties that kinetic operations cannot neutralize and frequently amplify.

3.2 Contemporary Concepts: Illuminating the Fragments

The post-Cold War proliferation of strategic concepts—such as the Revolution in Military Affairs (RMA), New Wars, Generations of Warfare, Asymmetric Warfare, Hybrid Warfare, Unrestricted Warfare, Multi-Domain Operations, Cognitive Warfare, and Cyber Warfare—has been intellectually productive and operationally consequential. Each framework illuminates a genuine dimension of contemporary conflict. Collectively, however, they present a paradox: **the more concepts proliferate, the more fragmented our understanding becomes.**

The Revolution in Military Affairs correctly identified the disruptive impact of technology, but it mistook a partial cause for the whole, generating a techno-optimistic doctrine that Afghanistan and Iraq empirically refuted. *New Wars* (Kaldor, 2012) and *The Transformation of War* (Van Creveld, 1991) accurately anticipated the erosion of the state monopoly on organized violence, yet they underestimated the technological and cognitive dimensions that define near-peer competition today. Similarly, Generations of Warfare models (1GW to 4GW/5GW) provided a useful typology, but imposed a forced linearity onto a phenomenon characterized by the coexistence and interaction of multiple forms. As Ukraine demonstrates daily, World War I-style trench warfare coexists with AI-driven drone operations, information warfare, and global cognitive campaigns.

Hybrid Warfare (Hoffman, 2007), perhaps the most influential contemporary framework, identifies the convergence of instruments as the defining feature of modern conflict. Its limitation, however, is analytical rather than descriptive: it catalogs *what* actors do without providing a theoretical apparatus to understand the systemic dynamics that produce, sustain, and expand that convergence. Multi-Domain Operations, for their part, move beyond the descriptive limitations of Hybrid Warfare by recognizing domain interdependence. Yet, MDO remains essentially a great-power operational doctrine whose resource assumptions render it inapplicable to the strategic reality of most defense systems worldwide, especially Argentina's.

What is absent across all these frameworks is what ECOW proposes to provide: **a theory of the system as a totality.** A theory that explains how domains interact non-linearly,

how actors coevolve adaptively, how small perturbations generate disproportionate effects, how self-emerging properties arise without being designed by any actor, and how these dynamics behave differently according to the topological structure of the network through which they propagate.

3.3 The Epistemological Root of the Insufficiency

The insufficiency of existing frameworks is not merely a matter of conceptual scope; it reflects a deeper epistemological problem (Kuhn, 1962): namely, **the paradigmatic dominance of linear and reductionist assumptions in strategic thought**. The classical tradition assumed proportional causality, predictive determinism, external observational objectivity, and the analytical sufficiency of breaking complex totalities down into simple parts. Each of these assumptions **is empirically refuted** by the anomalies generated by contemporary conflict.

ECOW's response is not anti-methodological. It proposes a rigorous epistemological alternative grounded in the complexity sciences (Morin, 2007). Accordingly, distinction without reduction, conjunctive rather than disjunctive logic, organizational recursivity, constitutive uncertainty, and the macro-conceptual integration of the whole form its scientific foundations. Far from being philosophical ornaments, these are the precise methodological conditions required to construct a theory adequate to its object.

4. FOUNDATIONAL PRINCIPLES OF ECOSYSTEMIC WARFARE

The theoretical architecture of ESW rests upon ten foundational propositions derived from the convergent application of **Chaos Theory** (Lorenz, 1963; Prigogine & Stengers, 1984), **Complexity Theory** (Morin, 2007), **General Systems Theory** (Bertalanffy, 1968), **Complex Adaptive Systems theory** (Holland, 1995; Kauffman, 1995), **Network Theory** (Barabási & Albert, 1999; Watts & Strogatz, 1998), and **Polemology** (Bouthoul, 1951). These propositions do not intend to be mere manifestos; they are testable theoretical assertions whose empirical implications are currently being developed within the author's broader doctoral research program.

