

Il tema

On the Edge of Chaos: From Resilient System to Catastrophic Break Point

Sull'orlo del caos: dal sistema resiliente al punto di frattura catastrofico

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Abstract. Chaos's widespread diagnosis of global instability calls into question the systemic approach (indeterminism and complexity) that was the cornerstone not only of analysis but also of technocratic management, during the golden years of neoliberalism, above all through the metaphor of resilience. Today, an absolutized version of chaos prevails, enabling a centralized and un-mediated political/economic command, supported by the evidence-based algorithmic decision-making. Yet, from an epistemic (and social) point of view, chaos also opens bifurcations at the point of catastrophe.

Keywords: chaos theory, complex systems, neoliberal governance, resilience, unpredictability.

Riassunto. La diffusa diagnosi dell'instabilità globale in termini di caos problematizza l'approccio sistemico fondato sulla coppia concettuale indeterminismo/complessità, che costituiva la chiave di volta non solo delle analisi ma anche della gestione tecnocratica, durante gli anni d'oro del neoliberismo, soprattutto attraverso la metafora della resilienza. Oggi prevale una versione assolutizzata del caos che consente un comando politico-economico centralizzato e non mediato, supportato da un processo decisionale algoritmico basato sull'evidenza. Eppure, da un punto di vista epistémico (e sociale), il caos apre anche delle biforcazioni sul punto di catastrofe.

Parole chiave: teoria del caos, sistemi complessi, governance neoliberale, resilienza, imprevedibilità.

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1. Introduction. The Crisis of the Systemic Approach: Inside or Beyond?

This essay delves into the mutual influence between the current governance of global instability and the epistemic paradigms that support and are supported by it.

Calling this situation *Chaos*, as many do, questions the systemic approach based on the conceptual indeterminism/complexity pair, the keystone of understanding and global governance in the golden years of neoliberalism. Today, a chaotic version of that systemic paradigm is prevailing, which strains it to the point, perhaps, of overturning it. This onto-epistemic slippage is reflected in the flanking and over-ordination of political/economic command and control bent on security, over neoliberal management. A power structure based on control and automation is attached to an absolutized and unpredictable chaotic indeterminism.

It may then be useful to question the onto-epistemology of chaos. It is scientific, and its preferential socio-political interface is managerial-technocratic, effective because it is widespread in common sense. Therefore, its ambivalence and contestability must be explored. What hybrid metaphors, between common language and science, have been (or can be) derived from an onto-epistemology that speaks of bifurcations, points of catastrophe, strange attractors...?

It's more and more difficult to think that what we are going through is an infra-systemic transition, as in the paradigm, that is in many ways enlightening, of the historical-theorist of the world-system. And it's difficult because, however confirmed the systemic constants are (the centrality of the capitalist Weltmarkt and its *structural* connection with the political), perhaps the very self-referential character of the systemic approach (an indispensable acquisition of contemporary epistemology) implies a succession of systemic equilibria that emerge from each other; it therefore has difficulty grasping the discontinuity that messes up the interrelations, the emergence of a truly unforeseen *new*.

Moreover, the *transition* is apparent: the system is besieged by such a disorderly, critical reality that the great effort of systemic-cybernetic control and adaptation, effective in the neoliberal heyday, gives way hastily. The centrifugal forces of the many regions, unsatisfied with their peripheral status, which Arrighi¹ had already pointed out, the financialization of capitalism as a sign of the never-ending and yet-to-be-ending decline of US hegemony, and the endless and always-unresolved wars, are clear signs of the transition. But they do not exhaust the variables that today make it impossible to glimpse the *passing* that the idea of transition brings to mind.

¹ Arrighi, Silver, *Chaos and governance in the modern world system*.

What is missing above all – and in my view, this is crucial – is the accelerated and all-encompassing irruption of algorithmic technology, with the power it exerts both over decision-making and in the renewed and peremptory revitalization of military force: indeed, in the last decade, it has caused a fracture deeper than previous capitalist transitions/revolutions.

In the time of emphasis on globalization, new technology has provided decisive support to complex systems cybernetic thinking in managing an *open*, dynamic, systemic indeterminism.

Today, it provides the shaky system *on the edge of chaos*, with powerful tools of governing/intervening that deeply alter the exercise of military force, labor management and population control. Yet it is not without potential alternative uses.

The typical idea of the *global liberal order* years, under US hegemony, of being inside a complex system of interdependencies open to the plasticity of life where emergency was a positive chance; this idea, which the cybernetics theoretical and ideological revolution supported, setting itself as a *universal method* of communication and control across all fields of post-determinist knowledge and action; that idea, in the pressing of very serious endogenous crises, twists uncertainty/positive chance towards a pessimistic, anxiety-filled insecurity.

We speak of chaos: the world is thrown into a chaotic transition, without being able to imagine new equilibria. The dynamic balance of the system of global interdependencies (of geopolitics, finance, energy and logistics, labor and culture, health and climate: all subsystems, complex and dynamic in their own right, that cybernetics modeled and stochastically managed) proves incapable of the most typical systemic performance: adapting and absorbing emergencies through adequate feedback, metabolizing crises by growing on them, self-organizing at a higher level.

