

POLYCRISIS AND THE TRANSFORMATION OF INTERNATIONAL ORDER: A SYSTEMIC COMPLEXITY FRAMEWORK

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Abstract

This article analyzes issues surrounding the polycrisis and the transformation of the international order through the lens of systemic complexity. The growing intertwining of geopolitical rivalry, economic shocks, technological competition, climate change, health crises, and resource security challenges has fundamentally altered the nature of contemporary international politics. These crises do not merely unfold in isolation; they increasingly reinforce one another, generating cascading effects and systemic vulnerabilities that challenge traditional conceptions of the international order. While existing international relations theories offer insight into specific aspects of instability, they often fail to explain the mechanisms of interaction between simultaneous crises and their broader consequences. This article develops a conceptual model based on the principle of systemic complexity to explain how the polycrisis drives the transformation of the international order. Drawing on complexity theory and systems thinking, the authors conceptualize the international order as a complex adaptive system comprising multiple actors operating across closely interconnected domains: security, the economy, technology, the environment, and public health. Through mechanisms of interdependence, spillover effects, feedback loops, and adaptive responses, the polycrisis generates non-linear dynamics that reshape patterns of cooperation, competition, and governance. Based on qualitative conceptual analysis and illustrative examples, the article argues that the polycrisis constitutes a systemic state rather than a mere temporary accumulation of disparate shocks. The proposed approach offers a complexity-theory perspective on contemporary global transformations and provides a foundation for further research into the evolving architecture of the international order.

Keywords: *polycrisis, international order, systemic complexity, complexity theory, complex adaptive systems, fragmented multipolarity, global governance, strategic competition, interdependence, systemic transformation.*

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Introduction

The contemporary international system is increasingly characterized by the simultaneous interaction of multiple crises that transcend conventional boundaries between security, economics, technology, health, and the environment. Unlike previous periods, when crises were often analyzed as isolated events, recent developments have revealed the existence of complex interactions among different sources of instability. These interactions have challenged existing understandings of international order and highlighted the need for analytical approaches capable of explaining how interconnected disruptions reshape global politics. Against this background, the present study investigates the implications of polycrisis for international order and proposes a Systemic Complexity Framework as a means of understanding contemporary transformations.

The post-Cold War period was initially characterized by expectations of increasing globalization, economic integration, and institutional cooperation. However, the twenty-first century has witnessed a succession of crises whose cumulative effects have altered the nature of international politics. The global financial crisis, the COVID-19 pandemic, the Russia-Ukraine war, climate change, technological fragmentation, energy insecurity, and food shortages have demonstrated that disturbances in one domain often generate consequences that extend far beyond their original context (Tooze 2022).

Recent developments reveal a shift from isolated crises toward interconnected and mutually reinforcing disruptions. The COVID-19 pandemic, for example, was initially perceived as a health emergency but rapidly evolved into an economic, social, and geopolitical challenge that disrupted supply chains, intensified inflationary pressures, and accelerated strategic competition. Similarly, the Russia-Ukraine war has affected not only European security but also global energy markets, food security, and geopolitical alignments. Climate change, meanwhile, increasingly interacts with migration, resource scarcity, and social instability, producing multidimensional effects that transcend national borders (Homer-Dixon et al. 2022).

These developments suggest that the international system is experiencing a new phase characterized by increasing complexity and interdependence. Rather than producing isolated consequences, contemporary crises create cascading effects that spread through interconnected networks and institutions. Consequently, understanding the transformation of international order requires analytical approaches capable of capturing these interactions and explaining their systemic implications.

Despite extensive scholarship on international order and global change, existing theories of international relations generally address crises separately. Realism emphasizes power distribution and strategic competition, liberalism focuses on institutions and cooperation, while constructivism highlights norms and identities. Although these approaches provide important insights, they tend to assume relatively linear causal relationships and often examine crises individually rather than as interconnected phenomena.

The growing overlap between geopolitical rivalry, pandemics, environmental degradation, technological disruption, and economic fragmentation exposes the limitations of conventional approaches. Existing frameworks provide valuable

explanations of particular dimensions of instability but offer limited understanding of how multiple crises interact and produce systemic transformations. Consequently, there remains a theoretical gap concerning the mechanisms through which simultaneous and mutually reinforcing crises reshape international order.

This limitation becomes increasingly evident in a world characterized by interdependence and rapid transmission of shocks. Events that originate in one domain frequently generate unexpected consequences in other areas, producing nonlinear outcomes that traditional frameworks struggle to explain. Therefore, there is a need for a broader analytical perspective capable of integrating the interactions among multiple crises and their implications for international order.

Against this background, the article seeks to answer the following central question:

How does polycrisis transform international order, and how can systemic complexity provide a framework for understanding this transformation?

Several subsidiary questions emerge from this inquiry:

- Why are existing approaches insufficient for explaining interconnected crises?
- What insights can complexity theory provide for understanding systemic transformations?
- Through which mechanisms do multiple crises interact and reshape international order?
- How do nonlinear dynamics and adaptive responses influence patterns of global governance and strategic competition?

The study pursues four main objectives. *First*, it seeks to conceptualize polycrisis and identify its principal characteristics. *Second*, it evaluates the explanatory capacity of existing theories of international relations in understanding interconnected crises and their limitations. *Third*, it introduces complexity theory and systems thinking as analytical foundations for examining nonlinear interactions and systemic adaptation. *Finally*, the article develops a Systemic Complexity Framework that explains how multiple crises interact and contribute to the transformation of international order.

This article argues that polycrisis should be understood not as a temporary accumulation of unrelated disruptions but as a systemic condition characterized by interconnected crises, feedback loops, and nonlinear interactions. Consequently, international order should be viewed as a complex adaptive system rather than as a stable structure governed by linear causality.

Existing approaches remain valuable, yet they are often insufficient to explain the multidimensional nature of contemporary transformations. The interaction among geopolitical, economic, technological, environmental, and health crises generates outcomes that cannot be fully understood through isolated analyses. Therefore, a broader perspective is required to capture the complexity of these dynamics.

The article contributes to the literature in three ways. First, it bridges the emerging concept of polycrisis with complexity theory and international relations scholarship. Second, it challenges linear approaches to systemic change and highlights the importance of interdependence and feedback mechanisms. Third, it proposes a Systemic Complexity Framework that provides a more comprehensive explanation of how international order evolves under conditions of persistent uncertainty and interconnected crises.

Methodology

Methodologically, this article adopts a qualitative theory-building approach based on conceptual analysis and analytical synthesis. Rather than testing a specific hypothesis, the study aims to construct a theoretical framework capable of explaining the relationship between polycrisis and transformations in international order.

The analysis combines three complementary approaches. First, conceptual analysis is employed to examine the evolution and characteristics of the concept of polycrisis. Second, insights from complexity theory and systems thinking are used to identify the mechanisms through which interconnected crises generate systemic change. Third, process tracing and illustrative cases—including the COVID-19 pandemic, the Russia-Ukraine war, climate-related disruptions, and technological competition—are utilized to demonstrate the empirical relevance of the proposed framework.

By combining conceptual analysis with illustrative evidence, the study seeks to provide an integrated understanding of contemporary transformations and contribute to theory-building in international relations.

Conceptualizing Polycrisis

The emergence of multiple and overlapping crises has stimulated renewed interest in concepts capable of capturing the complexity of contemporary global transformations. While crises have always been part of international politics, recent developments suggest that their nature has changed significantly. Economic instability, pandemics, climate change, geopolitical rivalry, technological disruptions, and energy insecurity increasingly interact rather than occur independently. Consequently, understanding the transformation of international order requires a conceptual framework that moves beyond isolated explanations and addresses the interconnected character of contemporary challenges. In this context, the concept of polycrisis has emerged as an important analytical tool for understanding how different crises reinforce one another and produce systemic consequences.

Origins and Evolution of the Concept

Although the concept of polycrisis has gained prominence only in recent years, its intellectual roots can be traced to earlier debates in systems thinking and complexity studies. Edgar Morin was among the first scholars to emphasize that modern societies are characterized by interconnected forms of uncertainty and complexity rather than by isolated problems. According to Morin (2008), contemporary systems should be understood as dynamic wholes in which interactions between different components generate emergent outcomes that cannot be reduced to linear causal relationships.

