

“HUNTING” FOR INFORMATION TO COPE WITH THE OMNIPRESENT UNCERTAINTY REPRESENTS THE NEW NORMALITY

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Abstract

Reality is not given to us; it must be deciphered: be it rules or customs or collective mind, be it chance. If we content ourselves with not knowing where the reality, we live in today was born, we must also be content with the fact that we will not understand it. Modern societies nowadays are more interested - surprisingly, but only at a first glance - in how we manage risk than in the distribution of power or wealth. The explanation lies in the fact that we are often hit by unplanned results and unexpected and unintended consequences of processes that were supposed to take place under control in the society. Change itself becomes the norm in this situation. We are witnessing a global process of dissolution of norms, simultaneously with the change of power structures. A new global behaviour is crystallized. Certainty breeds superiority; uncertainty breeds insecurity. The extremes are both the regions to be avoided in decision-making: the area of certainty beyond any doubt, whose sources are subjective, irrational, and, at the opposite pole, the area of incomprehensible uncertainty, whose sources are nothing but chance, accident. A deep knowledge must be brought into the middle of the space; thus, there can be a predictive capacity.

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Unpredictability means the lack of absolutely complete information. Information is as fundamental to life as energy. It imposes limits on action and planning, but not on thought. Ignorance makes horror win (diseases, pandemics, floods, earthquakes, etc.)

Making decisions means overcoming uncertainty. This is achieved through a vast picture of thinking; the decision management represents an information processing system. Information is a measure of uncertainty, and the totality of information we do not have is a measure of unpredictability. Sensitivity to initial conditions, that is, the source of unpredictability, shows us that vast and complex information cannot be mastered precisely from its (the information's) insufficiency.

We would have thought that the ubiquity of social media and the widespread addiction of present-day people to electronic devices would lead to a greater cohesion of humanity. In fact, despite the pernicious yoke of the cybersphere, exactly the contrary took place. But the knowledge that underpins our world of things “has been discovered over centuries, through repeated attempts, two steps forward, one step back, and improved through collaboration: the work of talented, largely autonomous groups, generation after generation, rather than identifiable individuals,” says Anthony Grafton. Understanding the cultural heritage from this perspective means approaching the knowledge and values of the communities, their history, their traditions, as well as the symbolic, territorial and ancestral picture of each nation.

Between shock and chaos

The emergence of the unpredictable phenomenon generates confusion and a vast uncertainty, and decision-making should be constituted in a vast and complex picture of thought. Bertrand Russell: *“Uncertainty, in the presence of living fears and hopes, is painful, but we must endure it ... To learn how to live without certainty and yet not be paralyzed by hesitation is perhaps the most important thing.”* The future is difficult, of course. It hasn't happened yet.

When faced with a structural changed decision (e.g., financing renewable energy or taxing carbon emissions above a certain level), the most important aspect is to choose the right moment. Too early means abrupt adaptation, i.e., shock. Too late means high transition costs that generate chaos. The choice is of course based on experience, but often also talent and intuition. Triggering

unpredictability produces confusion/bewilderment and highlights an acute lack of preparedness in the system in relation to the possibility of this triggering. The unpredictable phenomenon exists in our thinking; we know that it can occur, but we know nothing about when it occurs. We lack the complete information, which would be extremely vast and diverse, theoretically infinite. What we can do is process the information we have, add new information, coming from different sources, and base the decision. The "hunting" for information starts with our desire to deal with uncertainty, looking in our environment for patterns that make sense. We call it curiosity, but beware, curiosity is a double-edged sword.

Overcoming the state of unpredictability is done by decision, and this essentially consists in processing information. This includes objective analysis, but also intuition and courage, in proportions that define the art of decision-making.

We cannot lose sight of an obvious fact of our days: the growth of information. It is useful to keep our ability to be flexible regarding choices. We must not completely neglect a possible irreversible effect. Not all and anything can be replaced.

The mathematical modelling of risk situations operates with refined algorithms through extensive practice, but also with increasingly sophisticated ideas. It gives results on which certain predictions are based. It turned out not to be enough. The decision means much more and something else. Indeed, we cannot clone success.

The predictability window is different from situation to situation. The weather forecast is practically accurate for 24 hours, and within that the predictability window there are 10 minutes for rain intensity and one hour for wind speed.

