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# **Fundamentals for very long term planning**

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**Abstract.** After the economy, education, health system, culture, society in general were almost completely destroyed in the last decades, the Romanian civilization must be rebuilt, on new foundations, considering top trends. Being a complex action, the reconstruction and relaunching of the country on the way to development could be planned and carried out on the basis of very long-term strategies from which the plans for more and more detailed terms can later be extracted. The strategies must start from fundamental strategic principles that target the major objectives of the national interest, as well as the objectives of interest in the international arena in which the country is involved. From many possible principles, we comment only a few, less discussed, for exemplification.

**Keywords:** visionary policies, very long-term strategies, perennial goals.

## **1. Introduction**

The environment is the living space in which social-economic, educational, and commercial influences are exerted and in which the psycho-adaptive exchanges between individuals are carried out [1]. Systems of all types contribute to the reporting of the environment to individuals, placing everything in society, ensuring the harmonious evolution of environmental and human systems.

The destruction of some main systems in fields such as the economy, health, education, culture, led to deep modification of human resources through the mass emigration of people, which led to great risks of radical modification of the environment [2].

The slow transformations of the last decades, the decisions made chaotically and from one day to the next, have brought society to such a critical state that only a very long-term visionary planning can stabilize it on a trajectory of recovery and restart it. It has been done some development strategies based on very long-term

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vision [3], but they were applied more in the research and design phases, less in the implementation phase.

The problem being very vast, we mention below some highlights that can give an image of the necessary concepts in very long-term strategy.

### **Preliminaries to very long-term strategies**

For getting out of the system crises accumulated by the social-economic systems after 1989, there is pressing need for very long-term strategies for completing the changes and relaunching the sustainable development of society [2].

Before that, some improvements need to be made: reducing the number of budgetary workers in government institutions and territorial authorities; bringing back the inclination of citizens towards saving and reducing waste; discouraging and abolishing antisocial interest groups that led to the reversal of the value system; temporary reduction of external loans which actually fueled the corruption and parasitism of the political clientele; politicians must be humble and insinuate humility one to another; cultivating the traditional politician dedicated to the country, etc.

### **Breakthrough of the century**

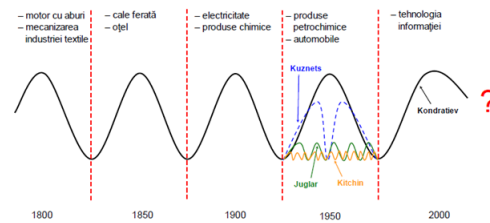
Very long-term planning, throughout future generations, is becoming more and more urgent because great progress will follow in all fields. In this respect, it is representative the competition which is underway for the biggest and most profitable business of the current century: the expansion in outer space to the Moon, Mars, asteroids, etc. The impact will be comparable to the wheel, plow, machinery, nuclear energy, artificial intelligence. Already, many of the rocket launches to space destinations are no longer breaking-news, but simple novelty and routine.

## **2. Some highlights on very long-term planning**

### **Basic needs in planning throughout generations**

The strategic planning of system development and management should take into consideration both the very long time horizons and also a deep incursions in the past. The objectives and strategic criteria going through more generations should be identified, that is to discover the invariants to be taken into account when issuing development policies in the future. Such invariants must primarily based on the future human needs, sustainable development, mobility, safety, comfort, welfare, etc. By these fundamental harmonics, the differences related to each generation interact, so that it should avoid the risk to get tied up in the local and acute needs of actors [4], fig.1.

## Inovații tehnologice majore și cicluri economice lungi



O interpretare simplificată a ciclului Kondratiev: fluxurile și refluxurile activității economice sunt determinate de inovațiile generatoare de plusuri de productivitate

Fig. 1. Technological innovations and economic cycles

There are objectives and projects that may be carried out along many generations and in such cases it is necessary to harmonize the strategies and concepts specifically to each generation. There is not a simple application of subsidiarity principle, but to know the strategic coherence of the trends on very long term, to define the strategic objectives, to build the necessary institutions, the models and methods. There is to solve at least the following problems:

- identification the profiles of policy-makers generations to be involved on very long term;
- build the data-bases with comparable data from different periods of time;
- identification of strategic objectives in the past and of the specific correlations;
- gradually achievement of new social, economical, and political patterns possible in the future;
- technological forecast on very large horizon of time, throughout generations;
- prognosis about human needs, typology of human resources, and future objectives, etc.

The dynamics of patterns and models on very long horizons is influenced by the dynamics of the generation's mentality that issue the strategic planning. A decision referring to the  $n$ -dimensional decisional level can be correctly issued within a space  $(n+1)$ -dimensional. For example, to each network of Romanian national systems, it is necessary to add a new dimension to its decision-making geometry, the EU context, in order to avoid provincialism.