P1 - Systemic Nature of Conflict. 21st-century warfare constitutes a complex adaptive system composed of heterogeneous actors (state, non-state, hybrid, and algorithmic) that interact non-linearly across intertwined domains (physical-kinetic, cyber, cognitive, economic-financial, informational, socio-cultural, technological-innovative, normative-legal, and healthcare). The **system is irreducible** to any single domain or class of actors.

P2 - Non-linearity and Sensitivity. Minor perturbations can generate disproportionate effects through positive feedback loops; thus, the conflict ecosystem exhibits acute sensitivity to initial conditions. **Strategic predictability** is inherently **limited**. The assassination of Archduke Franz Ferdinand in 1914, the self-immolation of Mohamed

Bouazizi in 2011, and the attacks of October 7, 2023, are no longer exceptions to strategic logic—they have become its systemic signature.

P3 - Emergent Properties. The system exhibits properties—including aggregated violence patterns, strategic equilibria, collective narratives, and legitimacy dynamics—that emerge solely from the organization of interactions, rendering prediction from individual components impossible. Consequently, these properties can be self-emerging across the system as a whole. Clausewitz’s **center of gravity** may well be one such **emergent** property, rather than a locatable node.

P4 - Recursive Multicausality. Conflicts possess constellations of structural, institutional, conjunctural, and psychological factors that operate across multiple levels and recursively feed back into one another (where the cause is an effect of its own effects). They no longer stem from a single, isolated origin. **Searching for the root cause of a single conflict is epistemologically flawed**; instead, the framework demands the mapping of causal ecologies.

P5 - Adaptive Coevolution. Actors within the ecosystem cease to evolve in isolation and instead coevolve. The adaptation of one actor forces adaptations in others, driving perpetual, unresolved arms races. **No advantage is permanent; every innovation becomes transient.** Therefore, strategic investment must prioritize **learning velocity over static material** superiority.

P6 - Topology as a Strategic Determinant. The **critical properties of the system** are determined by **the structure of the networks** connecting actors, domains, and infrastructures, rather than merely the capabilities of individual nodes. These governing properties include the velocity of information propagation and contagion, resilience against random failure, vulnerability to targeted disruption, and coordination capacity. Scale-free networks are simultaneously robust against random attacks and catastrophically fragile against targeted attacks on hubs.

P7 - Dialogic Autonomy-Dependence. Actors exhibit relative autonomy, particularly in decision-making and self-organization, yet they depend critically on environmental flows (resources, information, legitimacy). This autonomy-in-dependence is a structural condition rather than a potential anomaly. For a middle power like Argentina, **strategic sovereignty means** managing this **dialogic intelligently**, rather than pursuing an unrealistic autarky.

P8 - Irreducibility of Uncertainty. Information deficits—historically corrected by deploying more sensors or refining algorithms to reduce uncertainty—no longer play the decisive role in the conflict ecosystem. Uncertainty becomes a constitutive condition derived from sensitivity to initial conditions, coevolutionary dynamics, cognitive reflexivity, and emergence. Absolute strategic certainty is epistemologically illegitimate. **Doctrine must be designed for robustness under uncertainty, rather than optimized for point predictions.**

P9 - Resilience Over Optimization. Within adaptive ecosystems under constitutive uncertainty, **designing for resilience** (the capacity to absorb shocks without collapsing) **and adaptability** (the capacity to reconfigure rapidly) **is strategically superior** to optimizing for a single anticipated scenario. The latter creates fragile systems that collapse catastrophically when facing deviations.

P10 - Intertwined Domains, Not Compartments. Conflict domains are not separate operational compartments but intertwined dimensions of a single ecosystem. For instance, actions in the cyber domain trigger non-linear and frequently unintentional cascading effects across economic, cognitive, physical, and normative-legal domains. Consequently, cross-domain integration ceases to be mere operational coordination; it becomes the recognition that **no single domain can be analyzed in isolation** from the system containing it.