The system, instead, dies without dying, just as liberal democracy and the technocratic yet regulated governance that supported it, die without dying. Everything remains and is distorted. Everything coexists without synthesis; centrifugal forces reach the point of systemic non-tolerability. And so, in the onto-epistemology of complex and nonlinear systems, the focus shifts to a long-marginal field, due to its limited, always very short-term oriented, predictive capacity: chaos theory. It provides the heuristic tool of the *point of catastrophe*, the edge of chaos, where, due to exogenous and endogenous perturbations, the system moves away from the safety zone of homeostatic mechanisms.

This lexicon (rare in analyses, such as mine, that refer to the genealogical and historical paradigm) just belongs to the scientific-practical paradigm of the cybernetics of complex systems. Keeping it in mind is required by a genealogical analysis of the knowledges/powers that underlie

governmental technologies: it fuels (and in turn is fueled by) the neoliberal conceptual and metaphorical devices and follows its eclipse. Terms such as cataclastic order, plasticity, autopoiesis, order by noise, retroaction and feedback, without fail, are rethought or give way to those of chaos theory: catastrophe, bifurcation, unpredictability, strange attractor, non-proportionality of effects... The belated and fluctuating fortune of chaos theory – which, mostly ignored when it emerged in the late nineteenth century and up until the sixties, after a rapid success in the eighties, falls into disinterest and today comes back, driven both by the urgency of the climate crisis and meteorology (the science of chaos par excellence), and even more so by the current *Zeitgeist* filled with insecurity – attests to its (preter-intentional!) socio-political use.²

From the *catastrophic* event of 2001, which revealed the unseen anger of peripheral peoples, to the implosion of the financial system in 2007/08 (the black swan event we will return to), the chaos metaphors multiply. Not only does the term *chaos* appear in the lucid analysis of the latest Arrighi, but it also recurs in mainstream political scientists' analysis, in economic and social theories, in management textbooks, and even in psychoanalysis.³ As well as, of course, in everyday language.

Chaos theory, which, as we will see, in science refers to complex, non-linear systems in which an infinitesimal and seemingly irrelevant variation gives rise to abnormal, in fact unpredictable, effects, shows a paradoxical intertwining of the determinism of highly irregular (mathematical deterministic chaos detects, in chaotic behaviors, not predictable regularities, following fuzzy logics) and the recognition, *scientific and therefore indisputable* of a very limited or irrelevant predictability. This *incoherent coexistence* – developing on the systemic generative emergentism well-managed by cybernetics – becomes the hallmark of our contemporary world.⁴ Even more incoherent, as information technology, crucial to cybernetic governance but also key to diagnosing chaos, retains its own aim of control, while shifting the increasingly difficult stochastic prediction toward non-causal forms of induction based on pure correlation and contiguity. Chaos cannot be represented by causal processes, but only by top-

² The steps in the formalization of complex nonlinear systems range from Poincaré to the meteorologist Lorenz, "Deterministic Nonperiodic Flow," and, in the 1980s, to Prigogine, *Les Lois des Chaos*; Thom, *Paraboles et catastrophes*, outlined the morphogenetic nature of catastrophes.

³ Arrighi, Silver, *Chaos and governance*. See also the pointed introduction of Mezzadra, "Introduzione alla nuova edizione"; Bull, *The anarchical society*; Kavalski, *World Politics at the Edge of Chaos*; Saperstein, "Chaos in models of arms races and the initiation of war"; Goodwin, *Chaotic Economic Dynamics*; Navarro, Arteta, "Chaos in human behaviour."

⁴ Bazzicalupo, "Coesistenza."

ological patterns, drawn only by computer, as emerging from a limitless collection of micro-data. Computation does not produce prediction, but rather a figurative simulation of the possible. This is a powerful injection of contingency into a global systemic interdependence that, until a few decades ago, seemed indeterminate but governable, optimizable, thanks to the vital power of creative adaptation.

In chaotic systems, control, the primary aim of technoscience, coexists with its own failure. We only have historical series that can always be disproved. What if complexity were so indeterminate as to be ungovernable?

Contingency, recognized and metabolized by systemic theories, is absolutized in a dark feeling of ultimate risk of life itself; it creates fear and opens up a margin (which can be an abyss) of ungovernability. Then only a command external to the system, external to the dissolving cybernetic homeostatic, can attempt a new order or stress the disorder by making its command and predominant techno-political force weigh on it.

As cybernetic devices of managing emergencies and possible disasters are hastily updated, autonomy and self-governance (collective/democratic or individual/technocratic?), the pivots of the neoliberal immanentist narrative, are increasingly being replaced by the extrasystemic position of command. Whether political, military, or of the CEO/corporate owner, the decision-making *modus* does not change. The biographical overlap between economic-financial and political management makes the differences, although present, between the different kinds of leadership, irrelevant.

After a brief foreword to the interplay between everyday and scientific lexicon, we will explore the kind of power and control that the veridical regime of the indeterminate conveys in neoliberal globalization. We will then compare it with the role of the epistemology of chaos: how it, in a version that absolutizes its unpredictability, supports the authoritarian/decisionist turn, that paradoxically synergizes with *intelligent* automatism.

Concepts, words, and metaphors of complex and chaotic systems will drive us through the ambivalence that a serious taking charge of contingency (and its limits) brings to the political discourse.