All physical systems behave the same: they are predictable on a short time horizon and unpredictable on a long horizon. Even in an event considered unpredictable, such as the roll of the dice, an experimental study based on high-speed camera footage revealed that the trajectory of the dice is predictable for a window of about 0.1 seconds. This fact helps us to develop a unified perception of all natural phenomena and abandon the dichotomy of chance vs. deterministic.

Chance and predictability (i.e., rule) co-exist and are intrinsic to natural systems. The bottom line is that natural systems are both random and deterministic, the difference being that of time scale and time horizon. Thus, the uncertainty of geophysical processes can be both random and conform to the elements of knowledge (rules), that is, epistemic. Indeed, theoretically, we could perfectly know the initial conditions, as well as the equations of motion and thus specify the evolution of a phenomenon with accuracy. Practically, however, this is impossible: small variations of the initial conditions or external factors or the very lack of a calculation model, generate randomness. It is increasingly obvious that the economy must also be analysed through the prism of unpredictability. Uncertainty highlights the fact that the existing mechanism of the system/organization is not functioning properly. Decision management represents an information processing system. Information is a measure of uncertainty, and the totality of information we do not have is a measure of unpredictability. Sensitivity to initial conditions, that is, the source of unpredictability, shows us that vast and complex information cannot be mastered precisely from its (information) insufficiency. A massive amount of data fails to tell us what we need to know. How does one process under uncertainty? Whose failure is it? Ours or the information?

The Soviet economic system, notwithstanding the huge means of planning, proved unpredictable. China adopted the market economy and private property and made a miraculous leap. All available market information is assumed to be processed instantaneously and immediately reflected in traded asset prices. The following two hypotheses are accepted:

- the market is efficient;
- the behaviour of traders is strictly rational.

However, the available recorded statistical series (over a hundred years) present us with a random picture. The cause lies in the processing of information. The stock market system, which is a complex system, circulates so much information that certain regularities, patterns that indicate characteristic features of the system can no longer be highlighted. Series do not overlap, do not repeat. For computer processing,

there is no algorithm that can compress the huge mass of information with practical utility for traders.

At the heart of macroeconomic concepts there is still the illusion that uncertainty can be contained within a well-defined space. Stock prices constitute a defining counter-example: the aggregate evolution of stock markets. For example, let's look at the very long-term US Dow Jones Industrial index (100 years, 1922-2022, logarithmic scale) see figure - and the one recorded over the last 25 years in adjusted prices, the next figure.

The 100-year chart shows the movement of the index to the upper area of the ascending median channel since 2017. This fact has only happened twice, in 1929 and in 2000. In 2022 we are again very close to the same phenomenon. When the index returns to the median zone, although it is certain that it will, we cannot know because we do not, as it turns out, have sufficient statistical information. Between 1942 and 2000, in 58 years' time, the index settled in the median band, while after the 2007-2008 crisis it rose stratospherically in 13 years, well above the pre-crisis level. Thus, it is observed that after a sudden collapse in 2020, the year of the adoption of tough restrictions related to the COVID pandemic, the index immediately rises well above the pre-pandemic situation. We might intuitively conclude that the restrictions did not change the state of investor confidence existing at the time of the outbreak of the pandemic. On the contrary, the vast majority of economists have repeatedly stated that the current (May 2022) inflation, which had started to appear during the same period of the pandemic, is not serious and will die down fairly quickly. Economic and financial data seemed to support this thesis. They were badly mistaken. It was quite obvious that a stock market crash was coming and not deflation. The stock market (S&P 500) hitting an all-time high in January 2022 was followed by an 18% drop in May of the same year. The question is whether the market decline signals deeper problems in the economy. However, the uncertainty remains. We have no way of knowing if the current turmoil in the financial markets will not itself

amplify the economic problems, rather than just reflect them.

Consistency combined with observation and memory, which would lead to truth, are not enough. For my observations change, at least in part, my opinion of the observed facts. Nicolae Georgescu-Roegen states, for example, that the widely used logic of balance in economics: *"ignores a crucial phenomenon: the fact that, in a new economic situation, an individual can change his preferences."* This is the Oedipus effect: when announcing an action to be taken, the data on the basis of which an individual forms his anticipations changes.

Any economic intention introduced into a community succeeds only if the innovation is socially approved and understood by that community. *"Many midwifery economists do not understand the role and force of tradition, which has created strong cultural propensities,"* says Georgescu-Roegen. The success lies in a cultural adaptation. Ignoring this experience is evident in narrow-minded, considered safe decisions.