### Promotion of domestic production

There are complaints that fundamental areas of society are not sufficiently financed: health, education, culture, agriculture, defense, science, technology and many others that are useful for citizens. But, the main cause of the lack of funds is the lack of domestic production that was liquidated with ferocity and visceral hatred in the decades after 1989. Specialists know, however, that only the production of goods and services, specially industrial ones, could increase the national wealth consistently and sustainably, in the long term. The economy in general needs to be relaunched, but especially the industry in top fields, even with disruptive technologies, as well as the activities that capitalize on natural and human resources, capitalizing on the advantages that can come from international

organizations (insufficiently used opportunities yet).

We are not advocating against foreign investments, but for their stimulation, which would be to the advantage of the domestic economy through the effects of contagion and cooperation.

#### **Rise the system to higher level of reality**

The technological revolution, improving education, the simple application and completion of a project, any act of creation, represents progress, evolution towards a higher level of reality. That is, an ascending movement, an elevation [5]. The ascending approach to the evolution of a system is actually an action to reduce the informational entropy, which is done by supplying energy from the current reality, but also by the creative energy of man. So, open-type uncontrolled dissipative systems must be replaced by feed-back and feed-before systems. The systems are raised to another level of reality, a process which can be repeated often in the large term.

#### **Integration natural changes into human life**

Man has the ability, as he innovates or discovers something, to internalize their results, thus making them become natural objects in the environment and in himself. This is what happened after discoveries and innovations with a major impact: the fire, the wheel, agriculture, the transition from horse drawn carts to automotives and trains, navigation, roads, great geographical discoveries, art, etc. A new discovered or invented object shocks at first. Then it is assimilated and metabolized (mental, technological, biological, social), entering the current reality. The process will continue in the future, including by exploring the outer space and migrating to other celestial objects. What was unthinkable yesterday, is new today, and tomorrow will be something natural, this cycle repeating itself endlessly.

#### **Strategic development in historical context**

The very long-term planner must harmonize the strategies, even to the point of synchronization, in the historical context against which the dynamics of the objectives are projected. The strategies must not be discordant in the dynamics of national objectives in the very long term. A major strategic mistake was committed after 1989 by the almost total destruction of the economy, which was in contradiction with the economic dynamics of Romania in the last centuries, and also in comparison with other neighbors. Convergent destructive effects resulted in a deep negative singularity in Romanian civilization, from which the country will recover very hard and with heavy implications for the lives of its citizens. Beneficial singularities (scientific breakthroughs, disruptive technology achievements, etc.) to be integrated into past and future development strategies in the very long term must be preferred.

The central idea should be the historical integration of strategies, at least at the three-dimensional level "past-present-future", expressed very well also in the artistic language (T.S. Eliot):

Time present and time past

Are both perhaps present in time future,

And time future contained in time past.

### Considering variable geometry of market share

The long-term market share among competitors is variable and ultimately tends towards a dynamic balance. For instance, modeling of transport market sharing, this is cyclical in the very long term. Each mode gains first place from time to time [6].

Road transport flexibility enables it to gain some of railway market. Then, there follows reorganization and modernizing of railway transport, thus gaining a part of market. It is road transport's turn to modernize itself now, to develop new logistics services, thus continuing the cycle.

The dotted line, fig. 2, represents the modal split on very long term where also inter-modality has a role of historical driving force. The oscillations around this line are influenced also, function of the decision factors, which however fail to break the historical trend on very long term.

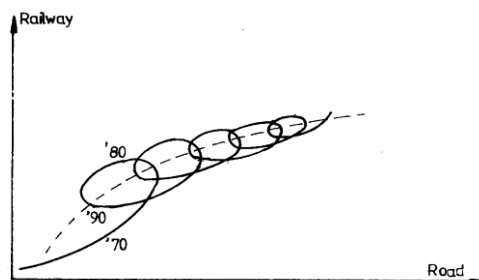


Fig. 2. A very long term pattern in transport.

We dare say that even the historical trend, but for a very long term, follows the same oscillation pattern. In other words, the self similitude of evolution in a historical perspective of inter-modality and transport modes competition is a fractal type.

### Static versus dynamic resilience

It is difficult, but also avoidable, to keep the resilience of a system constant. More important is the dynamic resilience of the system, which leads to the need for appropriate legislation, as well as models for adapting the system's behavior to the variable operating environment. The system must be adaptive type, having default dynamic resilience, continuous adaptation of strategies, feed-before management.

### Respect self-regeneration threshold of nature

When man creates something, he destroys something else. This is more visible in physical reality, but it also exists in the reality of abstract thought, as a result of intellectual activities. The results are seen in man's natural environment.

On the other hand, man is the one who also looks for solutions to mitigate the impact of his activity on nature. For this purpose, he must respect the minimum threshold of self-regeneration of the affected nature, thus ensuring the sustainability of his activity in harmony with the surrounding environment.