Building on these insights, recent discussions have revived the concept of polycrisis to explain the convergence of multiple crises in the twenty-first century. Adam Tooze (2022) popularized the term by arguing that contemporary disruptions are not merely simultaneous but mutually reinforcing. Rather than viewing the pandemic, geopolitical conflicts, climate change, inflation, and supply-chain disruptions as separate phenomena, Tooze emphasized that these crises interact through feedback mechanisms

that amplify vulnerabilities and create cascading consequences across sectors and regions.

The growing relevance of the concept reflects broader transformations in the international system. Increasing interdependence, globalization, digital connectivity, and complex supply chains have created new channels through which shocks spread rapidly. Consequently, the contemporary international order is increasingly characterized by overlapping disruptions that challenge conventional approaches based on isolated crisis management. This shift from discrete crises to interconnected crises represents one of the defining features of the twenty-first century.

Definitions of Polycrisis

Despite its growing popularity, there is no universally accepted definition of polycrisis. Existing interpretations converge on the idea that polycrisis involves interactions among multiple crises whose combined effects exceed the sum of their individual consequences.

Tooze (2022) defines polycrisis as a situation in which different crises become intertwined in ways that make their overall impact greater than the effect of each crisis considered separately. Homer-Dixon et al. (2022) similarly emphasize that interconnected crises generate cascading failures through feedback loops and systemic vulnerabilities. From a complexity perspective, polycrisis can be understood as a condition characterized by nonlinear interactions, uncertainty, and emergent outcomes.

Unlike traditional understandings that focus on isolated disruptions, the concept of polycrisis highlights the interdependence of crises and the dynamic relationships among them. This perspective shifts attention from individual events to the mechanisms linking different domains, thereby providing a more comprehensive understanding of contemporary transformations.

Before examining the characteristics of polycrisis, it is useful to summarize the main definitions proposed in the literature.

Table 1. Definitions and Characteristics of Polycrisis

Author	Definition	Key Elements
Morin (2008)	Complex interactions among multiple sources of uncertainty	Complexity, interdependence
Tooze (2022)	Interconnected crises whose combined impact exceeds individual effects	Interaction, amplification
Homer-Dixon et al. (2022)	Cascading failures across interconnected systems	Feedback loops, systemic vulnerabilities
Lawrence et al. (2024)	Simultaneous crises producing nonlinear and unpredictable outcomes	Nonlinearity, uncertainty

Table 1 illustrates that despite differences in terminology; most definitions emphasize interactions rather than the mere coexistence of crises. Interdependence, feedback mechanisms, and uncertainty appear as recurring themes across the literature,

suggesting that polycrisis should be understood primarily as a systemic phenomenon rather than as a collection of independent disruptions.

Characteristics of Polycrisis

Several characteristics distinguish polycrisis from conventional understandings of crises.

First, polycrisis is characterized by interdependence. Political, economic, environmental, technological, and health systems are increasingly connected, allowing disturbances in one area to affect others. As a result, local shocks can generate global consequences through interconnected networks.

Second, polycrisis exhibits cascading effects. Crises rarely remain confined to their original domains. Instead, disruptions spread across sectors and regions, producing secondary and tertiary consequences that are often difficult to predict. The COVID-19 pandemic, for example, evolved from a public health crisis into a broader economic, social, and geopolitical challenge.

Third, feedback loops constitute a central feature of polycrisis. Responses to one crisis may unintentionally intensify other problems. Economic sanctions, for instance, may influence energy markets, which in turn affect inflation and food security. Such interactions create self-reinforcing dynamics that complicate policy responses.

Fourth, polycrisis is characterized by nonlinearity. Changes within complex systems do not necessarily produce proportional outcomes. Relatively small disturbances may trigger major systemic consequences, while large interventions sometimes generate only limited effects. This feature challenges conventional assumptions based on linear causality.

Finally, uncertainty represents a defining characteristic of polycrisis. Because interactions among crises generate emergent outcomes, predicting the trajectory of systemic transformations becomes increasingly difficult. Consequently, policymakers and institutions often operate under conditions of incomplete information and heightened unpredictability.

Taken together, these characteristics suggest that polycrisis represents more than the coexistence of several crises. Rather, it reflects a systemic condition in which interconnected disruptions, nonlinear dynamics, and adaptive responses continuously reshape the international environment. Understanding this condition requires analytical approaches capable of capturing complexity and interdependence, a task that will be addressed through the lens of international relations theory in the following section.

Existing Approaches to International Order

Before developing a Systemic Complexity Framework, it is necessary to examine how the major traditions of international relations have conceptualized international order and systemic change. Realism, liberalism, constructivism, and international political economy have each provided valuable explanations for the sources of order and instability. Nevertheless, these approaches emerged largely within analytical contexts that assumed relatively linear causal relationships and treated crises as distinct phenomena. While they remain indispensable for understanding particular dimensions

of world politics, their ability to explain the interactions among multiple and simultaneous crises remains limited. Reviewing these approaches therefore helps identify the theoretical gap that justifies the development of a complexity-based perspective.

Realism has traditionally viewed international order through the lens of power distribution and competition among states. Classical and structural realists argue that the anarchic nature of the international system compels states to pursue survival and security, making shifts in relative capabilities the principal drivers of systemic change. According to Waltz (1979), transformations in international order occur primarily through changes in the balance of power and the emergence of new configurations of polarity.

Contemporary geopolitical developments have reinforced the relevance of realist arguments. The intensification of strategic competition between the United States and China, the return of great power rivalry, and the erosion of the post-Cold War unipolar moment have renewed debates concerning multipolarity and systemic transition. Recent studies emphasize that the contemporary international system is increasingly characterized by fragmented multipolarity rather than stable bipolar or unipolar arrangements (Farag 2026d).

Despite its explanatory strengths, realism tends to prioritize material power and security competition while providing limited explanations for the interactions among health, environmental, technological, and economic crises. Consequently, it struggles to account for the multidimensional character of contemporary transformations.

Liberal approaches emphasize institutions, interdependence, and cooperation as the foundations of international order. From this perspective, international organizations, regimes, and economic interdependence reduce uncertainty and facilitate collective action. Liberal scholars argue that institutions mitigate conflict by promoting transparency and establishing mechanisms for cooperation (Keohane and Nye 1977).

Globalization and economic interdependence have undoubtedly strengthened institutional linkages among states. However, recent crises have exposed the vulnerabilities embedded within highly interconnected systems. The COVID-19 pandemic, disruptions in supply chains, and geopolitical tensions demonstrated that interdependence can generate both cooperation and fragility. Instead of producing stability alone, interconnectedness may amplify shocks and transmit crises across sectors and regions.

Although liberalism recognizes interdependence, it often assumes that institutions can effectively manage disruptions. Such assumptions become problematic under conditions characterized by multiple and interacting crises, where uncertainty and nonlinear effects complicate collective responses.

Constructivism shifts attention from material capabilities to the role of ideas, identities, norms, and social interactions. According to constructivist scholars, international order is socially constructed and continuously shaped through shared understandings and normative practices (Wendt 1999).

This perspective provides important insights into how perceptions and identities influence international politics. Competing narratives concerning globalization, sovereignty, democracy, and security affect state behavior and contribute to the

emergence of new patterns of cooperation and rivalry. Moreover, the diffusion of information technologies and digital media has increased the importance of narratives and ideational competition.

Nevertheless, constructivism pays relatively limited attention to the structural interactions among crises and the mechanisms through which disruptions spread across interconnected systems. While it explains how actors interpret crises, it offers fewer tools for understanding nonlinear systemic dynamics.

International Political Economy (IPE) emphasizes the interaction between political authority and economic processes. Scholars in this tradition examine how globalization, production networks, financial flows, and resource competition influence international order. Recent studies have highlighted the increasing significance of geoeconomics, technological competition, and resource politics in shaping contemporary transformations.

The growing importance of energy security, supply chains, and critical resources illustrates the relevance of IPE perspectives. Competition over strategic resources, technological standards, and economic influence increasingly intersects with geopolitical rivalry and security concerns (Edmond, Forku, and Farag 2025). Moreover, resource interdependence creates channels through which disruptions in one domain rapidly affect others.

Although IPE recognizes the interaction between economics and politics, many analyses remain focused on particular sectors and do not fully address the multidimensional interactions among environmental, technological, health, and geopolitical crises.

Before assessing the limitations of these approaches, Table 2 summarizes their major strengths and weaknesses.