2. Migrating Words: The Systemic Approach and Resilience

Why call into question such difficult scientific paradigms? Surely not because of a physicalist reductionism that enables techno-engineering or behaviorist responses to political challenges,⁵ but because they are truthful

⁵ In defense of mathematical and algorithmic models widely used in the social sciences, see Boccia Artieri, "Fare sociologia attraverso l'algoritmo"; and in a critical perspective, Airoldi,

regimes explicitly called upon to provide scientific, and therefore unquestionable, support for the management programs of economic, political, social, and even cultural systems (rarely critical). It shouldn't be surprising that some scientific words/concepts have become key words for the knowledge and technologies that manage society and, through them, have entered into everyone's lives: this transfer is just the core business of modern techno-science. Which is, in turn, affected by the reverse process: from social to scientific language.

The words used in public and daily discourse to describe the confusion overwhelming us are as dark as they are vague: crisis, catastrophe, disaster, apocalypse, chaos. Being emotionally full of anxiety and impotence, they are crucial for those who manage power. But they are also the words of science. Or, rather, they belong to the intermediate land between science and common sense, increasingly less distinguishable; despite the clear Platonic detachment between episteme and doxa, that modernity reinforced, basing the indisputability of science on it.

That detachment has long been in crisis, not only due to the irruption of the uncertain and indeterminate within nature and science, with the onto-epistemic scientific revolution of the early twentieth century, but perhaps more because of science's own growing and unproblematic admission of its own technical nature, contiguous to power. Today, we call science an apparatus that produces truthful statements, using techniques and producing techniques: a field of expertise that acquires and spreads material and symbolic credit. Its credibility arises by assembling 'formal' statements with trans-epistemic themes that make its media credibility fluid (and contestable). The truth test of theories is their problem-solving effectiveness: an explicit and conscious dependence on scientists themselves, embedded in investment and financing networks, political-military commissions, public and private projects, which they often, as chief investigators/entrepreneurs, personally manage. The impurity of technoscience is not denied at all today.⁶ This is highly relevant for the translation of its conceptual knots to the study fields that directly govern lives and, through these, to common sense. Scientific language is increasingly taking on media-accessible terms, making explicit its relationship with social issues.

While the risks of this transposing/mixing languages must be quite clear, as techno-scientific solutions to political issues are quite the threat we wish to avoid, it cannot be denied that this intermingling, whether conscious or unconscious, is a fact and attests to broadly political working of the scientific apparatus.

"Teorie e dimensioni del potere algoritmico."

⁶ Bazzicalupo, "Natura e politica."

Mixing occurs precisely through the metaphors of everyday language. In neoliberal governance, terms such as sustainability, adaptation, self-regulation, organization, resilience, and emergency, far from neutral/objective in common language, become theoretical-normative terms in the market, in the slang of financial traders, and in the 'principles' of the eco-biosystem in green policies. We talk about *constitutive metaphors*, which begin their journey from daily language, full of social demands, towards epistemology and then return, strengthened by the scientific paradigm, to a politically decisive common sense.

If the words of modern epistemology (order, balance, certainty) are getting less and less common, it's a sign that indeterminacy (epistemological in Heisenberg, ontological in quantum theories) has affected not only science but also management knowledge and common sense. It's hard today to deny that living beings and nature are ontologically historical, indeterminate, and complex: and therefore modifiable. The space for doing increases. Complexity is an asset: you just need to update techniques, metabolizing new coordinates and, by modeling the data, manage predictions.

In a time of neoliberal revolution, complexity and emergentism enter a catallactic framework, a multilevel interdependence that finds its own order, on the model of the market, which in turn models all organizations. Reduction (which is power) is exerted on *extrasystemic* interferences. The key words are self-organization, creativity, competitiveness, optimization, flexibility, adaptability, and self-responsibility: resilience. All 'borders of uncertainty'.

Digital technology provides the image of the indeterminate (the unlimited and interdependent worldwideweb) and at the same time pursues it with its powerful tools for computing and processing micrological data. It is it that gives form and communicability to a living and social world, made up of codes, messages, information, programs. Cybernetics therefore plays a key role: more than a science, it aims to be a method for *all* sciences, an attractor (we will return to this term) for all the others: from natural sciences to psychology, anthropology, sociology, economics, political science and learning sciences. Its initially centripetal and homeostatic reasoning style, functional to self-referential systems, was rapidly updated in the eighties to meet the challenge of emerging behaviors. Which are, after all, practically all of them: crowds, consumers, market operators, users, voters, collectives...

From its first (and recurring) strategic-military matrix, it extends to business, financial, and political management, to which it lends its conceptual range: organization, reflection, program, control, retroactive feedback. The governance's work is twofold: internally, it is managed by conservative autonomous/automatic processes that integrate the emerg-

ing heterogeneous levels through homeostatic mechanisms; the external, indeterminate exchange, is instead stochastically governed with rules that produce new equilibria, enhancing the system. The ingenious Gould's *exaptation* enters the manager's behavioral code. And in neoliberal governance, also the leaders of political and public (corporatized) agencies are managers!