**Planning the interface between systems**

A strategic direction for the development and operation of systems is the optimization of their operation in networks. This objective is achieved through the planning and optimal operation of the system coupling interfaces in the networks.

Networks can be chains of systems, planar networks, n-dim networks, intersection of networks. Networks can be permanent, but also with variable geometry in a structural and/or functional sense, ad-hoc type, temporary networks, as force majeure cases (military, large-scale accidents), etc.

The interface between systems or networks of systems is the place where connections, communication protocols, modules for mutual adaptation, harmonization, mutual transfer of signals, acceleration/deceleration of system cooperation are made. In the interface, planning concepts are applied through which, working of the whole, of the system of systems, is realized.

The connections in the interface can be deterministic, probabilistic, even quantum. The coupling elements can be intelligent, seeking out each other for coupling. Interface can be the main element in the resilience of the system, in its reliability, the shape of the network being driven by the interfaces.

**The law of convergence of strategies**

The law of convergence can be applied in the very long-term multiple development of human society systems harmonized with the natural environment, in the idea of convergence of development trajectories towards intermediate and final objectives. Convergence towards multiple objectives can be assimilated with network cooperation trajectories, the theory of the optimal portfolio of policies, strategies, measures and projects. It can also be considered a single, but multi-criteria objective.

**National and international interests**

A system from the current reality is a subsystem to another system from a higher level of reality, as well as an integrating system for systems from a lower level of reality. The optimal relationship between systems on different levels of reality is achieved according to Bellman's theorem: an optimal policy is constituted by optimal subpolicies.

Those who do not act in the national interest violate the principle of subsidiarity. According to this principle the citizens of a country, led by their politicians, must act in the national interest.

On the other hand, the institutions at the EU level, through the respective officials, must act in the general interest of the EU. Similarly, at the level of other international organizations.

In this respect, are relevant, art. 5(3) of the EU Treaty and Protocol no. 2, regarding the application of the principles of subsidiarity and proportionality, as well as other similar provisions.

Do not confuse nationalism with chauvinism and xenophobia. If nationalism is something bad, then what about those who speak in term of national interest (Americans, French, Germans, etc.), use concepts such as national economy, national roads, national symbols (flag, anthem), national championships. Do the

political parties that have the word "national" in their official name have to change their name?

If no one, especially the politicians, should act in the national interest, then who should defend and promote the interests of the citizens of that country? What is the meaning of the bizarre pressure that politicians and citizens must not promote the national interest, but that of other entities? As usual, there are suggestive expressions in this sense, such as "one-is-one, another-is -another".

#### **Challenge from instinct of self-preservation**

A suggestion, but also a challenge for psychologists, sociologists, ecologists, lawyers and others, is to already conceive a specific ethics for systems with artificial intelligence, including those that work integrated with the human factor.

A system of values must be established that provides the benchmarks to protect the sustainability and other values of human society in the very long term, under conditions of expansion and sophistication of artificial intelligence.

#### **Strategies for intersection type systems**

Intersection differs from inter-, trans-, co-, multi-disciplinarity, because it is not something mixed or collaborative, well defined and independent.

Intersection is a system that works at the online intersection (overlapping) of domains, models, having observable variables that can also be of a quantum nature. The states of such systems can also be of type T from Lupasco's theory (the third included).

The systems can be of the fuzzy type, quantum processes, systems that contain the human factor, institutional and state-owned economic structures coexisting with market-based ones, etc.

#### **Causal coherence through pullback**

The descending causality, as well as the ascending one [7], manifesting itself between decision-making levels in a causal relationship, needs the coherence of hierarchical chains between different levels of reality vertically, but also on the same level (horizontally). It means that a circuit of the structure must be a pullback (fiber product).

The systems not having this characteristic will suffer when strategies are tried to be implemented there, especially the systems in which many such links are missing, such as: elements of the intra- and inter-companies technological chains and networks, when there is a gap between the generations of specialists and of stakeholders, in countries where emigration has made categories or generations of specialists disappear, etc.

Due to such causes, the systems work in a degraded state, failures in the education of children who grow up without their emigrated parents (interrupted descending causality), in systems where employees are promoted beyond stages, especially young people, to a higher hierarchical level (intermittent ascending causality). Promotion must be carried out from the bottom up, without skipping steps (Matthew 20.26-27).

#### **Organicity as a systems integrator**

Radu Preda (theologian) said that in modern times, the rural area in Romania has

not modernized in the same way as the urban area because their models differ too much, due to a lack of organicity.

Generalizing, we say that several systems can develop or modernize together harmoniously, if they make up a macrosystem based on organicity too. That is, the aggregation of systems in the macrosystem is achieved by their composition and integration.

