

## THEORETICAL FRAMEWORK OF GEOGRAPHICAL SPACE ORGANIZING

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*Abstract: The geographical reality is very large and because we don't know how to take care of it, there may appear some problems. We must understand that the humans have the obligation of solving some of the problems, not all of them because the principle of incomplete information will not let us do all the actions the nature needs.*

*This work paper presents some meanings which may help in a way or another to solve this ecological crisis. Also in this work paper one may find basic geographical categories - paradigms, laws, principles, rules, theorems, concepts, and models.*

*Key words: Spatial organization, system, operational components, GIS.*

### **The organization of geographical space and the implications of geography in it**

The subject of geography is “*the earth as one unit*” the smaller units that form this single unit are only to help understand the planetary system (V. Mihăilescu, 1969).

Al. von Humboldt was the first scientist who said that geography is the complex science of terrestrial – spatial units.

The subject of geography can not and it must not be wrongly perceived with study of its elements considered separated units because only together (land, water, air, animals plants, and humans) they form “one unit” balanced the whole territory – the subject of geography as a science. Geography is a science that does not say what its limits are because it makes an integrative analysis of the geographical space and also creates the synthesis of the whole unit using characteristics taken from other sciences. Because the Earth is very complex it has been divided into different regions in order to be studied more careful. This territorial unit is the result of direct and indirect spatial and temporal relations, ordering and sub ordering of its elements (figure 1).

This relation between components establishes a commonly creating evolution, because the change of an element (by an external cause or an internal cause) is affecting the other elements. So, we can say that the territorial unit (territorial geocomplex) with different levels is a system (geosystem) with spatial – temporal evolution of components.

The territorial geocomplex components may be set in two big categories:

- natural components – lithosphere, hydrosphere, atmosphere and biosphere;
- anthropic and social components – created by man during social work and thinking evolution.

The humans are natural components but his way of life and what he creates are included in the social components. What man produces returns to nature, but sometimes this return is not good for the nature – chemical, irradiative, organic, and phonic pollution. Natural systems are influencing the social systems but, the natural systems are influenced by social system, establishing a certain balance but not a perfect one.

There are some important relations between society and environment that way a new system appearing – the social geosystem. There are a lot of changes between the social system and geosystem's energy, information and material. The geosystem can exist without the social system, but the social system can't exist without the geosystem that gives it support and frame, and that gives it material, energy and information.

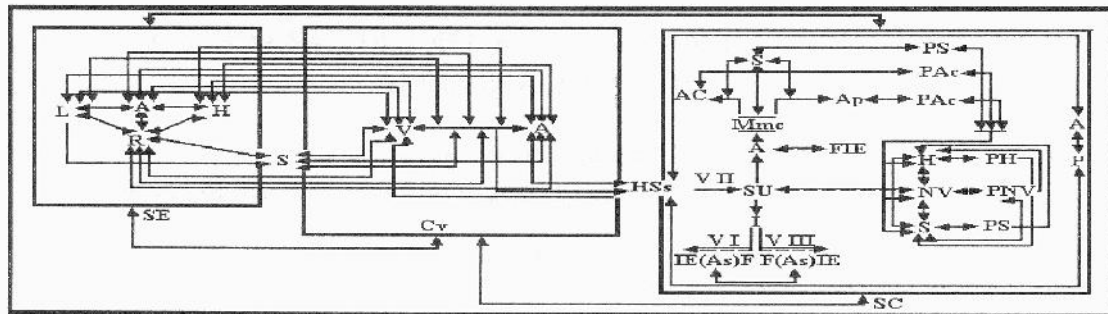


Figure 1. The logic scheme of geo-sociosystems structure (Irina Ungureanu, 1994):

*SE-Ecological system, L – lithosphere, A – atmosphere, H- hydrosphere, R – relief, G – ground, Cv – living community system, V- vegetation, A – animals, HSs – homo sapiens sapiens, SC - social-cultural system, SU- human society, A – busy population, WCM – work and creation means, AP – productive activities, CA- creative activities, S – services, PS –services products, Pap – productive activities products, Pac – creative activities products, VII – middle age population, I – up keeping population, VIII – aged population, VI –young population, F – family, As – social assistance, I – information, E – education, H - habitat, NV – vital necessities products, PH – health products, A – administration, P – politics,*

This extraordinary complexity of the geographical systems results from the serious relations between its components. The scientist, knowing the organization of the geographical systems, its social and economical systems, can coordinate and help anthropic organization of the geographical space over the natural organization. This anthropic organization is needed because there where some technical systems that destroyed the balance in the nature. It is very important to prolong the life of the social and economical systems, to avoid social systems' failure and to protect the natural environment.