A relative uncertainty⁷ is inherent to the process, but the systemic flexibility of responses can modify the program just in time. And no human agent does this better than deep-learning machines that automatically learn from mistakes. It is the dawn of a new millennium: uncertainty can be directed by integrating the emergency, quantifying as much as possible, and obsessively modeling virtual scenarios of variation. Emergency is governed by managing risk. Economics and finance are among the first social sciences to take over the terms of complex and reflexive systemics.⁸

But geopolitics also takes them on, mixing them with game theory and cognitive logic. The liberal order system, by its management models, *metabolizes* emergencies within higher levels of functionality. Even early financial crises and speculative bubbles are managed in such a way as to confirm the system's dynamic homeostasis. Thanks to them -- it is said -- the market is driven to give rise and set up to new systemic correlations which make it more efficient. Resilience, Horace, resilience! That's the mantra. System resilience works as long as it holds up in the face of turbulence, thanks to negative feedback;⁹ individual resilience, indeed, is getting harder and harder in times of austerity. When the system, under the blows of endogenous and exogenous crises – health, climate, and, once again, financial crises – begins to crumble, it's on individuals that the duty to be resilient falls: the failed, the fired, the earthquake victim or the hungry must resist and adapt. Perhaps, they might even seize the opportunity to re-build¹⁰ their lives!¹¹ Besieged by incessant crises, disasters, wars, and epidemics, the recommendation/need to be *resilient* sounds mocking.

When there are signs of financial turbulence before the 2007 subprime crisis (a minor event in itself), the market does not respond with corrective feedback, which would bring it to stability, but by highlighting disorder: positive feedback that further distances it from equilibrium. It is on the edge of chaos. We know that political and financial resilience will

⁷ De Finetti, *La logica dell'incerto*.

⁸ On embedded rationality, see the Nobel Simon, *Models of Bounded Rationality*; on the theory of decision-making under uncertainty (and behavioral finance), see another Nobel, Kahneman, Tversky, *Choices, Values and Frames*; on reflexivity, see Soros, *The Alchemy of Finance*.

⁹ Walker, Cooper, "Genealogies of resilience."

¹⁰ Joseph, "Governing through failure and denial."

¹¹ For a critical analysis see Schmidt, "Intuitively neoliberal?"

somehow react with ex post adjustments and controls, but chaos has barely been touched.

3. On the Edge of Chaos: Attractors and Bifurcations

A few months before the crash, mathematician and financial trader Nassim Taleb's book, *The Black Swan*, was published. Taleb, confusing chaos and chance, develops the idea that we are blind to the randomness of black swans, unpredictable catastrophes, but... If you became *anti-fragile*, that is, resilient in a constructive and useful way, it would be possible to whiten Juvenal's *rara avis*, that is, *to profit from catastrophe*.¹² The essay is remarkable not so much for the quality of its analysis, as it is for signaling a major epistemic shift that impacts governance; its worldwide success (followed by similar works: management manuals, policymaking and psycho-existential know-how) attests to the translation into common sense. The epistemic horizon does not change, but it veers toward chaos theory, whose indeterminism and unpredictability, however, are unduly absolutized: the line between chaos and pure chance becomes blurred. Furthermore, the centrality of the unexpected, surprising event, presaging the chaos, is recognized: the black swan enters the common mentality and language. The system is unable to metabolize it.

The event presents itself as a *point of catastrophe*, signaling a bifurcation that is as catastrophic/destructive as it is potentially morphogenetic: it therefore calls for a *decisive* choice for life. Hayek's catallactic and autopoietic system is disproved, and the oscillation both inside (homeostatic) and outside (integrative and exaptive) of the system, which long absorbed noise/disorder, doesn't work because the latter, the disorder, is, in practice, absolutely unpredictable: pure randomness.

Just because of this total lack of pattern, however, if you are *anti-fragile* (rather than merely resistant/resilient) and ready to change the rules, the catastrophic event can be a chance to exploit to your advantage.

Bringing indeterminism to its fullest extent impacts forms of power and can be functional to them. Indeed, socio-political powers paradoxically foster this mood of unpredictability and extreme randomness, therefore of ungovernability, which allows them not to investigate the historical sequences that conditioned the systemic collapse (supported in this by

¹² Anti-fragile people tolerate (and love) randomness, uncertainty, volatility, and errors: they benefit from chaos, do things well without understanding them, make non-predictive decisions: more than risk calculation, it is a reasoned gamble on an unpredictable future, typical of the stock speculator (trader). Assessable only ex post, by success or failure.

algorithmic logic). They settle on uncertainty and fear, in a paradoxical form of non-government.

It's now necessary to better focus on chaos and its metaphors by linking them to the techniques of government/non-government they influence.

Chaos, in its mythological root, is the void, the abyss from which the cosmos, the new order, will rise. For Plato, this leap requires an architect, the Demiurge, an ordering deity who counteracts the abyss: needless to say, this model has great weight in the history of Western politics. In fact, chaos in our language (which follows that philosophical myth and whose center is the logos/order) names pure, absolute disorder, the greatest risk, the reverse of the system.

The scientific paradigm, however, seemed to reverse that idea. Complex dynamic systems hold disorder and order together: *order by noise* enhances the generative potential of *noise*, managing it as we have seen, through vital plasticity and resilient adaptation; and so, even the subgroup of nonlinear chaotic systems, by the deterministic chaos oxymoron, detects, in disorder, self-replicating regularities, albeit in a fractal way: that is, it distances chaos from pure chance.¹³ Save that we're not dealing here with simple *noise*, but with a disorder that (however generative it may be, but may not) marks an unusual discontinuity. The non-proportionality between a disordered event and its effects (beyond, therefore, linear causality) now signals a possible reversal of the system. A discontinuity, indeed. A clarification that would give a negative answer to our first question of whether or not chaos is an infrasystemic transition.