Table 2. Strengths and Limitations of Existing IR Theories

Approach	Main Focus	Strengths	Limitations
Realism	Power and security	Explains strategic competition and polarity shifts	Underestimates interconnected crises and non-state dynamics
Liberalism	Institutions and interdependence	Explains cooperation and global governance	Assumes manageable interdependence and linear adaptation
Constructivism	Ideas, norms, identities	Explains narratives and social change	Limited treatment of systemic interactions
International Political Economy	Political-economic relations	Explains globalization and resource competition	Often sector-specific and insufficiently holistic

Table 2 demonstrates that each theoretical tradition contributes important insights into international order. However, their analytical focus tends to privilege specific dimensions of global politics rather than the interactions among multiple crises. As a result, contemporary transformations require a broader perspective capable of integrating insights from different traditions while accounting for complexity and interdependence.

Despite their analytical value, existing approaches share several limitations when confronted with conditions of polycrisis. *First*, they generally rely on assumptions of linear causality. Most theories explain systemic change through relatively straightforward relationships between causes and outcomes. However, contemporary crises often generate nonlinear effects in which small disturbances produce disproportionate consequences. *Second*, traditional approaches tend to focus on individual crises rather than simultaneous and interconnected disruptions. Security, economics, technology, climate change, and public health are frequently treated as separate analytical domains despite their growing interdependence. *Third*, most theories retain state-centric assumptions that understate the role of networks, multinational corporations, technological platforms, and transnational actors. Increasing interconnectedness has transformed the sources of power and vulnerability, making state-centered explanations insufficient for understanding systemic complexity.

Finally, existing approaches offer limited explanations for feedback loops, cascading effects, and adaptive processes that characterize contemporary transformations. Consequently, while realism, liberalism, constructivism, and international political economy remain essential components of international relations theory, they are individually insufficient to explain the multidimensional and interconnected nature of polycrisis.

These limitations suggest the need for an alternative perspective capable of integrating interactions among crises and capturing the dynamic processes through which international order evolves. Complexity theory and systems thinking provide such a foundation and therefore constitute the focus of the next section.

Complexity Theory and Systems Thinking

The limitations of conventional approaches to international order suggest the need for analytical perspectives capable of explaining interactions among multiple crises and their systemic consequences. Complexity theory and systems thinking provide such a foundation by emphasizing interdependence, nonlinearity, adaptation, and emergence. Rather than treating international politics as a collection of isolated components governed by linear causal relationships, these approaches view the international system as a dynamic and evolving network characterized by feedback mechanisms and continuous interactions. Consequently, complexity theory offers a useful framework for understanding how contemporary polycrisis contributes to the transformation of international order.

Complexity theory emerged from interdisciplinary research in mathematics, biology, physics, and social sciences. Unlike reductionist approaches that seek to explain phenomena through isolated variables, complexity theory emphasizes relationships, interactions, and emergent properties. Morin (2008) argues that complex systems cannot be understood merely by analyzing their individual components because interactions among these components generate outcomes that transcend the characteristics of each part.

Similarly, complexity approaches reject assumptions of equilibrium and predictability. Systems evolve through nonlinear processes and often exhibit unexpected patterns of adaptation. Such perspectives have increasingly influenced

political science and public policy studies, particularly in contexts characterized by uncertainty and interdependence (Cairney 2012).

In international relations, complexity theory challenges conventional assumptions regarding stability and equilibrium by emphasizing continuous change and dynamic interactions. Contemporary global politics increasingly reflects these characteristics, making complexity theory particularly relevant for understanding systemic transformations.

One of the central concepts within complexity theory is that of complex adaptive systems. Such systems consist of multiple interconnected actors that continuously interact and adjust their behavior in response to changing conditions. Adaptation occurs not through centralized control but through decentralized interactions among system components (Holland 1992).

From this perspective, international order can be viewed as a complex adaptive system composed of states, international organizations, corporations, technological networks, and transnational actors. These actors interact across multiple domains, including security, economics, technology, health, and the environment. Their interactions generate outcomes that are often difficult to anticipate and cannot be reduced to the intentions of individual actors.

Recent transformations associated with fragmented multipolarity further reinforce this interpretation. The contemporary international system is characterized by multiple centers of influence and overlapping forms of cooperation and competition, producing patterns of adaptation that extend beyond traditional state-centric frameworks (Frag 2026d).

Nonlinearity and Emergence

Nonlinearity represents one of the defining characteristics of complex systems. In linear systems, proportional relationships exist between causes and effects. In contrast, complex systems frequently produce outcomes that are disproportionate to their initial causes. Small events may trigger large systemic consequences, while major interventions sometimes generate only limited effects.

The COVID-19 pandemic provides an illustrative example. Initially emerging as a public health crisis, it rapidly evolved into an economic, political, and geopolitical challenge that affected global supply chains, inflation, labor markets, and international cooperation. These consequences were not fully predictable because they resulted from interactions among interconnected systems rather than from a single causal mechanism.

Complex systems also exhibit emergence. Emergent phenomena arise from interactions among individual actors but cannot be explained solely by examining those actors independently. Fragmented multipolarity itself can be understood as an emergent outcome resulting from the interaction of geopolitical competition, economic interdependence, technological rivalry, and institutional change (Frag 2026d).

Another fundamental characteristic of complex systems is the existence of feedback loops. Positive feedback mechanisms amplify changes and accelerate systemic transformations, whereas negative feedback mechanisms contribute to stabilization and adaptation. Contemporary crises increasingly demonstrate the importance of such mechanisms. Energy shortages may contribute to inflation, which in turn influences

social unrest and political instability. Likewise, geopolitical tensions can disrupt trade and technological cooperation, creating secondary effects that reinforce strategic competition. These interactions produce cascading effects that spread across sectors and geographical regions, often generating consequences beyond the original source of disruption (Homer-Dixon et al. 2022).

The interconnected nature of resource competition illustrates these dynamics. Competition over strategic resources and energy security increasingly affects political alignments, economic development, and international stability, producing feedback processes that influence multiple dimensions simultaneously (Edmond 2026). Before discussing resilience and adaptation, Figure 1 summarizes the key principles of systemic complexity that characterize contemporary international politics.

Figure 1. Key Principles of Systemic Complexity

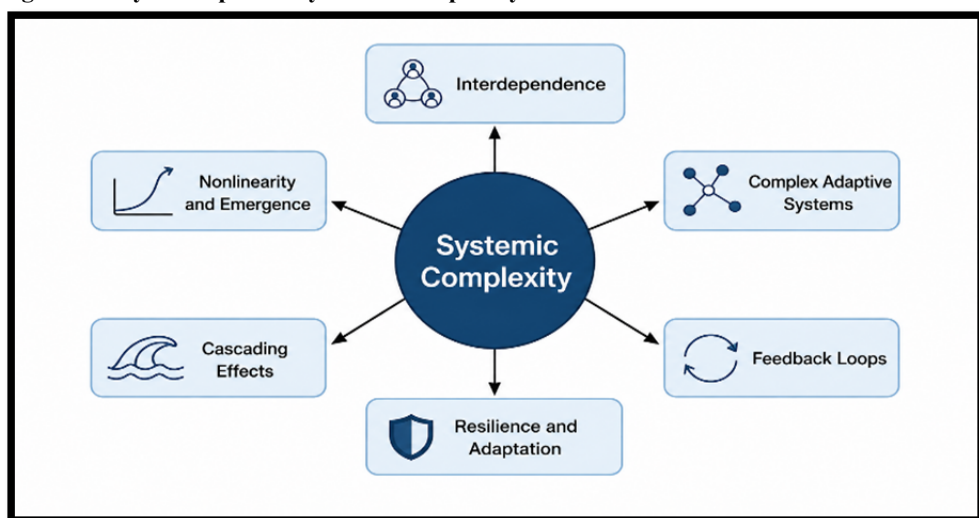


Figure 1 highlights that systemic transformations emerge from interactions among multiple mechanisms rather than from isolated events. These principles collectively explain why contemporary crises often produce outcomes that are difficult to predict and why international order increasingly behaves as a dynamic and adaptive system.

Resilience refers to the capacity of systems to absorb disturbances while maintaining their essential functions. Unlike traditional equilibrium models, complexity theory assumes that adaptation and transformation are continuous processes rather than exceptional events. Systems evolve through learning, experimentation, and institutional adjustments.