### Operational components in the organization of geographical space

#### 1. The organization of geographical space – the concept

The real world is orderly, but this order is differentiated in every man's own way. Spatial structures are being altered if they don't serve human's necessities. Nietzsche said: "human behavior is not rational but vital".

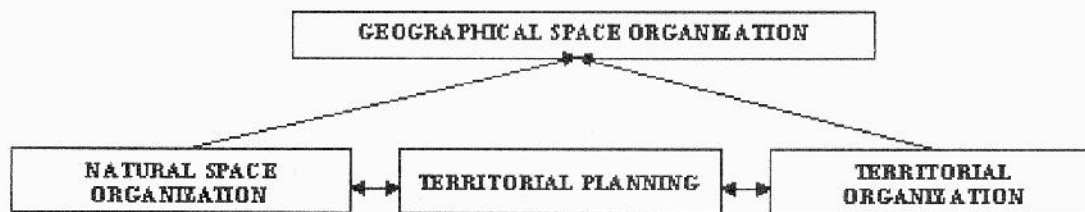
By geographical space organization we understand the organization of human factor over the natural organization of the geographical space. It contains: the natural organization of the geographical space – the organization of natural geosystems (geomorphologic

systems, hydrologic atmospheric geosystems, bio-pedological geosystems etc.), the territorial planning; the territorial organization; the geographical space organization.

W. Coffey (1981) says that organization is spatial process. Practically the organization means the same the use of the space does.

The geographical space was organized even from the beginning by the human society, man as social person (a man frames himself in natural ecological systems without disturbing the balance between components).

Figure 2. The content of geographical space organization.



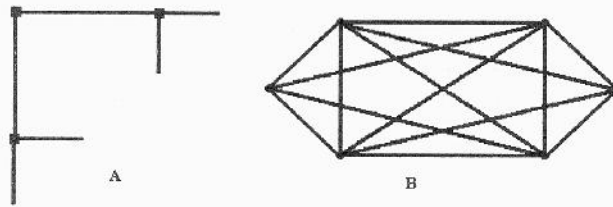
Human society is in a harmonious relation with nature and at the same time in a contradictory one. In a harmonious relation are the primitive human communities. In a contradictory relation are the developed social communities that have numerous populations and subjugate the nature for their own necessity. The purpose of geosystems existence is that of consuming the free energy that has created them; the typology, the structure, his complexity of geosystems organization are determined by the quantity of free energy, existent in the geographical space at the certain moment and at the certain holarhic level.

The framing of man in the geosystems structures and his survival as a species in the geographical space depends on his own necessities of energy. The disappearance of one geosystemic structure determines the appearance of others from the total available free energy.

The final aim of the organization of geosystems in the geographical space frame is that of spreading energy in order to achieve the thermodynamic balance. So, the final purpose of arranging and organizing the territory is to create favorable conditions for the anthropic systems to evolve from the biological stage to social – technical stage. There are two possibilities:

- a) Intensive dissipation is too much for a system and it's damaging for it, and eventually will induce the chaos.
- b) Rational dissipation is adapted to real energetic flukes that the environment need at a certain moment and at a certain period of time.

The quantity and the quality of the energy determines the type of organization it is needed. The deficit of energy is compensated by importing energy, and the surplus of energy is solved by stocking and exporting energy. If one analyses how much energy does the system get he will see that the system is no longer in balance. On the other hand a large quantity of energy generates a state of evolutional non-determination.



**Figure 3. Systems of organization and disorganization** (by W. Coffey, 1981): *A. Organized systems (spaces); B. Disorganized systems (spaces).*

We can say that appearance and existence of systemic structures is possible only outside the thermodynamic balance, where the components work together to make the dissipation process efficient. When the thermodynamic balance is achieved (total isolation) the components of the systemic structure had spread their energy they come back to maximum disorder and the systemic relations disappear.

The organization of the geographical space is determined by the complexity of and the number of the components. The level of organization can be realized through topology (which studies the characteristics of the figure from the qualitative point of view).

## 2. The operational components of the organization of the geographical space – concept

The operational components are logical, mental, conceptual, philosophical and scientific forms of organization the information get from the feed – back reactions in order to achieve the purpose. These components used for the organization of space are: the visions of world, the paradigms, the laws, the principles, the rules, the theorems, the concepts and the models.