Epistemic metaphors shift from the adaptive resilience that ensures governability to the unpredictable event/turn, within an absolute and ungovernable indeterminism, which facts seem to confirm: risk shows its dark side threatening life itself; techniques for organizing uncertainty appear impotent, incompetent, or irrelevant: law (a classic stabilization tool) but also free trade, pragmatic mediation, the solidity of money, the productivity of global mixing, the human rights institution... These stabilizers, which in dynamic systems are called attractors, lose their effectiveness. To clarify: attractors are grooves, spectra of motion *within a space of competitive coexistence*, between the stabilization of communication and the instability of fluctuations: equilibria the process tends to gravitate towards, attracting data in an invisible order. Although called *values* in organizational theories, they have nothing ideal or transcendent; they are rather, *ethoi* that act as an immanent and effective center of gravity: normative, immanent, quite stable conventions, often not modeled, but ever-present. It is a sign of highest systemic fragility when the social stabilizer

¹³ Casati, *Il caos*; Schuster, Wolfram, *Deterministic Chaos*.

par excellence, the law, which in its neoliberal metamorphosis worked as an attractor, ruling unstable social relations with adaptive flexibility, today, mainly at the international level, loses its grip. Once the stabilizers are loosened, the interdependent elements achieve partial autonomy by self-organizing in an uncontrollable and antagonistic way, despite the system's efforts to reprogram itself by integrating them. Thus a sequence of risky, catastrophic bifurcations emerges.

The chaotic behaviour of financial trading and geopolitical dynamics – aperiodic, predictable only in the very short term, unstable and reactive to small perturbations, seemingly random, producing disproportionate, nonlinear effects – signals the emergence of *chaotic attractors* sensitive indeed to minimal variations, toward which chaotic dynamics evolves.¹⁴ In an Aristotelian space, non-isotropic as the chaotic one, where divergences in competition, specializations of parts, mutations of functions, system gradients coexist, attractors are virtual *patterns*, fractal, unexpected structures (for Poincaré even unimaginable, therefore *strange*), detectable only by very powerful computers.

But, strange as they are, they are the system's *horizon of predictability*: identifying them is the only way to read the chaotic movement. In their (perhaps incautious) translation to the social sciences, they show what a collective movement means: a crowd, a consumer group, or a political protest one... empirical group-behaviors (*ethoi*), that seem connected by contagion rather than by causal-final reasons: the algorithmic output presents them as automata.

On the edge of chaos - a point of oscillation and bifurcation, neither order nor disorder - attractors can determine competition, cooperation, coevolution, but also discontinuity, bifurcations from which it's not at all sure that a self-correcting structure emerges, but rather *positive* feedback loops (in the market, in the war challenges, in the pursuit of tariffs) which increase entropic dissipation.¹⁵

At each critical bifurcation point, a size transition can arise from each anomalous behavior of the system. The neoliberal resilience itself can give rise to conditions that call into question the market-functional order. There may be strategic reversibilities: unexpected active resistance (Foucault-style) that changes the process's presuppositions. But unpredictability, bifurcation, catastrophe, and minimal but potentially decisive events become, above all, the keywords of the new way of governing. Each power agent holds them in the meaning that's most useful not to bend to the impotence that unpredictability could show.

¹⁴ Ruelle, "Small random perturbations"; Ruelle, "What is a strange Attractor?"

¹⁵ Cohen, *The Edge of Chaos*.

From political or managerial think-tank meetings to popular newspapers and philosophy festivals, the term chaos is chosen to take a stance on it. The response of powers, as we will see, is to ride it, enhancing the entropic and dissipative drive, and at the same time blocking the bifurcation paths that could push it toward unwelcome solutions. Even critical and antagonistic analyses see chaos as a potential suddenly at hand.

4. Chaos Management and Master's Command

Let's start again from the suggestions of Taleb and the group of theorists who, like him, are faced with the crisis of the systemic approach, on the edge of chaos. Metaphors taken from the theory of chaos (read as unpredictable disorder) trivialize the complexity of the scientific paradigm: they rather respond to the need of economic and political powers to preserve a now paradoxical control, chasing chaos, identifying attractors/trends to bend them for their own profit. It's interesting to observe the twist of organizational science (the mother of all management disciplines, from business economics to public policies and geopolitics) in manuals and workshops: chaos management (so explicitly defined) is their most updated paradigm, updated to the narrative of absolute indeterminacy.¹⁶

Management focuses on the active/subjective, *anti-fragile*, rather than systemic response, and therefore on the leadership's protagonism. Managers/leaders are advised to implement even drastic organizational changes, in a spirit, needless to say, of creative, assertive, and *visionary* optimism (beyond the traditional efficiency-driven approach). The organization is one with the competitive individualism of the leader, whose mindset is proprietary, private, and, obviously, decision-making-oriented, in a struggle for survival in a politically unstable globality that does not guarantee predictions: a struggle that focuses above all on technological competition. The leader *knows* that the old stabilizing attractors (shared corporate objectives, shared decision-making, self-correcting feedback, rewards) are losing their weight and should be mentioned as subordinate to the potential need to cancel them. The challenge is to identify, anticipate or predict the unexpected, strange attractor that is the trend, not visible but present, in all chaotic movements (from meteorology to social systems, from financial markets to collective protests): an unexpected, decisive *value* capable of attracting behaviors and positive feedback that could amplify entropy up to a different power structure.¹⁷

¹⁶ Kotler, Caslione, *Chaotics*; Azzariti, *Il Caos*, 97.