The **cognitive domain** warrants special emphasis within this architecture. ECOW (*Ecosystemic Warfare*) treats it as a **structuring domain** rather than a peer domain—one that shapes and is shaped by all other domains and, in numerous contemporary scenarios, **constitutes the decisive ground** of confrontation. The capacity to manufacture popular passion, algorithmically reshape cognitive frameworks, and erode adversary willpower without kinetic engagement represents a qualitative transformation of what Clausewitz understood as the trinitarian dynamic.

4.1 Theoretical Propositions in Real-Time: The 2025–2026 U.S.–Iran War

These propositions are not mere abstractions awaiting a future conflict to test them; the 2025–2026 war between the United States and Iran has been validating them in real-time. Operation Midnight Hammer represented the pinnacle of multi-domain operational synchronization. It demonstrated global reach, stealth penetration, precision-guided effects, zero friendly casualties, and the first direct U.S. military action against Iranian territory since 1980. As a kinetic-operational achievement, it validated everything that Joint All-Domain Operations (JADO) doctrine promises. Yet, as a strategic intervention within a complex adaptive ecosystem, its cascading effects escaped the planning envelope entirely.

The ceasefire that followed the Twelve-Day War held for eight months. However, when hostilities resumed in February 2026—marked by strikes launched amidst ongoing Geneva negotiations and the elimination of the Iranian Supreme Leader—the ecosystem responded across domains that no strike package could target. Iran closed the Strait of Hormuz, cutting off approximately one-fourth of global seaborne oil and one-fifth of the world’s liquefied natural gas (CNN, 2026). Brent crude surged past 114 dollars per barrel; southern Iraqi production plummeted by seventy percent within days; Gulf producers cut output by ten million barrels per day; Washington released over fifty million barrels from its Strategic Petroleum Reserve; and households in countries completely disconnected from the conflict absorbed the inflationary shock. Six Arab states came under Iranian fire;

three entered the war. What conventional kinetic planning had framed as a counter-proliferation strike transformed, in a matter of days, into a global economic event, a regional war, and a planetary cognitive contest.

The doctrinal lesson is precise, and it matters most to the very institutions that executed the operation flawlessly: synchronizing effects across operational domains is not synonymous with controlling the behavior of the conflict ecosystem. P2 (disproportionate cascades), P3 (self-emerging properties), P8 (the failure of all actors' predictions, including the attacker's expectation of a containable escalation), and P10 (intertwined domains) were not refuted by the most sophisticated multi-domain strike in history; they were demonstrated by it. For defense systems studying this war—especially resource-constrained ones—the core question is not how to replicate the operational excellence of Midnight Hammer, but how to model the ecosystem into which that excellence is inserted.

5. STRATEGIC INGENUITY, IMPLICATIONS AND RESEARCH AGENDA

5.1 Strategic Ingenuity as an Operational Concept

The analytical framework of ECOW (*Ecosystemic Warfare*) holds particular relevance for defense systems operating under permanent resource constraints—a defining characteristic of the Argentine Armed Forces. If 21st-century conflict is an ecosystem where reasoning, adaptability, and cognitive positioning matter more than kinetic mass, then **the logic of defense investment changes fundamentally**. Material accumulation as the primary metric of military capability becomes not only insufficient but strategically flawed.

The concept of Strategic Ingenuity, introduced here as an operational derivative of ESW, is defined as:

the institutionalized capacity to compensate for material limitations through conceptual creativity, doctrinal agility, the asymmetric exploitation of non-kinetic domains, and the intelligent leverage of Ecosystemic Leverage Points (ELPs). These ELPs are structural, flow, cognitive, and normative nodes within the conflict ecosystem where relatively modest interventions can generate disproportionate, systemic effects.