Removal of uncertainty

There is in the intimacy of nature an obvious contradiction between becoming and evolving. Becoming is something imposed by the law of entropy (the inexorable increase of disorder in a thermodynamic system) and evolution is something demonstrated by Darwinism.

Entropy has a perpetual tendency to increase, dissolving structures towards disorder, while evolution creates increasingly differentiated and ordered structures. Linear regimes are sources of entropy increase; nonlinear regimes develop and amplify bifurcations. Linear regimes are associated with necessity, and non-linear regimes with chaos.

We are able to formulate some possible theories of reality, based on mathematical and logical research, and using the inductive method, find the one that is the only one capable of correctly (consistently) linking the empirical data under a unique set of hypotheses. Decision represents a way of removing uncertainty, replacing it with certainty.

For the decision-maker, the main problem is not that of knowledge, although it is that of the beginning, but that of construction: information, ideas, thinking, solution.

The act of manipulation

Let us also examine the situation of a perfectly rational action with the aim of obtaining a completely false result. It's all about manipulation. Umberto Eco said that: *"falsehood has been the engine of many events in history."* Those who trigger the false, "ride" the uncertainty in the direction of maximum certainty, from their point of view. Umberto Eco also warned: *"The most important and at the same time the most difficult thing I to prove the authenticity of an authentic fact"* (Example: Târgu Mureș, Mihăilă Cofariu)

The most important effect of building and propagating a fake is not so much the number of people who see the "horse" as in turning the horse into a "Trojan horse." On Facebook we have the combination of maximum efficiency: enormously many people who see the horse but do not suspect that it is a Trojan horse.

Courage and communication in decisions

As Benoit Mandelbrot (the father of the *fractal theory*) demonstrates, the very small frequency of extraordinary, unpredictable events "beats" the massiveness of average data. I take an analysis coming from the communication theory formulated by Robert Escarpit (1976). Systems with information directed towards a single objective and clearly hierarchical, such as economic or financial ones, become extremely "fragile" after exceeding a critical dimension. Escarpit's theorem states that: *"the large size dominates the small size, however hyper dimension restores the power of smallness."* The amplification, itself increasing, of the diffusion of information, reaches a critical threshold that requires a return to close communication with people or groups of people. It is part of decisional thinking.

The advantage of social media giants is precisely that they only deal with close communication. The inherent disadvantage of large economic and especially financial organizations is that they cannot resort to close communication, which can generate a conflict of interests. The management of decisions under uncertainty requires close communication because we are in a moment after reaching the dangerous dimension. In a new situation, created by uncertainty, the decision-maker, as Grigore Moisil aphoristically remarks, *"can no longer find*

something that he is tempted to look for, that is, certainty." But that doesn't mean he's not looking for something else. Because: *"Nothing is more expensive than ignorance...You waste a lot of time when you think you know what you don't know. More precisely: what you don't know yet."*

Grigore Moisil has a special contribution in the logical classification of sentences. He states that propositions are trivalent: true, false or doubtful. Then add five-valued logic (pentavalent): the necessary truth, the contingent (unnecessary) truth, the doubtful, the contingent false, and the necessary false. Thus, it is established that in logical structuring there are no more than five variants. By extension, let's admit that in formulating scenarios of economic or financial evolution, we don't need more than five distinct variants. The idea of the "mechanical deduction" of the effects of an antecedent cause leads nowhere. On Google we are able to accurately determine the actual picture of links and nodes but not their rationale. Thoughts, feelings, emotions, the sense of danger, are not there. We have the totality, the hierarchy, the network. But we cannot understand and comprehend the chronology and rhythm.

Equivalence of Randomness - Complexity - Information

We owe the current version of the probability theory to Andrei Kolmogorov, who links probabilities to the concrete, to the real world:

"Events whose probability is sufficiently small are experimentally impossible" and *"Mathematics led me to the belief that the world is also ruled by chance and ordered according to the laws of probability. The notion of absolute randomness as well as that of absolute determinism make no sense. We cannot have a positive knowledge of the existence of the unknowable,"* asserted Kolmogorov in 1951. In Kolmogorov's demonstration the complexity of an object represents the amount of information, but also the degree of randomness. The three are fundamental equivalents. It makes sense, then, to reaffirm that a dynamic, i.e. non-linear, system produces information and to accept the proposition *"information first, everything else later."* But what information? The one processed automatically or the one processed by humans?