¹⁷ On manager leadership: Keene, "Complexity theory"; post-crisis, Griffin, Stacey, *Complexity and the experience of leading organizations*; Erçetin, Açıkalın, *Chaos, Complexity and Leadership* 2023.

Today, we are dealing more than with organized theories, with workshops and podcasts that follow current winning practices: the emphasis on crossroads and bifurcations works for a revolutionary, *visionary*, and fearless leadership, setting on them to direct them, blocking other possible trends. A lot of metaphors invite the leader (and us) to surf, to ride the waves of chaos, exploiting risk and contradictions without avoiding them, without solving them.¹⁸ It means welcoming disorder, drawing maximum energy from the crest of the wave (there is stasis upstream and downstream), occupying that apex of the bifurcation where it's possible to prevent trends that threaten one's own system of power, which morphs while remaining the same. A conservative revolution that paradoxically increases chaos. The needed merit, in an ever-changing world, is the speed of decision-making, which, rather than being carefully considered, must be timely, surprising, and unsettling for competitors: revolutionary, indeed. Schumpeter's *creative destruction* of the capitalist entrepreneur is often cited: the differences would be great, but the image, often compared to Weber's political leader, is strongly evocative.¹⁹ It's light-years away from any idea of a self-managed, bottom-up order. Speed of decision-making is everything, when one is riding the crest of the chaotic wave, in the space-time that *decides* the organization's fate. Managerial leadership (in BigTech, the CEO/owner) is highly hierarchical and exerts a surplus of control that adds to the loosening of interconnections between subsystems and exploits its own possible mistakes.²⁰ Deep learning technologies help in a major way to this well-running and self-enhancement, by replacing workers who might choose dissipative and entropic options: they automate them as much as possible to ensure obedience and predictability of the executive ranks. The *vision* of the decision maker rests, in fact, on the control of productive and social work, which in an unpredictable world, must increasingly be automated: robotic or passivized.

In chaos-management, the final attractor always remains the same: the capitalist valorization of social knowledge, but the *political* vector that supports it, is the avoidance or blocking of potential *strange and dissipative attractors* that compete with that: management is visionary as well as it is conservative. Flows of competitive or antagonistic behaviors that would derail the goal, and which, in the neoliberal cybernetic system, would have been hailed as creative, are blocked and overdetermined

¹⁸ See the re-edition of another worldwide hit: Peters, *Thriving on chaos*; Sirkin, Hemerling, *Globality*.

¹⁹ See also Ciappei, *Il realismo strategico nel governo dell'impresa*, where classical authors such as Carl von Clausewitz, Niccolò Machiavelli, and Sun Tzu are applied to business strategy.

²⁰ Miles, "The Billionaire King of Techtopia"; Chafkin, *The Contrarian*; Aresu, *Geopolitica dell'intelligenza artificiale*.

by decisions that are as timely as they are unforeseen, difficult to elude, unsettling.

Powers exploit chaotic unpredictability, indulging in it. Or rather, they themselves promote it to destabilize processes based on linear and proportional causality. After all, if a reality is totally unpredictable, it makes no sense to reconstruct the causes of events, nor to investigate the vectors that brought the system to the brink of chaos. The response can only be immediate, lightning-fast, crushing on the ongoing emergency, on presentism, which is, in fact, the temporal hallmark of the time, whether it is war, a financial crisis, global trade, emerging centers of power, or the magma of popular protest. And it's no coincidence that just-in-time presentism, the immediate, fast output (without analysis of causes and contexts), is the pride of algorithmic logic: correlations, connections, figures (or better, designs), simulations rather than interpretations, projects, and long-term plans that would require stories. It's the synergy of indeterminism, demiurgic solution, and cybernetic automatism. An immediate decision is called to untie the Gordian knot of complexity and instability. In chaos, everything can change; in chaos management, however, it is decided (the manager/demiurge commands) so that essentially nothing changes. Bifurcations end in a one-way exit.

5. Conclusions. The Battlefield of the Epistemic Horizon

Is this also the only possible reading? The bifurcation turns out to be a simple yet literally *decisive* metaphor. It shows the critical point of catastrophe as a crossroads: if, in the absolutely random (and therefore mythical) version of chaos theory, chaotic trajectories are multiple and unpredictable, competing between weakened but persistent conventions and still not explicit, *strange* trends, then the choice, the decision – a voluntaristic and political factor silenced by the neoliberal cybernetic narrative – becomes essential. And there is no doubt that this point of catastrophe, decisive and dependent on minimal variations, also holds appeal for those who, seeking radical systemic change, lack the strength to produce it. Indeterminism opens up possibilities not only for conservative, decisionist voluntarism that locks it into itself, but also for *minor* forces given up as losers in mainstream geopolitical models, and sometimes even in the critical and painful ones of world history. Huge and unforeseen effects caused by seemingly insignificant events: how should we read this trigger, this spark: random, determined, decision-made? Saying that the event is absolutely discontinuous and contingent still means oscillat-

ing between the current protagonism of decision makers and resting our hopes on chance.²¹

From this viewpoint, the onto-epistemic background matters and proves to be a battlefield.

Once the situation has been defined as the edge of chaos, projecting the decision onto a horizon of generalized, absolute, or partially knowable indeterminism, is relevant. Both management techniques and the logic of command, which we have seen as symbiotic, drag chaos towards pure randomness: both ride the chaos in the dystopian illusion of superimposing voluntaristic command by leveraging a hypothetical, total governability of automated infra-systemic behaviors.

