FOR A *TRANS-PRAGMATICS OF CRISIS*. ROMANIA BETWEEN EURO ATLANTIC PROGNOSES AND AUTOCHTHONOUS REALITIES. MODELS AND TRENDS

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Abstract. *The need for a coherent crisis models based on sustainable development renders necessary the cybernetic and mathematical models for completion of classic econometric models. Ours models and hypothesis propose a schedule of a trans-pragmatics constituting finally a lot of balanced vectors and fractal structures developing mirror (a)symmetry*.

0. The need for a coherent model of monitoring, management and solving of the crisis solution, sequential or niche, serial or cyclical, regional or global, makes that the models of cybernetic or mathematical type become complementary to the classical econometric models. (cf. Fig.1).

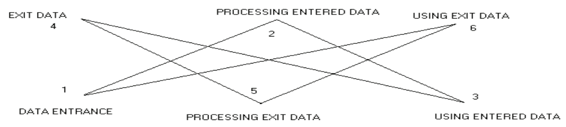

Fig.1

The sustainability of the assembly might be represented – according to certain researchers (8, 30) – by the triangulated structure – category where any commutative diagram is generated by three cycles, every cycle being generated at its turn by three commutative diagrams, thus forming a self-sustainable assembly (11). The final model is a triangulated category of dissipative systems in an homological relation forming fractal structures developing the *mirror (a)symmetry*. Among the themes, modalities and mechanisms of situational appreciation that must be taken into account, there should be the rules for action and institutional structuring, the public-private partnerships, the work codes and rules, the manner to evaluate *feedback*, generation of public and private strategies, the *policy making* system and expertise, the decision making system, *foresight*, etc. (24). By projections and extrapolations, these themes, modalities and mechanisms might be tested in re-professionalization and reengineering or co-participation programmes (33). We must quote here several graphic exemplifications of the commutative circuits and diagrams (Fig. 2, 3, 4) (8).