Recent developments demonstrate that international actors increasingly adopt adaptive strategies in response to uncertainty. States seek to diversify supply chains, enhance technological autonomy, strengthen energy security, and develop new forms of cooperation. These adaptive responses illustrate that resilience does not imply a return to previous conditions but rather the capacity to reorganize under changing circumstances. Moreover, adaptive processes contribute to broader transformations of

international order. As geopolitical rivalry intensifies and crises become increasingly interconnected, patterns of governance, alliances, and economic relations undergo continuous reconfiguration. Consequently, resilience and adaptation should be understood not merely as defensive mechanisms but as drivers of systemic change itself.

Taken together, complexity theory and systems thinking provide an analytical foundation capable of capturing the interactions, uncertainties, and adaptive processes that characterize contemporary international politics. By conceptualizing international order as a complex adaptive system, these approaches offer insights that conventional theories struggle to provide. Building upon these foundations, the next section develops the Systemic Complexity Framework, which constitutes the principal theoretical contribution of this article.

Having established the limitations of conventional theories and the analytical value of complexity theory, this section develops the central theoretical contribution of the article. Rather than understanding international order as a stable structure determined primarily by power distribution or institutional arrangements, this study conceptualizes it as a complex adaptive system characterized by continuous interactions among multiple actors, domains, and mechanisms. The proposed Systemic Complexity Framework seeks to explain how polycrisis generates transformation through interconnected and nonlinear processes. In doing so, the framework integrates insights from international relations, complexity theory, and recent studies on fragmented multipolarity, resource geopolitics, climate governance, and crisis management.

International Order as a Complex Adaptive System

The proposed framework rests on the assumption that international order behaves as a complex adaptive system. Unlike traditional approaches that emphasize equilibrium and predictability, complexity theory views systems as dynamic arrangements composed of interacting actors capable of adaptation and self-organization. Systemic outcomes emerge not from centralized control but from decentralized interactions among multiple actors operating under conditions of uncertainty (Holland 1992; Morin 2008).

This perspective is particularly relevant in the context of contemporary polycrisis. The interaction of geopolitical competition, economic interdependence, technological disruptions, climate change, and health emergencies has produced patterns of instability that cannot be adequately explained through isolated variables. Instead, these developments reveal the existence of interconnected processes that generate feedback loops and cascading effects across domains.

The transition from the post-Cold War unipolar order toward fragmented multipolarity further supports this interpretation. Contemporary systemic change does not follow a linear trajectory but emerges through interactions among geopolitical, technological, and economic factors. The growing fragmentation of power structures has created overlapping patterns of competition and cooperation, resulting in a more fluid and adaptive international system (Frag 2026c; Frag 2026d). Likewise, regional transformations increasingly reflect the influence of multiple interacting forces rather than the dominance of a single power center. This pattern is particularly visible in the

Middle East, where shifting alliances, regional competition, and external interventions have generated a more complex and fragmented regional order (Farag 2026c; Farag 2026d).

Consequently, international order should be understood as an evolving and adaptive system whose structure continuously changes through interactions among diverse actors and domains.

The Systemic Complexity Framework consists of three interdependent components: actors, domains, and mechanisms. Their interactions generate systemic outcomes that shape the evolution and transformation of international order.

International order is increasingly influenced by a broad spectrum of actors whose interactions transcend traditional state-centric assumptions.

States remain central actors in global politics. Nevertheless, their ability to address contemporary crises independently has diminished due to growing interdependence and external constraints. National responses increasingly depend on international cooperation, technological capabilities, and access to strategic resources.

Major powers continue to exercise disproportionate influence over systemic outcomes. However, contemporary competition extends beyond military capabilities and encompasses technology, finance, trade, and institutional influence. The emergence of fragmented multipolarity has intensified competition while simultaneously creating new patterns of selective cooperation (Farag 2026c; Farag 2026d).

International organizations play a critical role in managing crises and facilitating collective responses. However, geopolitical rivalries increasingly affect their effectiveness and legitimacy. The management of African crises illustrates how development assistance and humanitarian interventions are often intertwined with strategic and geopolitical considerations, revealing the complex relationship between governance and power politics (Edmond and Farag 2026).

Multinational corporations and technological firms have become major actors within global governance structures. Their influence extends across production networks, digital infrastructures, and technological innovation, granting them capacities that often rival those of states. Epistemic communities, advocacy networks, cities, and civil society organizations increasingly contribute to shaping agendas and mobilizing resources. Digital connectivity has further enhanced the role of networks in transmitting information and influencing policy responses.

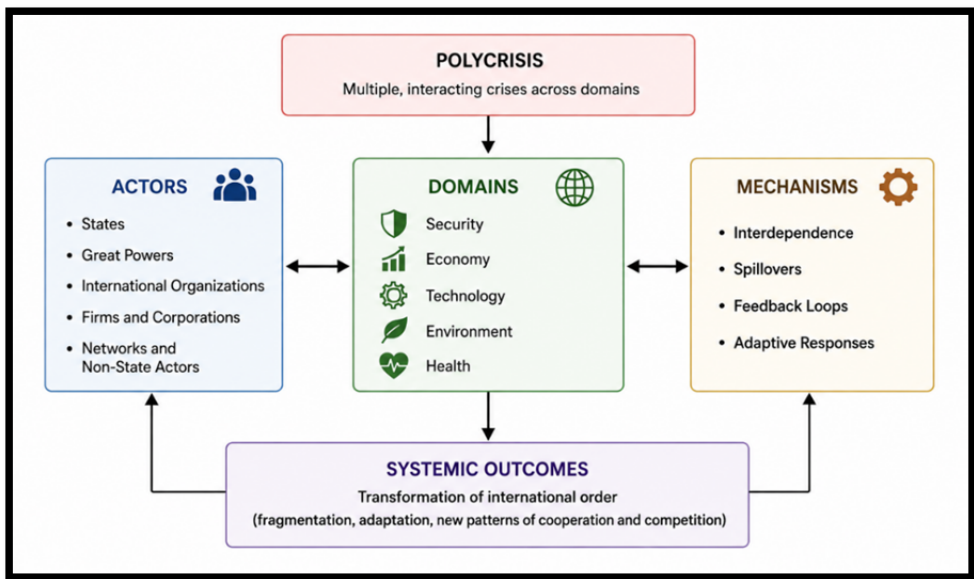
Polycrisis unfolds across several interconnected domains whose interactions produce systemic consequences. The security dimension encompasses interstate rivalry, regional conflicts, terrorism, migration, and asymmetric threats. Contemporary security challenges increasingly transcend traditional military concerns and involve multidimensional interactions between political, social, and economic factors. The Mediterranean region provides a clear example of how migration and asymmetric threats affect regional stability and security governance (Bibeau, Schriever, Bourbeau and Fournier 2025; Farag 2026c; Farag 2026d).

The economic dimension includes trade, financial systems, inflation, supply chains, and resource competition. Economic interdependence creates both opportunities and vulnerabilities, allowing disturbances to spread rapidly across sectors and regions.

Technology has emerged as a strategic domain influencing economic competitiveness, military capabilities, and global governance. Competition over artificial intelligence, digital infrastructure, and technological standards increasingly shapes international politics.

Climate change and environmental degradation have become major drivers of systemic instability. Environmental disruptions interact with migration, food insecurity, and economic vulnerability. Effective responses require multilevel governance and adaptive mechanisms capable of addressing interconnected challenges. Experiences from Egypt and Somalia demonstrate the importance of local adaptation and policy implementation in enhancing resilience under conditions of environmental uncertainty (Farang 2026c; Farang 2026d). Health crises constitute another essential dimension of polycrisis. The COVID-19 pandemic revealed how disruptions in public health rapidly evolve into economic and geopolitical crises through interconnected global networks. Before examining the mechanisms that connect actors and domains, Figure 2 illustrates the architecture of the Systemic Complexity Framework proposed in this study.

Figure 2. The Systemic Complexity Framework



The framework conceptualizes polycrisis as an initial condition that activates interactions among actors operating across multiple domains. Through mechanisms of interdependence, spillovers, feedback loops, and adaptive responses, these interactions generate systemic outcomes that transform international order (see Figure 2).