By blocking possible alternatives, they foster fear of the abyss in a permanent *war regime*, a firm chaos and a mood of impending catastrophe, functional to this purpose. Nothing is solved because nothing must be solved: multiple and pressing endogenous crises showed that the system cannot hold up, that centrifugal vectors were sought and are seeking alternatives. The answer was: stay in the chaos, blocking it in.

Even recent social theories, that are seemingly critical but fully intra-systemic, insist on absolute indeterminism: new materialism, network analysis, reflexive approach. These ontologies shift from political issues towards a subjectivity that is structurally plastic and ever-evolving, unstable, vulnerable, but able to incessantly reinvent itself. Anti-fragile management! Even the term management is avoided. There is no room for conflictual collectives, material differences that weigh differently depending on the places, work, and on economic, cultural, and political contexts in their material linking. It's once again an individualistic idea of reflexivity, risk, talent and resilience that we know is exposed to techno-authoritarian management. The point is that, here too, the causes and constraints within the real exercise of freedom and power are removed.

The epistemic battle, therefore, shifts to those *constraints*, which the chaos manager's operational style ignores, removes, and erases with the help of algorithmic connectionism, which de-contextualizes and de-concretizes the power of human/social work, depriving it of its antagonistic potential.

Catastrophic bifurcations seem undecidable. Are they? The more unpredictably contingent the system is, the more the decision at the catastrophic point is eradicated by constraints, the more inactive is the hope for chance.

The epistemic horizon *matters*, and so does its contestability. The onto-epistemology that supports the current synergy of decisionism and

²¹ In a critical key, see Kahneman, *Thinking fast and slow*.

automatism is more mythical than scientific. In science, however, mechanical deterministic paradigms and hybrid/dialectical paradigms coexist in conflict, which, however, consider (both in the mathematical and physical-meteorological matrix, and, even more, in the biological-evolutionary one) the coincidence of chaos and absolute contingency to be unacceptable, as it would prevent any theoretical reconstruction.

Evolutionary epigenetics highlights leaps, bifurcations, and generativity without erasing the conditioning and reciprocal relationship with the environment and with history. The bifurcations are many, and many and mostly accidental are the minimal variations that have weighed on an evolution that is *a cascade*, irreducibly dependent on the history of choices (random, exaptive, not always voluntaristic, indeed) at the bifurcations.²²

Even more so, Foucault's genealogy of the social (but he is not the only one) is a history of discontinuity within processes of disciplining and norming immanent to lives: fractures in regimes of truth, surplus power arising (however conditioned) in power relations. It is a genealogy of *Entstehungen*, of insurgencies, gaps that break processes, divert them. And these points of contingency and instability, where the system can take different paths, are held together with the network of conditioning that structures the subjects.²³

An indeterministic epistemic horizon certainly enhances the potential of the new. But it must be freed from the narrative that absolutizes it.

Our starting question – whether we are, today, in an infra-systemic transition of adjustments, retroactions and feedback, or whether a systemic rupture is occurring – refers us to the impure matrix of all ontologies whose truthful discourse has its origin and its end in the historical and political conjuncture. They are a battlefield where we must take a stand.

Perhaps those who endure this government/non-government grafted onto chaos/chance and aim to change the situation mood, must challenge the presumed unlimitedness of ontological indeterminism.

It's possible to affirm the coexistence (dialectical? not necessarily) of the onset (unforeseen events, eventualities, opportunities/kairos, to be seized perhaps in a Machiavellian key) with concrete, material systemic conditioning (immanent determinisms, causal series, constants). These constraints must be linked, as in epigenetics, to the valorization of chaos, which opens up to potential insurgence, to the strength of the minimal event, to be defended against any alleged cybernetic or structuralist annihilation. The fecundity of disorder is thus preserved and grafted onto a work of organizing the vectors of real and concrete struggles, ready to

²² Gagliasso, "Lontani dal determinismo."

²³ Foucault, "Nietzsche, la généalogie, l'histoire."

engage, in chaos, the potential glimmer of a *new* that is not, as Benjamin says, a masked and conservative repetition of the *always the same*.