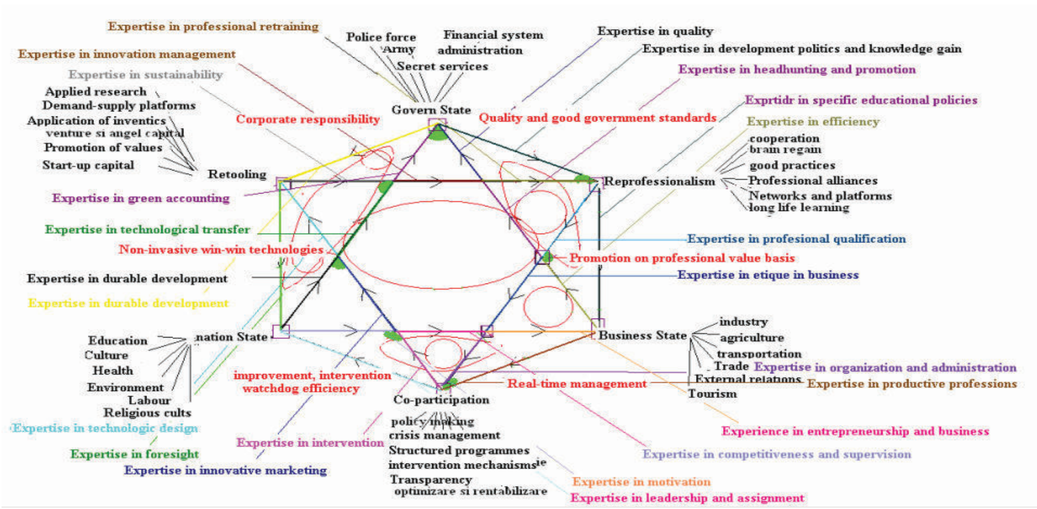

Fig.2

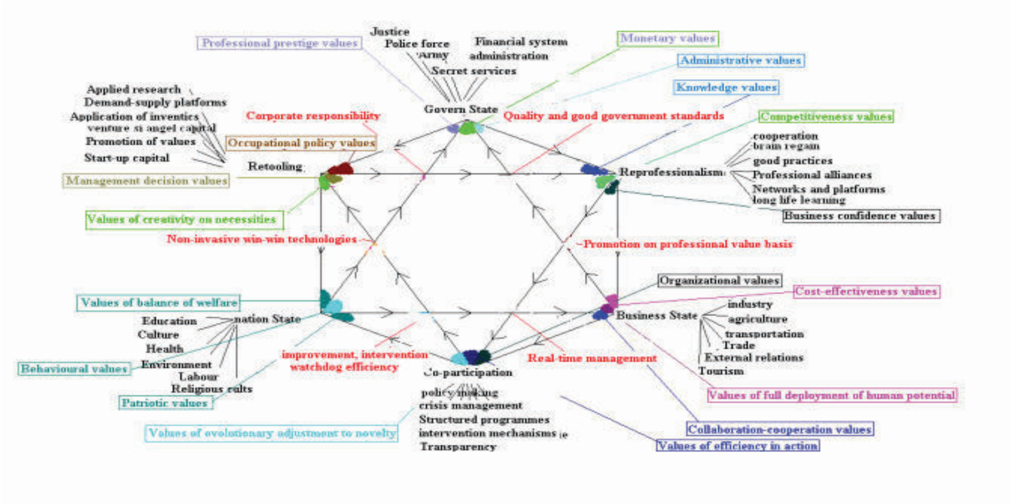

Fig.3

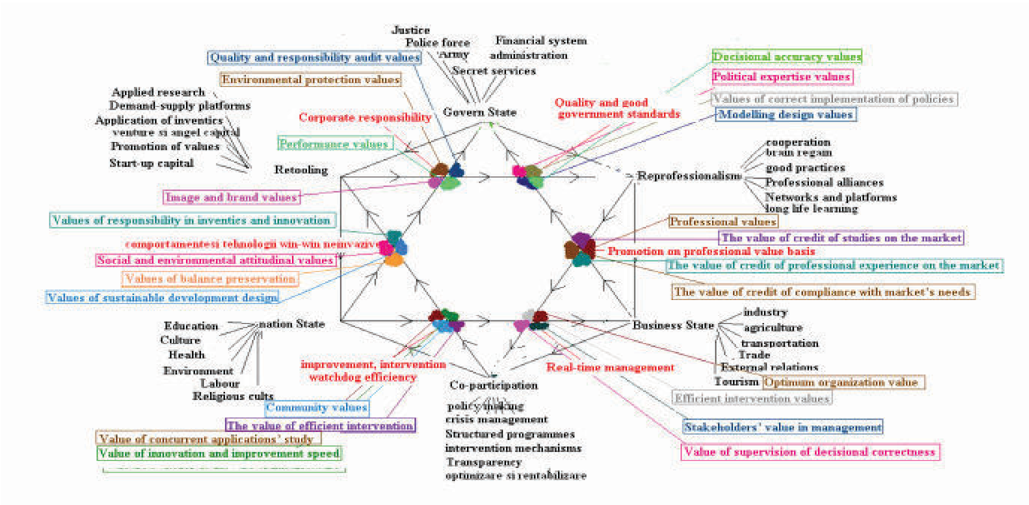

Fig.4

1. For the rigorous articulation of a phenomenology and a trans-pragmatics of the crisis situations, we may develop as work hypotheses diverse applications on classical models or theorems: Poincaré's recurrence theorem (3, 18), the recurrence theorem Markov's finite chain, quantic recurrence theorem (2) etc.