Interdependence creates channels through which shocks spread across political, economic, technological, and environmental systems. Globalization has increased connectivity but also amplified vulnerabilities. Disturbances originating in one domain frequently produce consequences in others. Resource competition, for example, affects economic development, security dynamics, and geopolitical alignments

simultaneously. The geopolitics of resources increasingly illustrates how economic and strategic considerations interact to shape contemporary international relations (Edmond 2026).

Complex systems are characterized by positive and negative feedback mechanisms that amplify or moderate change. Such feedback processes contribute to cascading effects and nonlinear outcomes, making prediction increasingly difficult. Actors continuously adjust strategies and institutions in response to changing circumstances. Adaptation influences governance structures, alliances, and patterns of cooperation. Consequently, resilience itself becomes a source of transformation rather than merely a mechanism for preserving existing arrangements.

The Systemic Complexity Framework

The Systemic Complexity Framework proposed in this article argues that international order is shaped by interactions among actors operating across interconnected domains through mechanisms characterized by interdependence, spillovers, feedback loops, and adaptive responses. Polycrisis serves as the catalyst that activates these processes and generates emergent outcomes.

Unlike conventional approaches that explain transformation through isolated variables, the framework recognizes that contemporary change is multidimensional and nonlinear. Structural transformations emerge from interactions rather than from predetermined trajectories. Consequently, international order should be understood as an evolving system whose behavior reflects the adaptive responses of diverse actors to interconnected crises.

By integrating insights from complexity theory, international relations, fragmented multipolarity, resource geopolitics, climate governance, and crisis management, the Systemic Complexity Framework provides a more comprehensive explanation of how polycrisis contributes to the transformation of international order. The following section examines the mechanisms through which these interactions produce fragmentation, resilience, and systemic reconfiguration.

Mechanisms of Transformation in International Order

Having established the Systemic Complexity Framework, it is now necessary to examine the processes through which polycrisis contributes to the transformation of international order. Rather than viewing systemic change as the result of isolated events or shifts in power distribution alone, the proposed framework emphasizes dynamic interactions among crises, actors, and domains. These interactions generate mechanisms that amplify disruptions, reshape institutions, and alter patterns of cooperation and competition. Contemporary transformations are therefore best understood as emergent outcomes arising from interconnected processes rather than predetermined trajectories.

One of the defining features of polycrisis is the tendency of disturbances originating in one domain to propagate across others. Unlike isolated crises, contemporary disruptions interact through interconnected systems, producing cascading effects that magnify vulnerabilities and create secondary and tertiary consequences. Such dynamics transform localized shocks into systemic challenges.

The COVID-19 pandemic illustrates this phenomenon. Initially emerging as a public health crisis, it rapidly disrupted global supply chains, generated inflationary pressures, intensified debt burdens, and altered geopolitical relations. Similarly, the Russia-Ukraine war produced consequences extending far beyond the battlefield, affecting energy markets, food security, and strategic alignments across regions. These examples demonstrate that crises increasingly spread through channels of interdependence and generate outcomes that cannot be understood through single-cause explanations (Homer-Dixon et al. 2022).

Climate change provides another illustration of cascading effects. Environmental degradation interacts with resource scarcity, migration pressures, and social instability, creating complex challenges that transcend national boundaries. Local climate governance and adaptation policies increasingly influence resilience at broader regional and international levels (Farang 2026a; Farang 2026b).

Consequently, the interaction among multiple crises transforms systemic vulnerabilities into a defining characteristic of contemporary international politics.

Nonlinear Dynamics

Traditional theories often assume relatively linear relationships between causes and outcomes. However, complex systems exhibit nonlinear dynamics in which small disturbances may produce disproportionate consequences. In such systems, outcomes are rarely predictable, and interactions among variables generate emergent effects that cannot be reduced to individual causes.

The contemporary transition from unipolarity to fragmented multipolarity demonstrates this nonlinearity. Systemic change has not followed a straightforward redistribution of power but has instead emerged through interactions among geopolitical competition, technological transformations, economic interdependence, and institutional fragmentation. These interconnected processes have generated a fluid and uncertain environment characterized by multiple centers of influence rather than a clearly defined polarity structure (Farang 2026c; Farang 2026d).

Similarly, strategic resource competition has increasingly produced nonlinear consequences. Energy disruptions influence inflation, inflation affects political stability, and political instability in turn shapes geopolitical alignments. Such interactions illustrate that contemporary transformations are characterized by feedback effects and unintended consequences rather than proportional relationships between causes and outcomes (Edmond 2026).

Therefore, understanding international order requires analytical frameworks capable of accounting for complexity, emergence, and uncertainty. As crises become increasingly interconnected, traditional governance mechanisms face growing limitations. Institutions originally designed to manage isolated problems often struggle to address multidimensional disruptions characterized by uncertainty and rapid change. Consequently, adaptation has become an essential feature of contemporary governance.

Adaptive governance refers to the capacity of institutions and actors to learn, adjust, and reorganize in response to changing conditions. Rather than relying solely on hierarchical decision-making, adaptive governance emphasizes flexibility, multilevel coordination, and continuous learning.

Recent experiences demonstrate the growing importance of such approaches. Climate adaptation policies increasingly require coordination between local and international actors. Evidence from Egypt and Somalia highlights the significance of multilevel governance and policy implementation in enhancing resilience under conditions of environmental uncertainty (Farang 2026c; Farang 2026d). Similarly, international responses to African crises reveal that governance mechanisms are increasingly shaped by the interaction between humanitarian objectives and geopolitical interests (Edmond and Farang 2026).

These developments indicate that governance structures themselves are evolving in response to polycrisis. Adaptation therefore becomes not only a mechanism of resilience but also a source of institutional transformation.

Fragmentation and Multipolarity

Another important mechanism through which polycrisis transforms international order is fragmentation. The interaction of geopolitical rivalry, technological competition, economic nationalism, and institutional distrust has weakened many assumptions associated with the liberal international order.

Rather than producing a stable multipolar system, contemporary transformations have generated fragmented multipolarity characterized by overlapping spheres of influence, selective cooperation, and increasing competition. Great powers compete simultaneously across military, technological, financial, and normative domains, creating patterns of rivalry that differ from previous polarity structures (Farang 2026c; Farang 2026d).

Regional systems have also experienced significant transformations. In the Middle East, changing power balances, shifting alliances, and external interventions have contributed to a more fluid and fragmented regional order. Structural transformations increasingly reflect interactions between global and regional dynamics rather than the dominance of a single actor or ideological framework (Farang 2026c; Farang 2026d).

Fragmentation is also evident in technological ecosystems, supply chains, and economic networks. The emergence of competing standards, sanctions regimes, and strategic decoupling reflects broader tendencies toward selective interdependence and differentiated globalization.

Thus, fragmentation should be understood not as evidence of systemic collapse but rather as an adaptive response to increasing complexity and uncertainty. Complex systems possess the capacity to adapt and reorganize in response to disturbances. Resilience does not imply a return to previous conditions but rather the ability to maintain functionality while undergoing transformation. Consequently, resilience and reconfiguration constitute essential mechanisms through which international order evolves.

Recent developments illustrate this process. States have sought to diversify supply chains, reduce strategic dependencies, and strengthen technological autonomy. Regional organizations have adapted to changing geopolitical conditions, while new forms of cooperation have emerged around energy security, critical minerals, and climate adaptation.

The geopolitics of resources further demonstrates how resilience and reconfiguration interact. Competition over strategic resources has accelerated efforts to develop alternative partnerships and strengthen regional cooperation mechanisms, thereby contributing to the emergence of new patterns of influence and interdependence (Edmond 2026).

Before concluding this section, Figure 3 summarizes the principal mechanisms through which polycrisis contributes to the transformation of international order.