Otherwise, the lack of organicity is visible, as in the case of a system from an EU Member State, which does not modernize in harmony with the European Union referential, because it does not harmonize organically with the EU, but through mimicry, resulting within a Member State in so-called forms without consistency (T. Maiorescu, M. Eminescu).

#### **A possible indicator, the entropic GDP**

The starting point is the GDP structure based on different criteria: fields of activity, counties, rich vs. poor, planned vs. realized structure, even in dynamics. Entropy and informational energy are calculated for them, allowing qualitative and quantitative analyses, such as the degree of concentration on the respective samples, the identification of reserves for improving the efficiency, effectiveness, and competitiveness of the economy, the identification of ways to increase the standard of living. Such a formula for calculating the GDP would also show the fact that the current economy is not progressing because only products manufactured in other countries are sold in national markets, which is a serious vulnerability.

Anyway, it is necessary to analyze the current shortcomings of the GDP calculation method and to revise it in order to consider the fundamental changes in the economy and society level.

#### **Systemic planning**

The systems interact statically, but also dynamically, depending on the time factor. Systemic planning can be approached and built, starting for instance, from the input-output model of Leontief, which was influenced by the historical-cultural theory of L.S. Vygotsky (people construct history, being determined by it). That will show how the systems interact [8], namely the branches of the economy.

Similarly, the transition (transformation) matrix from Markov chain theory is usable, as well as the state and input/output equations from systems theory:

$$X(t+1) = A X(t) + B U(t)$$

$$Y(t+1) = C X(t) + D U(t)$$

#### **The scenario in a chaotic environment**

In the market-based economy, the role of evaluation and control activities must increase. Some politicians and stakeholders say that policies and strategies would not be necessary, because at the macroeconomic level there is the chaos characteristic of the free market, the competitors being actually independent chaotic systems. Besides chaos itself is a fractal process found through self-similarity at all levels. However, this process makes a strategy for managing chaotic processes necessary [9].

Sometimes a complicated mathematical apparatus might be required if modern



control techniques were to be used [10]. A chaotic system is sensitive to the variation of the initial data. Thus, it can establish the operating scenarios of several chaotic systems in an integral macro-system.

The result is an aggregated scenario or a scenario on an aggregated system. For example, let's consider a method of synchronizing two identical chaotic systems described by:

$$x_{n+1}^1 = M(x_n^1, r_i), \quad (1)$$

$$x_{n+1}^2 = M(x_n^2, r_i) + N_n, \quad (2)$$

with variables  $x_n^j \in R^n$  and control parameters  $r_i$ .

System (1) is the controlled one, system (2) is the one by which the control is realized, and  $N_n$  are the control functions that must be determined to create their synchronization. If we consider  $x_n = x_n^2 - x_n^1$ , the following dynamic errors result:

$$x_{n+1} = M(x_n) + G_n$$

which can be a control problem or even the controlled system, being linear with a control input  $G_n$ .

It result:

$$x_{n+1,i} = k_i x_{n,i}, \quad k_i < 1,$$

which leads to synchronization.

If the two systems are designed from two different initial ideas, they may reach the same positions after a certain period of time. Scenarios that also consider the system synchronization criterion are necessary because a macro-system will operate at a degraded level imposed by its less resilient link. This reasoning applies both to the horizontal and vertical integration of system activity, as well as to international integration, to the realization of logistic chains and networks.

### Abstract planning

A theory or a model is a spatial structure, at least 3D, resulting from the composition of a set of concepts that achieve a multidimensional configuration with orientations in several directions. It is an abstract scaffolding of symbols, styles, words, numbers and equations. With such scaffolding can be made master plans, strategies, feasibility studies, projects, etc.

This approach, for example for a master plan, can be achieved if the specialists who develop it are high skill, i.e. very valuable researchers and designers. Such specialists still exist in academia, knowing that scientific research and design institutes have been destroyed in the last quarter of a century, with or without political will.

But let's accept the hypothesis that it is possible to design such abstract configurations that generate scientific, economic, industrial, managerial projects. Then, we rightly wonder if decision-makers and beneficiaries are able and interested to manage their achievement and use them. If they failed to materialize

the master plans and feasibility studies, prepared with current rudimentary methods (for highways, industry, etc.) and funded from European funds, how could they manage technological masterpieces designed by models based on abstract and sophisticated concepts, designed to meet the increasingly refined and complex human needs of the postmodern era we are going through?

### 3. Conclusions

The few highlights and benchmarks mentioned above should only be considered a kind of suggestions for building a structure of theories and models for very long-term planning, a scaffolding model for the development of visionary strategies that will affect people from several generations.

The issue is timely because systems of all types are becoming more and more complex and sophisticated, as well as people's needs that need to be met.

The demand for such far-reaching plans will increase, which is also visible in the accelerated pace of science, technology and future explorations, including in outer space.

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