2. *Simulator/generator of equations for a potential corpus of informational/decisional flows in crisis situations. Application on Markov's chain paradigm.* A Markov chain is a process for which the probability to get into a certain state depends on the current state. Thus, the probability to pass from the crisis state (conflict, disequilibrium or informational minus) i to a non-crisis state (equilibrium or informational plus) j has been noted by p_{ij}. The multitude of these transition probabilities includes a matrix $\|p_{ij}\|$ and this matrix defines the Markov chain. If there are only a definite number of states, then we have a finite Markov chain. Be it $[p_{ij} + p^{(n)}]$ the probability that the chain may pass from state i to state j in n steps; be it $[fij + f^{(k)}]$ the probability of first arrival to state j coming from state i after k steps; and be it $[f_{ij} + f^{(k)}]$ the probability of a first return to state i after k steps. Then, it is obvious that

$[p_{ij} + p^{(k+1)}] = \sum [p_{im} + p^{(k)}]\,[p_{mj} + p^{(i)}]$ (Chapman-Kolmogorov equation)
and also,
$[p_{ij} + p^{(n)}] = \sum [f_{ij} + f^{(k)}]\,[p_{ij} + p^{(n-k)}]$, where $\boxed{k = 1}$
The probability f_{ii} that a system leaving from state i to return to the same state i s given by
$f_{ii} = \sum [f_{ii} + f^{(n)}]$, where $\boxed{n = 1}$.
We say that a state i is recurrent if
$f_{ii} = 1$
and non-recurrent if
$f_{n} < 1$

2.1. This average time of return may be finite or infinite. If it is infinite, the state is called null since in this case $[\mu_i + \mu^{-1}] = 0$. If it is finite, the state is called positive, since in this case $[\mu_i + \mu^{-1}] > 0$.

