

**THE URBAN ENVIRONMENT AND THE SUSTAINABLE
DEVELOPMENT.
CONCEPTUAL AND APPLICATIVE PRELIMINARIES**

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Abstract. The present paper represents a conceptual and methodological general framework which will offer the ground for future applicative demarches aiming to identify some sustainable trajectories for the towns of Romania. Starting from some fundamental lacks and errors of the existing approaches in the urban planning, the authors try to establish some methodological guiding marks of the systemic analysis of the urban environment. The identification of some structurally and functionally relevant indicators and their successive integration on certain progressive levels, of a rising complexity, is a key component of the present approach. In the final indicator of the (geographic) favourability of the urban areas for a sustainable development are to be found, simultaneously, three complex reference levels: the natural favourability for the habitation, the socio-economic internal favourability for the development and the territorial capital of insertion within the system of settlements. Although the difficulties appearing in the way of such an approach are not negligible (and are related not only to the identification of the indicators but also to the possibilities of their aggregation and integration), the proposed model of systemic research can become an efficient instrument for the identification of real development potential, for the diagnose of the disfunctionalities within the towns and for the realistic tracing of some adequate directions of urban evolution.

Introduction

Almost half a century ago, *the environment and its problems, well known and studied for a long period in the geography, were an absolute novelty for the various branches of this fundamental science and for the application field.* They

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were quasi-unknown to the great public – much later and in the best case - one may say they were at the margin of the general interest. As it was too preoccupied to eliminate – as soon as possible – the (unfortunately, a very long time sustainable) negative consequences of the Second World War, to consolidate the peace and to ensure the material prosperity, in the post-war period ***the human society only late reflected on the objective possibilities of growth and development.***

The acceleration of the technical progress, the ever rapid diversification and dissemination of certain multiple-effect beneficial results at the level of the effectiveness of all the types of activity, of the accumulation, processing and transmission of an ever-growing amount of information and - in consequence - of an ever greater potential comfort, were based upon a bigger proportionally and insufficiently controlled appeal to the necessary natural resources, on a bad management, with numerous and varied discrepancies, of the human resources and (at the beginning) with a total ignorance regarding the negative interactive effects of this progressive race for the growth.

The concrete and tough expression of the immediate unwanted consequences of this growth race has had a rapid and general impact. As it was prepared only for an as ***fast as possible and anthropocentric evolution***, the human society faced again hard and hardly solvable problems, so much the more it came in this conjuncture with an ability and with perception modalities and intervention possibilities so different (sometimes even conflicting), that it did not manage to act in a justified, or united, or effective way or to solve the problems a lot slower than it had generated them. Although advanced sectors of the scientific research, sustained by the economic and financial pragmatism of some genuine and profitable industries (oriented towards the protection of some natural elements and resources or towards fighting against/preventing the degradation forms), are more and more dedicated to the problems of the environment, although the public opinion succeeded to become a beneficial influence/pressure factor, with more than a regional impact, the consensual human attitude is still mainly theoretical. *Necessarily united and simultaneous actions are frequently carried on in a unilateral and/or out of phase manner, the exclusively/excessively specialized perception and vision produce decisions of a different nature, hard to fit or to adjust, which, many times eliminate partially each other's finalities, the unanimously desired beneficial results being left behind and remaining much under the dimensional and qualitative level of the expectations.*

Under the empire of the general feeling of panic caused by serious forms of generalized pollution, by its great negative effects upon the human health and upon the state of the natural ecosystems, by the decrease in the effectiveness of certain natural self-regulation mechanisms, by the severe consequences of the accelerated and diversified use of growing quantities of energy obtained from classic sources

and of the cumulative coincidence of the thermal/pollutant consequences of this energy consumption with a possible natural thermal jump, generating obvious climatic modifications (in their turn, generating hardly predictable consequences) a relatively close dark prospect has been created and is more and more accentuated underlined nowadays, ***In this context, the environment and its related problems are at the very core of the general interest.***

This interest in underlined, first and foremost, by a ***massive information request, as detailed and easy to access as possible.*** But, there are also requests for regulations, investments, ***solutions,*** for a profitable and sustainable planning of ***extremely varied problems, generated by multiple factors,*** controllable or independent, natural, anthropized or completely anthropic, the last ones having very different administrative, economic, political, legal, etc. statuses. Nevertheless, we notice an almost general ignorance of the fact that operant options may generate results with an interactive impact, desirable/acceptable in a certain sector/sequence, but totally misplaced/contraindicated in others. ***In essence, there are requests for optimal analytic, sectorial solutions, totally ignoring the functionality of the integral systemic structures which organically include those very sectors.***

Thus, the context is particularly favourable for the massive participation to investigating/regulating/solving, etc. the environment-related problems of numerous groups, institutions, bodies, physical persons, experts, evaluators, observers, etc. extremely varied as regards the competence field and level.