Figure 3. Mechanisms Linking Polycrisis to International Order Transformation

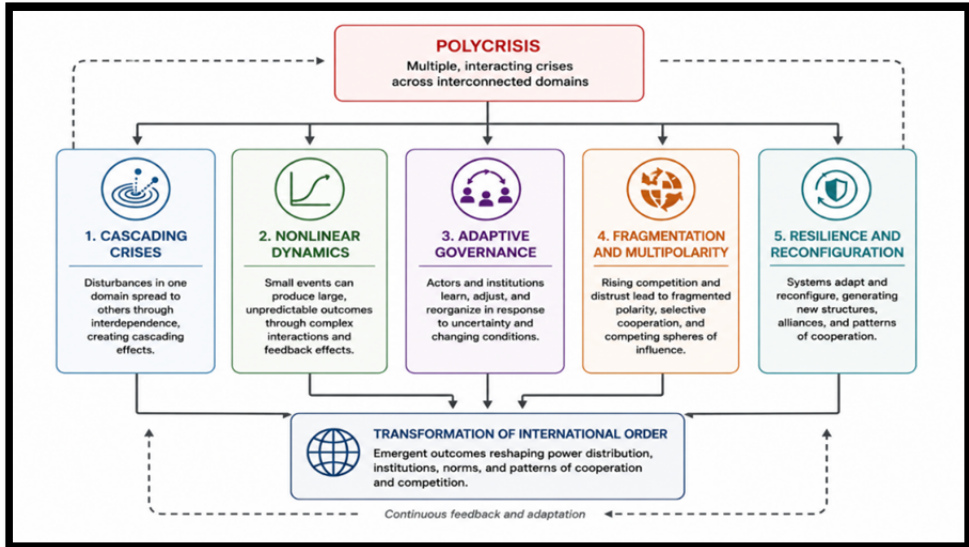


Figure 3 illustrates that polycrisis generates systemic transformation through interconnected mechanisms rather than through isolated causal pathways. Cascading crises, nonlinear dynamics, adaptive governance, fragmentation, and resilience interact continuously to reshape patterns of cooperation, competition, and governance.

Taken together, these mechanisms demonstrate that international order evolves through dynamic processes characterized by uncertainty and complexity. Transformation is therefore neither linear nor predetermined. Instead, it emerges from interactions among crises, actors, and institutions operating across interconnected domains. Understanding these mechanisms provides the foundation for examining empirical manifestations of polycrisis, which constitute the focus of the following section.

Illustrative Cases of Polycrisis

The theoretical framework developed in the preceding sections suggests that contemporary transformations in international order are driven not by isolated crises but by the interaction of multiple disruptions across interconnected domains. To demonstrate the explanatory utility of the Systemic Complexity Framework, this

section presents four illustrative examples of polycrisis. These examples are not intended as comprehensive comparative case studies but rather as empirical illustrations of how crises interact, generate cascading effects, and contribute to systemic transformation. Together, they demonstrate that contemporary challenges increasingly transcend sectoral boundaries and produce consequences that reshape patterns of governance, competition, and interdependence.

COVID-19 and Global Supply Chains

The COVID-19 pandemic represented one of the most significant manifestations of polycrisis in the twenty-first century. Although initially viewed as a public health emergency, the pandemic quickly evolved into a multidimensional crisis affecting economic production, international trade, labor markets, and geopolitical relations (Baldwin and Weder di Mauro 2020). Lockdowns and restrictions on mobility disrupted global supply chains and exposed the vulnerability of highly interconnected production networks. Shortages of semiconductors, medical equipment, and strategic commodities revealed the fragility of contemporary globalization and highlighted the risks associated with excessive dependence on geographically concentrated supply chains (Laborde, Martin, and Vos 2021).

The pandemic also accelerated structural trends that had emerged before 2020. Governments increasingly adopted policies aimed at strengthening resilience through reshoring, friend-shoring, and diversification strategies. At the same time, the crisis intensified debates concerning strategic autonomy and the balance between efficiency and security in global economic networks (Baldwin and Weder di Mauro 2020). Consequently, what began as a health crisis evolved into a broader challenge affecting economic governance, geopolitical competition, and technological development.

More importantly, the pandemic illustrated how crises originating in one domain can generate cascading effects across others. Health disruptions influenced trade, trade disruptions contributed to inflation, and inflation created political and social consequences. Such interactions provide a clear example of how contemporary crises produce systemic outcomes that extend far beyond their original context.

Russia–Ukraine War and Energy Security

The Russia-Ukraine war provides another illustration of polycrisis dynamics. Although the conflict emerged primarily as a geopolitical and security crisis, its effects rapidly extended into energy markets, food systems, inflation, and international trade (Yergin 2020). Sanctions imposed on Russia and disruptions in energy exports contributed to rising oil and gas prices, creating economic pressures that affected states far beyond the immediate theater of conflict.

The war also exposed the strategic implications of energy interdependence. European dependence on Russian energy transformed economic linkages into geopolitical vulnerabilities and accelerated efforts to diversify suppliers and invest in alternative energy sources (Yergin 2020). Simultaneously, interruptions in grain exports affected food security, particularly in developing countries dependent on

imports from Ukraine and Russia. Rising food prices and inflationary pressures generated additional political and social consequences across different regions. These developments demonstrate that contemporary conflicts generate cascading effects extending beyond traditional security concerns. The interaction between energy, economics, and geopolitics illustrates how disturbances in one domain can produce consequences throughout the international system, reinforcing the multidimensional character of polycrisis.

Climate Change and Food Security

Climate change represents one of the most persistent and complex dimensions of contemporary polycrisis. Rising temperatures, extreme weather events, droughts, and floods increasingly affect agricultural production and food systems, creating significant economic and social challenges (IPCC 2023). Environmental degradation interacts with migration, resource scarcity, and political instability, generating consequences that extend far beyond ecological concerns.

Food security has emerged as one of the clearest manifestations of these interactions. Changes in precipitation patterns and increasing climate variability threaten agricultural productivity and amplify vulnerabilities among developing countries. These pressures are further intensified by existing inequalities and weak institutional capacities, creating conditions that may contribute to social unrest and population displacement (IPCC 2023).

Unlike sudden crises, climate change unfolds gradually while interacting continuously with other sources of instability. Consequently, environmental challenges should not be viewed as isolated phenomena but rather as integral components of broader systemic transformations. The relationship between climate change and food security demonstrates how long-term environmental processes contribute to the complexity of contemporary international order.

US-China Technological Rivalry

Technological competition between the United States and China illustrates how innovation and digital infrastructure have become central arenas of strategic competition. Rivalry increasingly extends beyond military capabilities to encompass semiconductors, artificial intelligence, telecommunications, cyber capabilities, and digital governance (Allison 2017). Technological superiority has become closely associated with economic competitiveness and geopolitical influence, transforming innovation into a strategic asset.

Competition over technological leadership has generated important consequences for globalization and economic interdependence. Export controls, restrictions on semiconductor technologies, and investment limitations have contributed to the fragmentation of global technological ecosystems and accelerated tendencies toward selective decoupling (Farrell and Newman 2023). Competing technological standards and digital governance models have further reinforced divisions within the international system.

The growing strategic importance of technology demonstrates that economic, security, and technological dimensions are increasingly inseparable. As a result, technological rivalry has become a critical driver of systemic transformation and an important component of contemporary polycrisis.

Before concluding this section, Table 3 summarizes the interactions among the illustrative cases and highlights their broader implications for international order.

Table 3. Illustrative Cases of Polycrisis and Systemic Effects

Illustrative Case	Primary Domain	Interacting Domains	Major Systemic Effects
COVID-19 Pandemic	Health	Economy, Technology, Politics	Supply chain disruptions, inflation, strategic autonomy
Russia-Ukraine War	Security	Energy, Economy, Food Security	Energy transition, geopolitical realignment, inflation
Climate Change	Environment	Food Security, Migration, Economy	Resource scarcity, social instability, adaptation policies
US-China Rivalry	Technology	Security, Economy, Governance	Technological fragmentation, selective decoupling

Table 3 demonstrates that contemporary crises rarely remain confined to a single sector. Instead, interactions among health, security, economic, technological, and environmental domains generate systemic consequences that reshape patterns of cooperation, competition, and governance. These examples provide empirical support for the Systemic Complexity Framework developed in this article and illustrate how polycrisis contributes to the transformation of international order through interconnected mechanisms rather than isolated events.

The following section examines the broader implications of these transformations for international order, focusing on fragmented multipolarity, strategic competition, challenges to global governance, and emerging patterns of cooperation and rivalry.

Implications for International Order

The preceding analysis suggests that polycrisis is not merely a collection of simultaneous disruptions but a systemic condition capable of reshaping the foundations of international order. The interaction of geopolitical competition, economic interdependence, technological fragmentation, environmental pressures, and institutional challenges has generated patterns of transformation that cannot be adequately understood through conventional frameworks. Rather than leading to a clear transition toward a new stable order, these developments have produced a more fragmented, adaptive, and uncertain international environment. This section examines the broader implications of polycrisis for the evolution of international order and the changing patterns of global governance and strategic interaction.