3. State i may refer to (a) the informational field on an axis from (- 0/-∞) to (+ 0/+∞), connected to the crisis situation or/and (b) the decisional field oriented (b_1) retro-paradigmatically (on the time axis: past), (b_2) pro-paradigmatically (on the time axis: future) or/and (b_3) syntagmatically: a plurimodular synthetic stage where the anti-crisis team defines its options, formalizes the topics, syntax and coherence of decisions preliminary to action, depending on certain value priorities and hierarchies. We must mention that, though the past axis is irrelevant for the classical model of Markov chain, the model may be applied to the data bank of crisis situations "archived" by a specific programme compatible with Chapman-Kolmogorov equations.
3.1. If we consider the informational/decisional field connected to the crisis situation as being a Markov chain, finite and non-decomposable, namely, for all the states i and j from the chain, $i \leftrightarrow j$, then all states are recurrent and, moreover, the probability $[f_{ij} + f^{\infty}]$ that the system starting from any state i, to get to another state j for an infinite number of times is equal to 1: $[f_{ij} + f^{\infty}] = 1$.
3.2. So, be it the space of states of Markov's finite chain Markov S = {1,2,..., s}. The transition matrix $\|p_{ij}\|$ is a stochastic matrix meaning that all its elements are not negative and the sum of elements on a line is equal to 1: $\Sigma_{j=1}\ p_{ij} = 1$. Thus, if we assume that all states are non-recurrent, then $\Sigma_{j=1}\ p_{ij} = 1$ for any n. But contradiction shows that not all states may be non-recurrent. Be it j_0 one of the recurrent states and i another state. If by hypothesis $j_0 \leftrightarrow i$, *Lemma 1* shows that i is recurrent, then all states are recurrent. Once the system returns to state i, it must, with probability *1*, return to state i, by virtue of Markov's model. Thus, we may notice that the probability that the system should return to state i for an infinite number of times is equal to 1: $\boxed{[f_{ij} + f^{\infty}] = 1}$.
At the same time, we may demonstrate that for all Markov chains modeled on crisis situations, finite and non-decomposable, all states are positive meaning that the average interval of recurrence is finite. In fact, we may show that a Markov finite chain applied to diverse topics/syntaxes of crisis admits at least one positive state.
3.2.1. If state i of a Markov non-decomposable chain, modeled on a crisis situation s_c is aperiodic, then we may show that $[p_{ii} + p^{(n)}] \rightarrow 1/\mu_i$, where $n \rightarrow \infty$ and if the period of Markov chain is T, then $[p_{ii} + p^{(nT)}] \rightarrow T/\mu_i$, where $n \rightarrow \infty$.
4. *Simulator/generator of equations for a potential corpus of informational/decisional flows in crisis situations. Application on Markov's chain paradigm*. **IF** in the dynamic macro space of crisis, the informational/decisional flow is a *function almost periodic* f(t), namely a continuous and limited function, so that for any $\epsilon > 0$ there is a relatively dense set $\{T_\epsilon\}$ with $| f(t+T_\epsilon) - f(t) | < \epsilon$ for any moment t and for any T_ϵ of the set, **THEN** the function of wave and the expected values for all limited operators are almost time periodic functions.
4.1. *Crisis as a wave function*. Schrödinger's equation, a fundamental equation of physics, describes certain sizes and functions of quantic mechanics. Also called the wave equation, it describes the dynamics of the wave function of a physical system evolving on a time axis.
4.1.1. Crisis as a wave function is negative only for a finite set of spatial-temporal coordinates. Thus, the Hamiltonian $\hat{H}_0$ is determined to have a discrete specter: the informational energy does not vary continuously and may have only discrete values $\{E_1, E_2, ...E_i, ...\}$. Since the Hamiltonian $\hat{H}_0$ is self-adjunct, the wave function may be developed as a series of powers of its own functions hose form $[exp\{iE_i t/\hbar\}]$ ensures their periodicity in time. The fact that the Hamiltonian is limited means that when measuring the energy of the informational system connected to the crisis situation one may not obtain a high energy and this means that the abovementioned set of discrete energies is finite. Thus, the serial development corresponding to crisis as a wave function has a finite number of terms (20).
5. *Multiple worlds*. The idea from where the Multiple Worlds model starts is that evolution occurs permanently by means of Schrödinger's equation, either in the variant *time-independent*, or in the variant *time-dependent*, where $\hat{H}$ is the Hamiltonian operator. Thus, we may find the hypothesis of the crisis as a wave function. The mathematical descriptions of determinism in Schrödinger-Heisenberg paradigm, transcribed into programming languages of *fourth generation* (non-procedural languages oriented towards the solving of a certain problem class: SQL) or *fifth generation* (languages used in fields such as fuzzy logics, artificial intelligence or neuronal networks: Prolog, LISP a.o.) (21, 22) complemented with applications of Mandelbrot set (9, 25).
5.1. *Simulator/generator of equations for a potential corpus of informational/decisional flows in crisis situations. Application on Mandelbrot paradigm.* If the *border* of Mandelbrot's set is the bifurcation place of the square family, namely the set of parameters c for which dynamics changes abruptly by small changes of c, then we may build – as a limited set of a plane algebraic curve sequence - multiple images of the crisis situations according to the model of *Mandelbrot curves*, studied as polynomial lemniscates.
5.2. As a consequence of the definition of Mandelbrot's set, there is a tight connection between the geometry of Mandelbrot's set, at a given moment, and the structure of corresponding *Julia's set*, a mathematical model that might partially order the distorting informational flows and re-syntaxize the incertudinal entropy.
5.2.1. *Fatou set F(f)* of f is complementary to Julia set. So in *F(f)*, the behaviour of f is regular, whereas in $J(f)$ it is chaotic. From our researches, it results that both *Julia set* and *Fatou set* may be applied to the informational flows of Brownian type, especially in the crisis situations.
6. *Simulator/generator of equations for a potential corpus of informational/decisional flows in crisis situations. Application on "Game theory" paradigm.* The first who developed a theory of the Brownian movement, later confirmed experimentally, was Albert Einstein (10), who on May 11th 1905 published the article "About the movement of small particles suspended in stationary liquids, according to the requirements of the kinetic-

molecular theory of heat". Though no scientist has noticed so far, Einstein inaugurated in 1905, in the article about the movement of small particles what will be called half of a century later, *the game theory* (27).

6.1. Unlike Von Neumann and Morgenstern who were deeply reductionist by pragmatically refusing the incertudinal field and the pressure of hazard focusing their analysis only on "zero-sum games", John Forbes Nash (28) (1950) mathematically clarifies the distinction between "cooperative and non-cooperative games". Given the fact that "non-cooperative games" are frequently found in the real world, the author proposes a study methodology and practical modeling called *Nash program*, not tested yet in the macro-situations of crisis. The models conceived by us and simulations, though applied on fragmentary cases, are at least satisfactory in this stage of research.