In itself, the size and the diversity of the human resource which tackle the environment-related problems are beneficial, as much from the point of view of the involvement in an objective of a general interest and responsibility, as much from that of the interdisciplinary investigation potential. But, in the highest degree, ***the approaches are strictly specialized and the interdisciplinarity, extremely rare, manifests itself in an associative and not in an integrative manner.*** In the same manner, the advanced investigation methods are almost exclusively analytical and the actions models, sectorial also, but considered as performant, are presented as valid for the entire environment. In this way, the same context, with large offers, stimulates (besides the ***speed*** in the actions, often caused not so much by the seriousness and urgency of the real problems, but by financial competition) and the ***frequent extrapolation of some sectorial and partial results. The generalization and, in the end, the standardization consecutive to this work method produce an unacceptable simplification of the reality.*** So simplistic approached, and not ***as a geo-systemic reality,*** to the environment – in all its structural and functional complexity – are applied sectorial solutions. Obviously, the adequation of the results/solutions is frequently only accidental or partial.

The state “diagnoses” and the functioning “norms” of the approached sectors/phases, deduced by interpreting some inherently incomplete and simplified

results, become nonetheless the legal grounds for certain decisions and measures which often impose reference points and obligations which are, in their turn, unadequate/inapplicable and, thus, losing ones.

The main *shortcomings* of this type of demarche are both *conceptual and methodological*.

Firstly (this one being the *conceptual* orientation, with the strongest distorting effect), *the objective interactions, universally present and operant in all structures of the environment are ignored*, not regarding of its evolution stage, of its structural or dynamic dominant or of the occupied area. In consequence, by ignoring the intrinsic capacity of any (primary or derived) structural element or of any mechanism (specific or resulted from the specific functioning) to act producing state modifications or even of the nature of the generating element/context, the investigation is incomplete; the result is ephemeral; the decisions/measures are wrong. Secondly, in the same *conceptual* register, one operates *a clear, irreversible fracture between the references upon the natural elements/mechanisms and those upon the social-economic specific*, the latter being, moreover, either omitted in the majority of the “environmental” studies, or being only approached from the perspective of the human aggressiveness.

In a geographic vision, the noticed inadvertences are even clearer, as the concept of geo-system supposes a complete and interactive/synergic approach of the elements of the environment, where man and society often become the central elements.

From this perspective, the environment-focused studies have the obligation to analyze and to interpret in an integrated manner not only the state of the natural structures, but also the production, construction and evolution processes of the anthropic systems, complex, multidimensional and interfering architectures, which, through the complexity and the rapidity of the matricial *input-output* transformations, always renew and rebuild the relations between the nature and the culture.

In the abovementioned incomplete and simplifying approach, from a *methodological* point of view, the contemporary demarche upon the environment is based on *very few indicators* (practically, only the consecrated ones in the analytical fields recently coming towards the problems of the environment), of course *absolutely necessary* in order to investigate a specific aspect/element or group of aspects/elements of the studied structure, in a certain region, but *absolutely insufficient for the investigation of the whole structure*, of the manner in which it functions, of the manner in which it integrates itself in the network of similarly organized or are super/subordinated, structure for whose “environment” the respective demarche had assumed its entire scientific responsibility. Moreover (and worse), *the investigation* on the basis of these (few) indicators *is finalized by*

agglutinating the results and not integrating them, the only approach form according to the natural and social-economic real interactions.

The difficulty of the integration process also comes from a still modest and inefficient interdisciplinary methodological collaboration of the disciplines related to the environmental research, from this perspective, being noticeable a double epistemological hiatus:

- between the analysis techniques of the physical geography and those specific to the human geography, the first ones being favoured by clearer and better circumscribed relations, favourable to an axiom elaboration, while the latter are more discrete, sensible to inference and multicollinearity;

- among the descriptive, catechetical, punctual, inventory-like techniques, particularized by an inductive approach, and the systemic, spatially transversal, temporally longitudinal techniques, susceptible to a multi-criteria analysis, particularized through a deductive approach.

1. Objectives

Taking into account the numerous and so various problems in our country – both regarding natural structures, and human communities –, as well as the specific of the current project general demarche regarding the environment and its problems, this paper (which constitutes only the conceptual and methodological initiation of a more vast study) has as objectives the as advanced as possible **remediation** of the **abovementioned lacks and the foundation**, on this way, **of a more adequate methodology to identify the real - natural and social-economic - premises of the sustainable development in case of some urban structures.**

The conceptual basis of these objectives is ensured by the **systemic fundamental geographic accumulations**, long before the study of systems became a science (Alexander von Humboldt, Paul Vidal de la Blache, Simion Mehedinți, George Vâlsan, etc), by the **conceptual correction of the “environment” and its assimilation to the Earth system/geo-system** (Irina Ungureanu, 2005), by assuming **the investigation of interactive relations**, of the way certain units function within the geo-system, **to identify their self-regulatory structural and functional potential**, **to be responsible of imagining work methods corresponding to the systemic organization and functioning of the investigated structures** (Irina Ungureanu, 1995 b).