Robert Escarpit states that we cannot ask a computer (artificial intelligence) to exercise the same capacity to manage information and to manage human unpredictability. Today, such attempts multiply exponentially. But, I think it remains true that machines value the mechanical, repetitive part, the pattern, which can also be random, but, naturally, they will erase everything that is the exercise of freedom, that is, exactly what is authentically human.

In this sense, it can be said that the quantitative result of voters' opinions expressed by voting shows us *"everything that is non-essential and nothing that is irreplaceable."* In a situation of apparent inferiority, when the opponent (adversity) is credited with a superior force, our personal game must be both coherent and irrational. Irrational does not mean random, but intuitive, through free thought. For us, objectivity requires the acceptance of uncertainty.

By this we are, I think definitively, superior to artificial intelligences. The most successful decision maker is a connoisseur of chaos.

Kolmogorov: *"Mathematics is actually a tool of thought (for thinking). It is an extremely important one in a world where feedback and non-linearities abound. The models used to simulate and calculate non-linearities are increasingly sophisticated. Because that's how you reach more and more valuable results. Linear models are honest, but also a bit sad and depressing: efforts are proportional to results. But, in the non-linear world, an input however small (infinitesimal) can have a macroscopic output (or vice versa). To be clear: if electronics were linear, we would have neither computers nor TV. Actually, we wouldn't read these lines."*

Mervyn King notes, however, that information is immediately incorporated into stock prices, and explaining past price movements is not a basis for predicting future prices. It is something demonstrated by Mandelbrot. King states that if we admit that people behave irrationally by their very nature, the practical solution in society would be for governments to intervene to correct irrational propensities, or push people towards optimal outcomes. King's question "are political decision-makers more rational than voters?" is absolutely relevant.

Defying uncertainty

It remains for us to talk about an act of decision that is not overcoming uncertainty, but what I call defying uncertainty: the courage of an enterprise against what presses on its own vision of development. It is an exceptional attitude and hard to recommend. It cannot be included in the category of fighting uncertainty, but in the category of fighting the system. It is most often the struggle of a single man possessed by a vision and a complete belief in the justice of that vision. Among the great successes in the history of the industrial economy, I opt for that of Henry Ford. It was the beginning of the 20th century when automobiles were already being produced, both in Europe and America. Henry Ford was convinced that we had entered a new era, one in which the automobile was the new king of industry, virtually replacing horse power as the means of individual transportation. His idea of producing automobiles on assembly lines was subject to aggressive uncertainty, generated from all directions: the automakers of the moment, stockholders, the press, and even public opinion. All were hostile to Ford's economic ideas. We don't know if Ford had done a cost versus profit plan. However, we know that he firmly believed that the automobile had a mass destination, and not an object reserved only for those with money. The combination of his economic operation was particularly risky because it was a double bet: the substantial reduction of costs and the massive reinvestment of the profit obtained in the same enterprise. In 1908, when the Ford Model T appeared, its price was \$950, and in 1927, the price dropped to \$290, for a total production of nearly 17 million units during the 22 years that included the World War. From a production of 100 cars daily in 1908 to the production of a Ford T in 24 seconds in 1927. The initial value of the Ford company was 28,000 dollars, but in 1919, Henry Ford bought back 38% of his company's shares for 106 million dollars. The value of the company had increased 10,000 times in 11 years!

Reducing uncertainty through Artificial Intelligence (AI)

AI is the science of making machines think and act like humans. The AI revolution was based on three factors:

- increasingly sophisticated and efficient algorithms;
- increasingly powerful computers, capable of running these algorithms;
- digitization, which allows more and more data to be processed by algorithms.

Artificial intelligence today is a \$13 trillion global market. In 2020 an AI system called AlphaGo, belonging to DeepMind, defeated the best player of GO - an Asian game of exceptional complexity. A few years ago, another system AI, Deep Blue, beat world chess champion Kasparov. Tech giants Facebook, Amazon, Google, Microsoft, Netflix, use AI on a very large scale because their operations require minimal human intervention. In fact, they have reached \$1 trillion market shares thanks to these AIs, using little labour. It should be noted, however, that the "snowball" rolled faster by securing the monopoly position on the market, practically unfettered (not even, or especially, by the tax authorities). This position has allowed them to hire the best AI experts, who are scarce and command salaries at the level of CEO, completely beyond the possibilities of ordinary, or even large, companies.