7. *If:* the standard model of cosmology relies on the hypothesis that, on a large scale, the universe is homogenous and isotropic, the temperature variation $\Delta T/T$ of background cosmic radiation being a direct measure of its homogeneity and isotropy (31).

7.1. *If:* we may prove that there is much more reality in the future than in the past by comparing the volume of the entire continuum space-time with the volume of space-time from the bright cone corresponding to the past (Hawking, Ellis) (17).

7.2. *If:* entropic time Θ (t), defined as the total entropy quantity existing in the universe at moment *t*, represents a time scale much more relevant from the physical viewpoint than real time (37).

7.3. *If:* space-time, where all sets of the form $J^+(p) \cap J^-(q)$ are compact, is called the global hyperbolic space-time (15).

7.4. *Then*: the global hyperbolic character supposes the validity of determinism and the entire space-time is determined uniquely on the basis of initial data from hyper surface S.

7.5. *Then*: the micro-system of global or planetary crises, integrated and pluridetermined by the cosmic "genome" should no longer surprise anyone. In the perspective of the conspiracy theory, we may imagine an Orwellian programme for the breaking out and unleashing of crises. In fact, beyond the drama induced to the individual or the community, dramas quantifiable in statistics, digitalized and transformed in Fibonacci sequences, any crisis is a Gaussian curve transposed in the real world. On the other hand, the "forty-eight" conspirationism was discretely replaced by a "new world order" that practices the social, economic, political, financial, military experiment, reiterated in a fractalic manner on all meridians.

7.5.1. *Corollary 1*: history is a succession of Gaussian curves, modulated on diverse levels and registers and, more recently, a "chaos" generated and generating fractalian dimensions (32).

7.5.2. *Corollary 2*: a crisis situation is a topologic space (5).

7.5.3. If up to the 20th century, the output of deterministic dynamic systems, as the crisis situations were considered, might be in principle exactly anticipated and supposing that the model representing the real system was correct, the prediction errors would have had the same size order as the errors in observing and measuring variables. Conversely, the random processes describe systems of an irreducible complexity due to the presence of a large number of degrees of liberty whose beh vaviour may be estimated only in probabilistic terms. This is the new interpretational paradigm of the crisis situations in the 21st century. This means that for the chaotic systems (e.g. a crisis system), if measurements determining states are finitely precise, the result might be random and, in essence, unpredictable.

7.5.3.1. Crisis generates a dissipative space-time. Due to dissipation, the dynamics of a system whose phase space is n-dimensional will be finally contained in a sub-set of a size smaller than *n*. So dissipation allows us to distinguish between the transient behaviour and the permanent one. For the crisis structures of dissipative type, the permanent behaviour may be simpler, even if the number of variables from the phase space is large. If a crisis structure is an n-dimensional system of differential equations, then it will be characterized by a unique, global and asymptotically stable point. For such a system, the flow will contract any n-dimensional set of initial conditions into a state 0-dimensional, a point in *R*. If a dissipative n-dimensional system is characterized by a unique, global, stable limit cycle, once the transient orbits came to an end, there will be just one one-dimensional orbit: the cycle. The asymptotic permanent condition of a dissipative system is the only detectable behaviour given its iterativity. But to evaluate correctly the asymptotic properties of a dissipative system we have to consider the attractor or attractors to which the trajectories of a set of initial conditions are attracted.

7.6. Though crisis is a complex of chaotic type, even the chaos may be identified and measured using the quantitative and qualitative methods such as: Liapunov exponents, Kolmogorov-Sinai entropy, fractal dimension, correlation dimension. At the same time, for a chaotic system we may reconstitute the state space on the basis of some information related to the correlation dimension of stage attractors it includes.