References

- Airoldi, Massimo. "Teorie e dimensioni del potere algoritmico tra agency e dominio." *Scienza&Politica* 36, no. 70 (2024): 49-63. <https://doi.org/10.6092/issn.1825-9618/19863>
- Aresu, Alessandro. *Geopolitica dell'intelligenza artificiale*. Milano: Feltrinelli, 2024.
- Arrighi, Giovanni and Beverly J. Silver. *Chaos and governance in the modern world system*. Minneapolis: Minnesota University Press, 1999.
- Azzariti, Ferdinando, a cura di. *Il Caos: nuova regola del mercato. Principi e metodi di sopravvivenza per imprenditori e manager*. Milano: Franco Angeli, 2016.
- Bazzicalupo, Laura. "Coesistenza." *Filosofia politica* 31, no. 1 (2017): 47-58.
- Bazzicalupo, Laura. "Natura e politica: il potere dei saperi: dal certo all'indeterminato." *Filosofia politica* 37, no. 3 (2023): 465-482.
- Boccia Artieri, Giovanni. "Fare sociologia attraverso l'algoritmo: potere cultura e agency." *AIS Journal of Sociology* 15, 2020: 137-148. <https://dx.doi.org/10.1485/2281-2652-202015-7>
- Bull, Hedley. *The anarchical society*. London: MacMillan, 1977.
- Casati, Giulio, ed. *Il caos. Le leggi del disordine*. Firenze: Le Monnier, 1991.
- Chafkin, Max. *The Contrarian: P. Thiel and Silicon Valley's Pursuit of Power*. London: Penguin Books, 2021.
- Ciappei, Cristiano. *Il realismo strategico nel governo dell'impresa*. Firenze: Firenze University Press, 2006.
- Cohen, Bernice. *The Edge of Chaos. Financial Booms, Bubbles, Crashes and Chaos*. Hoboken: Wiley, 1997.
- De Finetti, Bruno. *La logica dell'incerto*. Milano: Il Saggiatore, 1989.
- Erçetin, Sefika Sule and Suay Nilhan Açıkalın, eds. *Chaos, Complexity and Leadership 2023*. London: Springer Nature, 2024.
- Foucault, Michel. "Nietzsche, la généalogie, l'histoire." In *Hommage à Jean Hyppolite*. Sous la dir. de Suzanne Bachelard. Paris: Presses Universitaires de France, 1971.
- Gagliasso, Elena. "Lontani dal determinismo: reti di relazioni vincolate." *Etica & Politica* 18, no. 3 (2016): 75-90.
- Goodwin, Richard. *Chaotic Economic Dynamics*. Oxford: Clarendon Press, 1990.
- Griffin, Douglas and Ralph Stacey. *Complexity and the experience of leading organizations*. Abingdon-on-Thames: Routledge, 2008.

- Joseph, Jonathan. "Governing through failure and denial: the new resilience agenda." *Millennium* 44, no. 3 (2016): 370-390. <https://doi.org/10.1177/0305829816638166>
- Kahneman, Daniel. *Thinking fast and slow*. London: Penguin Books, 2012.
- Kahneman, Daniel and Amos Tversky. *Choices, Values and Frames*. Cambridge: Cambridge University Press, 2000.
- Kavalski, Emilian, ed. *World Politics at the Edge of Chaos*. New York: Albany University Press, 2005.
- Keene, Angelique. "Complexity theory: the changing role of leadership." *Industrial and Commercial Training* 32, 2000: 15-18. <https://doi.org/10.1108/00197850010311121>
- Kotler, Philip and John Caslione. *Chaotics: the business of managing and marketing in the age of turbulence*. New York: Amacom, 2009.
- Lorenz, Edward Norton. "Deterministic Nonperiodic Flow." *Journal of Atmospheric Sciences* 20, no. 2 (1963): 130-141. [https://doi.org/10.1175/1520-0469\(1963\)020<0130:DNF>2.0.CO;2](https://doi.org/10.1175/1520-0469(1963)020<0130:DNF>2.0.CO;2)
- Mezzadra, Sandro. "Introduzione alla nuova edizione." In Giovanni Arrighi e Beverly J. Silver, *Caos e governo del mondo. Come cambiano le egemonie e gli equilibri planetari*. Milano-Udine: Mimesis, 2024.
- Miles, Jonathan. "The Billionaire King of Techtopia." *Details Magazine*, September 2011. Available at <https://web-wp.archive.org/web/20150910022753/http://www.details.com/culture-trends/critical-eye/201109/peter-thiel-billionaire-paypal-facebook-internet-success>
- Navarro, José and Carlos Arteta. "Chaos in human behaviour." *The Spanish Journal of Psychology* 13, no. 1 (2010): 244-256. <https://doi.org/10.1017/s1138741600003826>
- Peters, Tom. *Thriving on chaos. Handbook for a Management Revolution*. New York: HarperCollins, 1991.
- Prigogine, Ilya. *Les Lois du Chaos*. Paris: Flammarion, 1994.
- Ruelle, David. "Small random perturbations of dynamical systems and the definition of attractors." *Communications in Mathematical Physics* 82, no. 1 (1981): 137-151.
- Ruelle, David. "What is a strange Attractor?" *Notices of the AMS* 53, no. 7 (2006): 764-765.
- Saperstein, Alvin. "Chaos in models of arms races and the initiation of war: Crisis stability and instability in an international system." *Complexity* 12, no. 3 (2007): 22-26.
- Schmidt, Jessica. "Intuitively neoliberal? Towards a critical understanding of resilience governance." *European Journal of International Relations* 21, no. 2 (2015): 402-426. <https://doi.org/10.1177/1354066114537533>
- Schuster, Heinz Georg and Just Wolfram. *Deterministic Chaos. An Introduction*. Weinheim: Wiley-VCH, 2005.

- Simon, Herbert Alexander. *Models of Bounded Rationality*. Cambridge: MIT Press, 1982.
- Sirkin Harold and James W. Hemerling. *Globality: Competing with Everyone from Everywhere for Everything*. Business Plus, 2008.
- Soros, George. *The Alchemy of Finance*. Hoboken: Wiley & Sons, 2003.
- Taleb, Nassim Nicholas. *The Black Swan: The Impact of Highly Improbable*. London: Penguin Books, 2008.
- Thom, René. *Paraboles et catastrophes*. Paris: Flammarion, 1983.
- Walker, Jeremy and Melinda Cooper. "Genealogies of resilience: from systems ecology to the political economy of crisis adaptation." *Security Dialogue* 42, no. 2 (2011): 143-160. <https://doi.org/10.1177/0967010611399616>