## 3. The holarhic structure of the operational components in the organization of the geographical space

### *The visions of the world – forms of interpretation the reality*

*The idealist vision* is in opposition with the material vision and considers the spirit, the conscience, the thinking to be primary factors and the material, the nature, the existence as second factors. There are also two currents: the objective idealism (based on the existence as a spiritual reality – the idea, the universal spirit, the universal reason) – Platon, Hegel; the subjective idealism (the unique reality are the sensations, the representation and the individual conscience).

*The material vision* considers the material, the nature, the existence as primary factors and the conscience, the spirit, the thinking as second factors. The materialism considers the world to be a material one, it is an objective reality outside the human conscience, the nature is not created and not vanished, and also all the processes in the Universe are subordinated to nature's laws.

*The disastrous visions* ignore the possibility of internal organization of systems and sustain the idea of inevitable disasters.

### *The paradigms*

*The paradigms* – a universal accepted way of resolving the problems (Barnes, 1982). In geography there are seven paradigms that help the developing of the science: Ecological paradigm, Possibility paradigm, Landscape paradigm, Regional paradigm, Systemic paradigm, Sociological paradigm, Spatial organization paradigm.

The order of this paradigm in resolving the spatial organization is: the systemic paradigm, the regional paradigm, the ecological paradigm, the sociological paradigm, the sustainable organization of space paradigm.

### *The laws*

*The laws* – “philosophical category that expresses the essential, necessary, general, stable relations between internal parts of the same object or phenomenon, between different objects and phenomena’s, between successive stages of a certain process” (Mic dictionar filosofic, București, 1968). The law is an order of essence, an order parameter and it has an objective, historical and continuous character. Laws also have their own autonomy, they interact and have different grade of generalization. The holarhic character of the laws is presented in three theses: the laws of every holarhic level are determined by the laws of the superior holarhic level; the laws of a holarhic level depend on the circumstances of which they refer to; the hierarchy of laws has evolved together with the evolution of the Universe. The new laws weren’t initially laws but some possibilities.

There are special laws, general laws, universal laws, dynamic laws and statistics laws.

*Physical and geographical laws* are general laws coming from the Universal laws that function in the geographical space. This laws are strictly determinates.

*Social and economical laws* like other objective laws from the material world presents real, stabile, needed relations that exist between people, social groups, communities, social classes, and nations etc. The social laws have certain characteristics: objectivity, existence necessity, repetition autonomy and systemic content. Sometimes not all these characteristics exist together because of some political, scientific and economical causes.

There are social laws that function: in all social economical structures – the law of permanent growth of efficiency in the production process; only in certain social economical structures – the law of maximum benefit in capitalism; in few social economical structures – the law of goods production. The natural laws and the social – economical laws represent two distinctive categories of laws. He first one presents the existence and the development of the material world, and the second one is based on the development of the human society and the relations in it.

### *The principles*

From the philosophical point of view *the principles* are a primary spring of cognition, a primary cause of the reality, a conviction, a final point of view.

### *The rules*

*The rules* are “laws” that guide a process, an activity, the production of a phenomenon. They are also ways of determining problems that have common characteristics.



*The theorems*

*The theorems* are phrases in which truth results after a demonstration, they have a vectorial value.

*The concepts*

*The concepts* are general ideas about the certain aspect of the reality.

*The models*

In mathematics the model is a group of elements in between which there are relations; it's a real or abstract structure, if one can establish the correspondence between them.

In physics the model reflects only partially the reality and takes into account both the object and the subject.

The model represents a simplified form, which presents the basic characteristics, structures or relations of the reality.

*The modeling process.* In order to decide which method is the best for modeling a certain situation it is necessary to do a detailed analysis of this process to establish the strengths, the limits and the weaknesses of the method. The GIS technology proved to be the most efficient of all the other methods. With this technology one can elaborate a map, a scheme, a graph, some dates etc.

The mathematic modulating is divided in two categories:

- modeling based on precise relations;
- modeling based on probable relations.

Any modeling process means accepting some laws, paradigms and principles. Without them the model cannot be made.