The Argentine case illustrates the stakes involved. A nation with a recognized Exclusive Economic Zone of over 1,782,000 km² in the South Atlantic, possessing strategic assets in nuclear technology (CNEA/INVAP), space capabilities (CONAE/SAOCOM), and a regionally renowned software export sector—yet operating with a defense expenditure of approximately 0.55% of GDP—cannot and should not attempt to replicate the material posture of major powers. What it can do, and what **ECOW suggests** it must do, is **map the ecosystem intelligently, identify its leverage points, and develop asymmetric capabilities in domains that yield disproportionate returns** (cyberspace, electronic

warfare, cognitive operations, and civil-military integration in strategic technological sectors such as space and nuclear). Crucially, it must institutionalize a culture of innovation under constraint—a trait that Argentine history proves to possess inherently.

Strategic Ingenuity is not improvisation dignified with a strategic label; it is the deliberate institutionalization of **adaptive creativity as doctrine**. It represents the transformation of a cultural capacity historically exercised on an *ad hoc* basis into a systematic organizational competence embedded within the training, planning, and design of the Armed Forces. Historical precedents include, among others, the British Invasions (1806–1807), the Revolutionary Battles (1810–1815), the Battle of San Lorenzo (1813), the Crossing of the Andes (1817), the Chilean and Peruvian Campaigns (1817–1821), the Battle of Ituzaingó (1827), the Battle of Vuelta de Obligado (1845), the Desert Campaign (1878–1885), the Counter-Subversion Campaign (1975–1978), and Operation Rosario and the Air Campaign during the Malvinas War (1982).

5.2 Doctrinal Implications

ECOW has concrete implications for how defense systems conceive planning, intelligence, doctrine, and force design.

- In Planning: The framework requires a transition from linear predictive planning to **adaptive design**—meaning the construction of forces and procedures capable of operating across a wide range of scenarios, rather than optimizing for a single, anticipated type of conflict.
- In Intelligence: Ecosystemic intelligence maps actor networks, identifies critical flows (information, resources, legitimacy), detects proximity to systemic thresholds, and **anticipates cascading effects**, rather than focusing exclusively on the isolated (and never confirmed) intentions and capabilities of the adversary.
- In Doctrine: The ECOW framework suggests treating military doctrine not as a prescriptive canon but as a falsifiable hypothesis—that is, the current best understanding of how the conflict ecosystem functions, subject to continuous revision based on operational experience. **Organizations that treat doctrine as dogma ossify; those that treat it as a hypothesis evolve.** The recent Argentine regulatory update via Decree 1112/2024, which explicitly recognizes cyberspace, the electromagnetic spectrum, and outer space as operational domains—while incorporating the strategic relevance of artificial intelligence, autonomous systems, and transnational non-state actors—represents a significant step forward. ESW provides the theoretical architecture to imbue that regulatory recognition with genuine doctrinal content.
- In Force Design: The ECOW principle of resilience suggests prioritizing **diversified capability options over concentration in a single platform or domain**, building redundancy into critical functions, developing modular

organizational structures that can recombine flexibly, and establishing decentralized Command Posts capable of operating even when higher-level coordination is degraded.

5.3 The Research Agenda

This article introduces a conceptual framework; its full development, testing, and application constitute a substantial research program. The following priorities represent the immediate next steps:

- **Formal Operationalization of the ECOW Framework:** The ten propositions presented in Section 4 require operationalization into measurable variables, testable hypotheses, and research designs capable of confirming or refuting their empirical assertions. This involves developing two key proposals: the Ecosystemic Correlation of Forces and Means (CFM-Eco)—a multidimensional assessment tool that extends classic Relative Combat Power (RCP) analysis into a simultaneous cross-domain correlation of forces—and a Typology of Ecosystemic Leverage Points (ELPs) to classify high-leverage nodes within complex conflict systems.
- **Validation Through Contemporary Case Studies:** The explanatory power of the framework must be tested against paradigm-shifting contemporary conflicts. The 2022 Russian invasion of Ukraine, the 2023 Israel-Hamas conflict, and the 2025–2026 U.S.-Iran war offer laboratories to compare ECOW's explanatory reach against existing frameworks (Hybrid Warfare, MDO, Cognitive Warfare). Preliminary analysis suggests that ESW's systemic, cross-domain focus captures dynamics—particularly cognitive-physical cascading effects and the role of global narrative ecosystems—that domain-specific frameworks systematically understate.
- **Computational Corroboration:** ECOW's theoretical propositions regarding network topology, cascading dynamics, and emergent properties lend themselves to computational modeling through agent-based simulation, dynamic network analysis, and semantic network mapping of doctrinal corpora. A planned computational component (the *Doctrinal Algorithm*, currently under development) will apply text mining and semantic network analysis to the military doctrines of major powers, testing hypotheses on conceptual evolution toward ecosystemic thinking and identifying patterns of cross-domain interdependence across different national strategic cultures.
- **Application to Strategic Planning in the South Atlantic:** The most consequential practical application of the framework concerns Argentina's primary strategic theater: the South Atlantic, with its extended continental shelf, sovereign projection over the Malvinas Islands, Antarctic projection, and increasingly contested maritime resources. Applying the CFM-Eco and the ELP framework to this theater

under a simulated ecosystemic threat scenario offers both a validation exercise and a practical contribution to Argentine defense planning.

- Educational Implications for Defense Training: If the dominant mode of 21st-century conflict is ecosystemic (non-linear, multi-domain, adaptive, and cognitively intensive), then **the training of strategic leaders must be redesigned accordingly**. Curricula at institutions such as UNDEF, the War College (*Escuela Superior de Guerra*), and the Joint Chiefs of Staff (*Estado Mayor Conjunto*) require frameworks that train officers to think systemically, map complex networks, design for resilience, and exercise adaptive leadership under constitutive uncertainty. The theoretical architecture of ECOW provides the conceptual foundations for this pedagogical transformation.

6. CONCLUSION

THE SEED OF A NECESSARY PARADIGM

The strategic theory demanded by the 21st century does not yet fully exist. The classical tradition provides an indispensable conceptual vocabulary but falls short of offering a comprehensive explanatory scope. While contemporary frameworks illuminate critical facets of conflict, they fragment understanding in proportion to their proliferation. The result is a theoretical landscape that is simultaneously rich in partial perspectives and impoverished in systemic comprehension.

Ecosystemic Warfare does not claim to be a complete theory. Instead, it aims to be a **necessary reframing—one that shifts the unit of analysis from actors and their capabilities to the ecosystem of interactions among them**; from domain-specific operations to intertwined multi-domain dynamics; from prediction and control to adaptive design under constitutive uncertainty; and from material accumulation as the metric of strategic capability to network positioning, learning velocity, and cognitive leverage as the decisive variables of 21st-century competition.

For middle powers like Argentina—with real strategic assets, genuine intellectual traditions of innovation under constraint, and the obligation to defend sovereignty in one of the world's most strategically significant maritime theaters—this reframing is not merely an interesting academic exercise. It is a strategic necessity. A Defense System that continues to think within the categories of 20th-century warfare—while its adversaries, threats, and operational environment evolve toward ecosystemic complexity—will perpetually find itself fighting the last war.

The seed planted here requires cultivation through rigorous research, open intellectual debate, and the kind of institutional courage that transforms academic frameworks into doctrinal reality. This is the work that lies ahead. This article intends to be its beginning.

Author's Note

This article presents foundational concepts from an ongoing doctoral research program at the National Defense University (Universidad de la Defensa Nacional – UNDEF), National Defense College (Facultad de Defensa Nacional – FADENA). The full theoretical development—including the formal operationalization of the ESW framework, computational validation, and its application to Argentine defense planning—is contained within the doctoral dissertation titled "Ecosystemic Warfare: Argentine Strategic Ingenuity to Decode 21st-Century Conflict," scheduled for completion in December 2026.

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