The contribution of AI in medicine and especially in science, where huge volumes of data are accumulating that need to be analysed and exploited, is exceptionally important. However, there are essential limitations. Common sense, or *savoir faire* (knowing how to do), or *joie de vivre* (enjoying life) is missing from AI and shows the distance from what we call intelligence.

A phenomenon associated with the current use of algorithms today is their use as an excuse to avoid taking responsibility for one's own failure: *"It's the algorithm's fault; he didn't calculate correctly!"*. Most often, those who blame algorithms are politicians from public administrations.

This shows us that, in reality, what concerns them first and foremost is not improving people's lives, but lest they fail. The press reports such cases every day and all over the world.

The Internet, by its very nature, is an environment of speed, navigation, quick references, simple words and even simpler

sentences and constructions. As a result, Internet connectivity provides virtually unlimited knowledge and communication channels, but at the same time, this medium and its use of connectivity severely limits people's ability to express themselves in a more meaningful manner and thus can significantly reduce understanding common, sharing of meanings and empathic interactions. A more agile, more responsive way of thinking is often preferable. It doesn't really appear that way in digital reality.

Today's generation, which I would call the FaceTik generation, was born from Facebook and TikTok, but without book and toc (pen, in Romanian), that is, without book and without writing or even without speaking.

Judgments that can be made automatically should be as close as possible to the field of artificial intelligence. Those judgments, and consequently norms, that cannot be or do not want to be made automatically require a special approach. Organizations that are open to understanding the causes of erroneous decisions start by measuring the noise (through auditing) to assess whether an intervention is necessary.

The first step is to have a good set of options. Something useful can be built on this basis provided a rigorous comparison (with a clearly established and unequivocally repeatable sequence) is made between these options. The authors call this procedure decision hygiene:

- Establishing the list of options;
- The decision regarding their assessment method;
- Evaluation done separately, for each option;
- Conclusion.

Let's note that the procedure has a preventive character. That's why it's called hygiene. It works without you knowing what error or "disease" in the system has been removed. Judgment becomes more uniform and disciplined. The consequence in the system is stability and possibly increased resilience. Indeed, feedback and selection eliminate in good measure a source of error from variability, which exists in itself and is very useful in dynamics, evolution and adaptation.

And in the economic field, the goal is to increase the resilience of the system. A system's resilience is not built to avoid risk. Basically, risk absorption shows and leads to economic progress. The resilient

system is adaptable in exactly the sense required, i.e. preventing critical thresholds from occurring.

The wealth or poverty of nations.

Today, the idea that the roots of differences between states are cultural is emerging more and more. Fernand Braudel wrote that civilization is defined in a relationship with many human sciences, of which, of particular importance is collective psychology, awareness, mentality: *"In any (historical) period, a certain vision of the world, a collective mentality, is prevalent, animates and penetrates the entire mass of society. This mentality, which dictates society's attitude, guides its own choices, confirms its prejudices, and directs its actions, is certainly a fact of civilization. Much more than the accidents or historical and social circumstances of a period, mentality is the fruit of distant heritages from the past, to beliefs, fears and old anxieties, often unconscious. We could say (that they are) the fruit of an immense contamination whose germs have been lost in the course of time, but which has been transmitted from generation to generation. The reaction of the society to the events of the day, to the pressure exerted by them, to the decisions it faces, are subject less to logic or selfish interest than to the unexpressed and irrepressible command that is born from the collective unconscious."*

These structures of a collective mind differentiate and even isolate civilizations and, for this reason, are the least able to ensure communication between them. Religion is an obvious example. Over time, these traits change little and slowly. The biggest mistake is to ignore or not pay enough attention to them. The importance of history is crucial, including in recognizing accidents in history. Economists are partisans of it. Some countries are rich, others poor because of a combination of economic incentives, culture, institutions and chance. Which is more important remains an open topic. My experience as a Prime Minister is crucial to run away from historical backwardness.

Finally, allow me to quote Marin Sorescu's words from his little-known and promoted text, "Extemporal about me" from 1981: "By remaining ourselves and not being ashamed that we are as we are - sometimes even more naked, and uneaten, and in the rain, and at the crossroads of times, spells and germs - we will be of more interest for the broad humanity than if we tried to interest it by continuously borrowing in, homologated from everywhere, things and not risking anything with our a lot-little."