7.6.1. We suppose that the temporal evolution of a crisis structure from the category of chaotic dynamic systems was registered under the form of a time series. Having an apparently random evolution, this is convergent in the state/phase space of the system towards a chaotic (strange) attractor. Such attractor occupies only a part of the phase space and is characterized by a fractal dimension. The larger this dimension, the higher the number of variables that must be taken into account when modeling the chaotic system under study.

8. *Who, what and how decides?* A spatial o temporal variation of some physical or chemical parameters may generate for the human subject a state of feeling that activates a mechanism for the evaluation of reality based on order, classification and, implicitly, recognition of a situation that has become stable in time and accordingly

labeled. Any variation involves a modification of a physical parameter describable by a scalar, vector or a tensor attached to the Euclidian space 1D, 2D, 3D. At the same time, it involves the access to at least two points, in *space* or in *time*, between which there must be a detectable difference. Anisotropy constitutes today a starting point in the activity of reevaluation of the useful information. Aspects that seemed extremely disordered, without periodic components, may be now discriminated and classified in fractal, chaotic structures with a correlation on a large scale (1).

8.1. For Cannon-Bowers, Tannenbaum, Salas, and Volpe (1995, 7), the "team skills" first define the level of behavioral and cognitive involvement in the fulfillment of the mission. As compared to the individual action, the "teamwork" needs another type of behaviour called in the specialized literature "coordination and information sharing" (36). In various taxonomies (16, 19) and models (13, 26, 34), the team behaviour is characterized by communication, adaptability, coordination, performance, monitoring/feedback, leadership, power of decision and efficiency in solving the conflict, the information management and the "science" of assigning tasks. In the triadic model below, we may notice the interrelation and functioning manner of individual behaviours integrated in a team (cf. *infra*)(6).

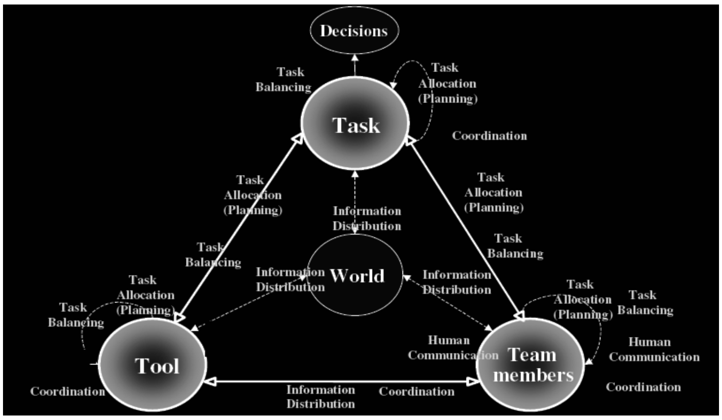

Fig.5

8. In conclusion, for the rigorous articulation of a phenomenology and a ***trans-pragmatics of crisis situations***, an ideal analyst of the crisis situations as well as an ideal stakeholder should evaluate the specific models, strategies and programmes as well as the enumerated theories and instruments for information processing (cf. *supra*), not only with the affective intelligence "hot" and "weak" (12, 38), but also with a lucid logic, "cold" and "strong". Frege, for example, stipulates that all improper descriptions designate an arbitrarily chosen object, such as the void set or number 0 or the truth value F. This way, Frege (*Begriffsschrift*, 1879) (35, 4), interprets the identity proposition '$(\iota v)A = (\iota v)B$' as being true, if nothing corresponds to condition A and nothing corresponds to condition B and also if A is more than an object and B is more than an object. Or, in other words, it incorporates the set theory or the theory of value domains in its logic theory. Accordingly, if predicate A is uniquely satisfied, then $(\iota v)A$ denotes the only object denoted by t in such a way that $A(t/v)$, and if A is not uniquely satisfied, then $(\iota v)A$ will denote the set $\{v/A\}$ of objects satisfying A (23). So, there is a last sequential example extracted from the paradigm of a "strong" thinking logically founded and sustainable in a project for the optimization of the equilibration-solving strategies of the crisis situations.

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