From Liberal Order to Fragmented Multipolarity

The post-Cold War liberal international order was characterized by expectations of increasing globalization, institutional cooperation, and the predominance of a relatively

stable unipolar structure. However, recent developments have undermined many of these assumptions. Strategic rivalry, economic nationalism, technological competition, and geopolitical fragmentation have weakened the foundations of the liberal order and contributed to the emergence of a more complex and decentralized system (Ikenberry 2018).

Rather than producing a classical multipolar system, contemporary transformations have generated what may be described as fragmented multipolarity. In this environment, multiple centers of influence coexist without clear hierarchical arrangements, and patterns of cooperation and competition overlap across different domains (Farag 2026a; Farag 2026b). Power is increasingly exercised through economic leverage, technological capabilities, and control over strategic resources rather than through military capabilities alone.

This transformation is particularly evident in regional systems. In the Middle East, changing power balances and shifting alliances have generated a more fluid and fragmented regional order characterized by overlapping spheres of influence and selective partnerships (Farag 2026c). Similar patterns are observable in other regions where external powers, regional actors, and non-state entities interact within increasingly complex geopolitical environments.

Consequently, contemporary international order appears less as a coherent system governed by common rules and more as a flexible and fragmented structure characterized by differentiated forms of cooperation and competition.

Strategic Competition under Complexity

Polycrisis has altered the nature of strategic competition. Traditional understandings focused primarily on military capabilities and territorial rivalries. However, contemporary competition increasingly extends into economic, technological, financial, and informational domains. States seek to enhance resilience, secure access to critical resources, and strengthen technological autonomy in response to growing uncertainty (Farrell and Newman 2019).

Competition between major powers now involves control over digital infrastructure, supply chains, artificial intelligence, rare earth minerals, and energy systems. Such multidimensional rivalry creates complex patterns of interdependence in which competition and cooperation coexist simultaneously. Strategic relationships increasingly involve selective decoupling rather than complete disengagement.

The geopolitics of resources further illustrates this transformation. Access to strategic minerals, energy supplies, and critical infrastructure has become closely linked to national security and geopolitical influence. Resource competition increasingly shapes patterns of alliances, investment, and diplomatic engagement, reinforcing the multidimensional nature of strategic rivalry (Edmond 2026).

Under conditions of systemic complexity, strategic competition becomes less predictable and more adaptive. States continuously adjust their strategies in response to changing circumstances, generating dynamic interactions that reshape international order.

Challenges to Global Governance

Polycrisis has exposed important limitations in existing mechanisms of global governance. Institutions designed to address specific issues often struggle to cope with interconnected and multidimensional crises. Fragmentation among major powers and increasing geopolitical tensions have reduced the effectiveness of multilateral cooperation and complicated collective responses to global challenges (Hale, Held and Young 2013).

At the same time, governance itself has become increasingly politicized. Humanitarian assistance, development programs, and crisis management mechanisms are frequently influenced by geopolitical considerations. The experience of European engagement in African crises demonstrates how development objectives and strategic interests increasingly intersect, creating complex patterns of cooperation and competition (Edmond and Farag 2026).

Environmental governance provides another example of these challenges. Climate adaptation requires coordination among local, national, and international actors operating across multiple levels. Effective governance increasingly depends on flexibility, institutional learning, and adaptive capacities rather than rigid hierarchical structures (Farag 2026d).

These developments suggest that future governance arrangements are likely to become more decentralized and networked. Rather than relying exclusively on universal institutions, international cooperation may increasingly emerge through flexible coalitions and issue-specific partnerships.

New Patterns of Cooperation and Rivalry

Despite increasing fragmentation, polycrisis does not necessarily imply systemic collapse. Instead, contemporary transformations are producing new forms of cooperation and rivalry. States increasingly engage in selective partnerships based on specific interests and issue areas. Cooperation in climate governance, public health, and energy transitions may coexist with competition in technology, trade, and security.

Middle powers have also acquired greater significance within this evolving landscape. Rather than aligning exclusively with major powers, many states pursue flexible strategies aimed at maximizing autonomy and diversifying partnerships. Such behavior reflects the growing complexity of international relations and the decline of rigid bloc politics (Farag 2025).

Furthermore, adaptive forms of regionalism and minilateralism are becoming increasingly important. Smaller coalitions and functional arrangements often provide more flexible responses to specific challenges than universal institutions. These developments suggest that international order is evolving toward a more pluralistic and differentiated structure.

Before concluding, it is important to emphasize that the interaction of competition and cooperation constitutes one of the defining features of contemporary international politics. Polycrisis has not eliminated interdependence; rather, it has transformed its nature and generated new configurations of power and governance.

Taken together, these developments indicate that international order is entering a phase characterized by fragmented multipolarity, multidimensional strategic competition, adaptive governance, and differentiated patterns of cooperation. Understanding these transformations requires moving beyond traditional dichotomies and recognizing the complexity and interconnectedness that increasingly define world politics.

Theoretical Contributions

Beyond explaining contemporary transformations, this article seeks to contribute to ongoing theoretical debates in international relations by proposing an alternative framework for understanding systemic change under conditions of polycrisis. Existing approaches have generated important insights into the sources of order and instability, yet they often treat crises as separate phenomena and assume relatively linear patterns of causality. By integrating insights from complexity theory and international relations, the Systemic Complexity Framework developed in this study offers a broader perspective capable of capturing the interconnected and adaptive nature of contemporary transformations.

The theoretical contributions of this study are organized around four interrelated dimensions. First, the article conceptualizes polycrisis as a systemic condition rather than a temporary accumulation of disruptions. Second, it establishes a dialogue between complexity theory and international relations scholarship. Third, it challenges conventional linear models of systemic change. Finally, it advances a complexity-based approach to the study of international order and global transformations.

Polycrisis as a Systemic Condition

One of the principal contributions of this article is the reconceptualization of polycrisis as a systemic condition rather than a collection of independent crises. Existing analyses frequently interpret crises as temporary disturbances that interrupt otherwise stable patterns of international interaction. Such interpretations implicitly assume that systems eventually return to equilibrium once crises subside.

This article advances a different perspective. Polycrisis is understood as a persistent condition characterized by the interaction of multiple crises across interconnected domains. Under these conditions, instability itself becomes a structural feature of international politics rather than an exceptional event. Economic disruptions, geopolitical rivalry, technological competition, environmental pressures, and health emergencies interact continuously, producing cascading effects and reinforcing systemic vulnerabilities (Tooze 2022).

Consequently, the transformation of international order should not be interpreted as the result of isolated events but rather as the outcome of continuous interactions among overlapping crises. This perspective shifts attention from individual crises toward the mechanisms that connect them and generate systemic change.

Complexity and International Relations Theory

A second contribution of this study lies in its effort to establish a stronger dialogue between complexity theory and international relations scholarship. Although complexity approaches have influenced various disciplines, their integration into mainstream international relations remains limited. Traditional theories continue to focus primarily on power distributions, institutions, and identities, often overlooking the interactions among multiple domains and actors.

By conceptualizing international order as a complex adaptive system, this article extends existing theoretical approaches and highlights the importance of interdependence, emergence, adaptation, and feedback mechanisms. Such an approach complements rather than replaces established theories. Realism continues to provide insights into strategic competition, liberalism explains institutional cooperation, and constructivism illuminates the role of ideas and norms. However, complexity theory offers an overarching framework capable of integrating these perspectives within a broader understanding of systemic interactions (Morin 2008).

The concept of fragmented multipolarity further illustrates the relevance of this perspective. Contemporary transformations emerge through interactions among geopolitical, economic, technological, and institutional factors rather than through changes in material capabilities alone (Farag 2026a). Thus, complexity theory provides a more comprehensive lens for analyzing contemporary international politics.

Beyond Linear Models

A third contribution concerns the critique of linear approaches to systemic change. Much of the existing literature assumes relatively proportional relationships between causes and outcomes. Structural transformations are frequently explained through singular variables such as shifts in polarity, institutional decline, or economic crises.

However, contemporary developments increasingly reveal the limitations of such assumptions. The COVID-19 pandemic, technological rivalry, climate change, and resource competition demonstrate that small disturbances may generate disproportionate consequences through cascading effects and feedback loops. Conversely, large interventions do not always produce predictable outcomes. These characteristics indicate that international politics is shaped by nonlinear processes and emergent phenomena rather than by straightforward causal relationships (Holland 1992).