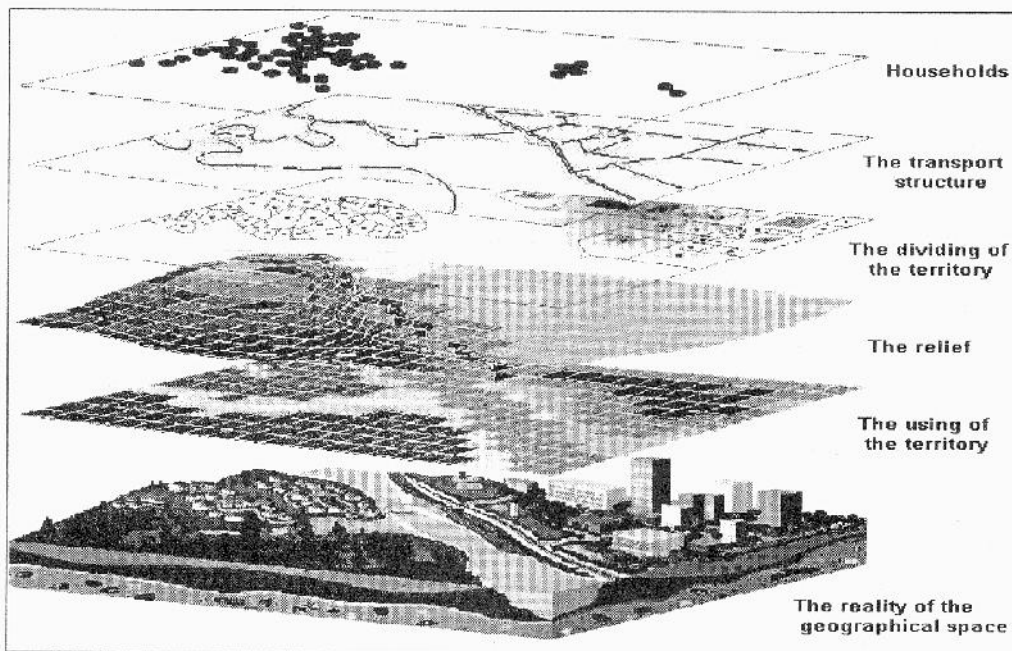


Figure 4. Typological pattern of content variation, used to draw up a model, to organize a geographical space.

An important issue in spatial modeling with GIS technology would be the identification of the important elements and also the unimportant ones for the phenomenon.

As a rule, the minimum of every variable may be tested to find the more appropriate model with an optimum number of explained variables.

*The stages of the spatial shaping with GIS technological help.* Generally, to model a geosystem, process or phenomenon from the geographical space using GIS technology, we must go through many stages according to the main purpose.

The way the succession stages follow is determined by the manner in which the program was imagined. With the last generation of SOFT used by GIS (Arc View, Arc Info, ArcGIS) the stages of the spatial modeling process, valid for almost all types of models are the following:

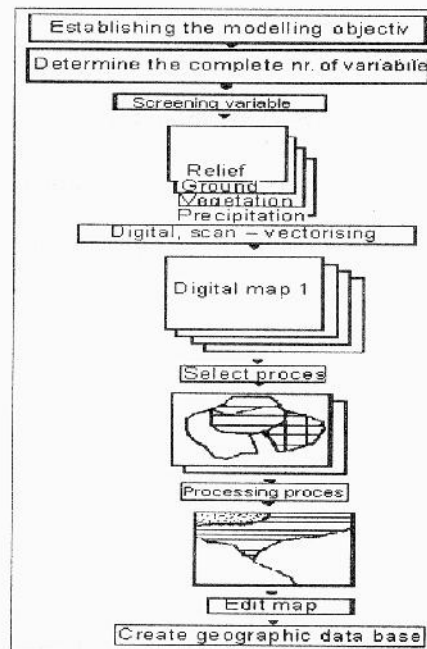


Figure 5. The stages of achievement for a digital model  
(after A. Imbroane, D. Moore, 1999 improved).

- the stage of establishing the geosystem, phenomenon, and process that follows to be modeled;
- the determination of the complete number of variables that must be calculated to elaborate the pattern, as a result of scientific interpretation of the reality through the eyes of paradigms, laws, principles, concepts, assumptions, that govern the studied subject;
- the establishing of expressing shape, both quantitative and qualitative of variables in accordance with the SOFT and the prescriptions of the used methods (variables expressed graphical as maps, conventional signs etc);
- the insert of the variables into the computer to build data base, graphs, that will be trituted in a logical way for the process that follows;

- the insert of the variables can be done by digital scan process for the graphical variables and by introducing numbered table for those variables that are expressed through numbers, all this being made in specific SOFT of this stage;
- the change of all specific SOFT files in DBF files that are recognized by processing SOFT of variables and the export of these;
- the drawing up and the organizing of digital data base represented by graphical variables (digital maps of different types and category) and attribute (numbered data related to modeling subject);
- the processing of the variables that refers to the studied subject in specific SOFT, for this stage and the elaboration of the model;
- the storage of the models and the interpretation of this for the analysis of the geographical space;
- the showing of the obtained models, in the modeling process, on paper, transparent paper, or through images.

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