The Systemic Complexity Framework therefore moves beyond reductionist explanations by emphasizing interactions, uncertainty, and adaptive processes. This approach provides greater analytical flexibility for understanding contemporary transformations and the multidimensional nature of international order.

Toward Complexity-Based International Analysis

The final contribution of this article is the development of a complexity-based approach to international analysis. Rather than focusing exclusively on states or single domains, the proposed framework incorporates multiple actors, interconnected domains, and dynamic mechanisms. States, international organizations, firms, and networks interact across security, economic, technological, environmental, and health

dimensions through processes characterized by interdependence, spillovers, feedback loops, and adaptation.

This perspective encourages a shift from equilibrium-based models toward approaches that emphasize resilience, uncertainty, and systemic interactions. It also broadens the understanding of power by recognizing the importance of technological capabilities, resource networks, governance arrangements, and adaptive capacities. Resource geopolitics, climate governance, and strategic competition increasingly demonstrate that power is exercised through complex channels rather than through military capabilities alone (Edmond 2026).

More broadly, the framework contributes to emerging debates concerning the transformation of international order under fragmented multipolarity. Instead of viewing systemic change as a transition from one stable order to another, complexity-based analysis emphasizes continuous adaptation and reconfiguration (Farag 2026a). Such an approach is better suited to understanding the uncertainty and fluidity that characterize contemporary global politics.

Taken together, these contributions suggest that international order should be understood not as a fixed structure but as an evolving complex adaptive system. Polycrisis, therefore, represents more than a series of concurrent disruptions; it constitutes a systemic condition that continuously reshapes patterns of cooperation, competition, and governance. By integrating complexity theory with international relations scholarship, the Systemic Complexity Framework offers a new analytical lens for examining the transformations of the twenty-first century and provides a foundation for future theoretical and empirical research.

Limitations and Future Research

While the Systemic Complexity Framework developed in this article offers a broader perspective for understanding the transformation of international order under conditions of polycrisis, several limitations should be acknowledged. Recognizing these limitations is important not only for evaluating the scope of the proposed framework but also for identifying promising directions for future research.

First, this study is primarily conceptual and theory-building in nature. The framework has been developed through analytical synthesis and qualitative reasoning rather than through systematic empirical testing. Although illustrative cases have been used to demonstrate its explanatory relevance, the relationships among actors, domains, and mechanisms require further empirical validation. Future studies could employ comparative case studies, longitudinal analyses, and mixed-method approaches to assess the explanatory power of the framework across different contexts and time periods (George and Bennett 2005).

Second, the framework emphasizes interactions and complexity but does not provide a quantitative assessment of the intensity and direction of these interactions. The dynamic relationships among security, economics, technology, health, and environmental domains are inherently difficult to measure. Consequently, future research could utilize network analysis and complexity metrics to map patterns of interdependence and identify critical nodes through which crises propagate. Such

approaches would make it possible to examine cascading effects and feedback mechanisms more systematically (Newman 2018).

Third, the article focuses primarily on global-level transformations and provides only illustrative references to regional dynamics. Since the effects of polycrisis vary across geographical and political contexts, comparative regional analyses represent an important avenue for future investigation. Regional orders in the Middle East, Africa, Europe, and the Indo-Pacific are shaped by distinct historical experiences and institutional arrangements, suggesting that the mechanisms of systemic transformation may differ across regions. Comparative studies could therefore contribute to a more nuanced understanding of how complexity and polycrisis influence international order under different conditions (Frag 2026a; Frag 2026d).

Fourth, the framework treats adaptation and resilience as central mechanisms of systemic transformation but does not fully explore the role of agency and decision-making processes. Future research may benefit from examining how leaders, institutions, and non-state actors respond to uncertainty and how these responses shape systemic outcomes. Such analyses could provide greater insight into the relationship between individual choices and emergent patterns of change.

Finally, advances in computational social science create new opportunities for extending complexity-based approaches in international relations. Agent-based modeling, simulation techniques, and machine learning tools could be employed to explore nonlinear interactions and emergent behaviors within complex international systems (Miller and Page 2007). These approaches would allow researchers to investigate scenarios that are difficult to capture through conventional analytical methods and contribute to the development of a more rigorous complexity-oriented research agenda.

Despite these limitations, the present study provides a foundation for integrating complexity theory and international relations scholarship. Future research combining conceptual innovation with empirical and computational approaches has the potential to enhance our understanding of polycrisis and its implications for the evolution of international order. Rather than representing a final theoretical statement, the Systemic Complexity Framework proposed in this article should be viewed as a starting point for further research into the increasingly interconnected and uncertain dynamics of global politics.

Conclusion and discussion

This article has argued that the contemporary international system is increasingly shaped by the interaction of multiple and interconnected crises whose combined effects transcend conventional analytical boundaries. Rather than representing isolated disturbances, geopolitical competition, pandemics, climate change, technological fragmentation, energy insecurity, and economic disruptions interact through complex mechanisms that amplify vulnerabilities and generate systemic consequences. These developments suggest that the concept of polycrisis captures an emerging condition of international politics characterized by persistent uncertainty, nonlinear dynamics, and continuous adaptation.

The analysis has shown that existing approaches in international relations provide important insights into particular dimensions of international order but encounter limitations when confronted with the multidimensional nature of contemporary transformations. Realism explains power competition, liberalism highlights institutions and interdependence, constructivism emphasizes ideas and identities, and international political economy illuminates the relationship between politics and economics. However, none of these approaches alone adequately captures the interactions among simultaneous crises and the mechanisms through which they collectively reshape international order.

To address this theoretical gap, the article introduced complexity theory and systems thinking as analytical foundations for understanding contemporary transformations. Building upon these insights, it proposed a Systemic Complexity Framework that conceptualizes international order as a complex adaptive system composed of multiple actors operating across interconnected domains through mechanisms characterized by interdependence, spillovers, feedback loops, and adaptive responses. From this perspective, systemic change emerges not through isolated events or predetermined trajectories but through dynamic interactions among political, economic, technological, environmental, and health-related processes.

The framework developed in this study further demonstrated that contemporary transformations are driven by several interconnected mechanisms. Cascading crises, nonlinear dynamics, adaptive governance, fragmentation, and resilience contribute to the continuous reconfiguration of international order. The illustrative cases examined in this article, including the COVID-19 pandemic, the Russia-Ukraine war, climate change, and US-China technological rivalry, provided empirical examples of how crises interact and generate consequences extending across multiple domains. These cases highlighted the growing inadequacy of compartmentalized approaches and reinforced the importance of understanding international politics through the lens of complexity.

One of the central arguments advanced in this article is that polycrisis should be understood as a systemic condition rather than as a temporary accumulation of unrelated disruptions. Contemporary instability no longer represents an exceptional deviation from equilibrium but increasingly constitutes a defining characteristic of international politics. Under conditions of fragmented multipolarity, interactions among multiple centers of power, technological competition, resource geopolitics, and environmental challenges generate patterns of cooperation and rivalry that are fluid, adaptive, and often unpredictable. Consequently, international order should be viewed not as a fixed structure but as an evolving and dynamic system whose behavior reflects continuous processes of adaptation and reconfiguration.

The article also contributes to the growing dialogue between complexity theory and international relations scholarship. By integrating concepts such as emergence, interdependence, and adaptive systems into the study of international order, the proposed framework provides an alternative perspective capable of complementing existing theoretical traditions. Rather than replacing established approaches, complexity-based analysis offers a broader lens through which the interactions among

crises and the multidimensional nature of systemic transformation can be better understood.

Ultimately, the transformation of international order in the twenty-first century cannot be adequately explained through linear models or isolated variables. Contemporary global politics increasingly resembles a complex adaptive system characterized by interconnected crises, nonlinear interactions, and evolving patterns of governance. The Systemic Complexity Framework proposed in this article offers a new analytical lens for understanding these dynamics and provides a foundation for future research on polycrisis and the changing architecture of international order. As uncertainty and interdependence continue to intensify, complexity-based approaches are likely to become increasingly important for explaining the evolving nature of global politics and the challenges confronting international society.

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Ethics Statement

The author affirms that this research was conducted in accordance with the Journal's Research Ethics and Integrity Statement and that all ethical requirements applicable to the study have been fulfilled.

Conflict of Interest Statement

The author declares no conflict of interest.

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