2. Methodological orientation

The geographic methodological variant of fulfilling the first proposed objective consists in the *identification of as many representative structural and functional indicators as possible* for the investigated (respectively, urban) structures, on whose basis, *one can evaluate their real development capability*. The

following work phases consist in the *successive integration, on several levels of progressive complexity, beginning with the simple initial indicators*. By applying and completing a previously conceived and verified methodology (Irina Ungureanu, 1995 b; Irina Ungureanu, Al. Bănică, 2008), becomes possible and relevant the *investigation of the natural habitation offer, of the effects of its valorisation and of the social-economic situation (internal and territorially regional) resulted during the existence of the studied urban area*.

What is that which point-blank differentiates methodologically this orientation from any other demarche over the environment, geographic or of an other nature, is the ***simultaneous integration – conceptual and graphic, through a progressive visualization (Irina Ungureanu, 1995 b) – of the results***, so that the ***three complex reference points : the natural favourability for habitation (indicator resulted from four progressive integration sequences of over 55 indicators with a rising complexity), the internal social-economic favourability for development (resulted from three progressive integration sequences of over 70 indicators) and the territorial capital of insertion in the settlement system network (resulted from four progressive integration sequences of a number of around 80 indicators) substantiate scientifically the structure of the fourth reference point, with the highest complexity, the geographic favourability for the sustainable development***. Its pertinence is neither given only (and nor firstly) by the total number of simple or integrated indicators, but also by the ***correspondence between the integration sequences of these indicators and of the natural and social-economic interactions expressed by the respective sequences***.

3. Concrete conceptual and methodological aspects. Difficulties. Open integration phases

Generally rather heterogeneous, *simple indicators* are (or characterize) support-elements or initiators of some support-characteristics of the natural framework, of the human load, or of the social-economic infrastructures.

The first exigency when identifying/selecting them was, of course, that of the *conceptual subordination towards the aimed objective*. For example, in order to put the basis of the natural offer for habitation, of all the genetic, dynamic, dimensional etc. of the relief, we have kept in mind the altitude of the constructible land, the depth of the relief fragmentation; the geodeclivity (and the supporting geodeclivity), the types and the evolution stages of the actual geomorphological processes, the slope exposition. In the same way, of the multitude of indicators which may characterize such a complex system as the urban environment, the evaluation of the internal social-economic development potential only includes the representative part for the quality of the inhabited space, the quality of the

functional urban structures and, respectively, the social-economic identity of the habitation neighbourhoods.

Methodologically, the series of exigencies continues. In the frame of the *simple indicators set*, the identification of the natural offer has imposed adaptations and associations of the morphological reference points with other ones, expressing the characteristics of the geological support (the alteration crust, the surface deposits, the seismicity), the hydrological and hydro-geological specific, the microclimatic specific, the ecosystem types and their viability, the types and adequation of the land use. Each of these aspects, despite the low integration level at which we are, has a rather high degree of complexity; so is, for example, the microclimatic specific which integrates the most detailed climatic aspects at the local level. The advanced minution degree of the indicator supposes a rich information, exceeding the standard one obtained from the specialized network.

In another example, the achievement of a favourability/adequation map of the land use – an inciting problem for the researchers all over the world – very different working methods have been proposed (*Hopkins, 1977*), oscillating between extremes, from a kind of holon sui generis (named *Gestalt*) to logic/linear combinations of individual factors, in favourability layers (*McHarg, 1969, Lingjun, 2008*). More realistic, this last method is closer to our orientation, but it lacks the reference capability to the essential functional systemic reference point: the interaction of the individual factors. Blocked in an integrality which it doesn't argue, but it identifies mostly declaring, by outlining certain areas considered homogeneous and rather subjectively bonitated, *the Gestalt* remains under the level of the McHarg method.

In order to identify correctly the reference points of the social-economic favourability for the development, we have taken into account, on one side, a set of indicators characterizing the quality of the urban environment – respectively the dwelling space, the urban public equipments and services, the general service, educational, health, commercial, financial-banking, public administration, leisure infrastructure, as well as the communications and public transportation infrastructure (fig. 1). On the other side, we have integrated characteristics of the functional urban structure and also of the socio-economic structure of the vicinity units, identifiable on the basis of the identities outlined in the urban space. This way, we can identify a/the relation between the city functions (residential, industrial, service provider or agrarian) and the micro-territorial structures – demographical, socio-professional, and socio-economic.

But the exigencies grow *progressively*, once we *pass to higher integration levels*. They are first of all *conceptual* (the integration of one or several groups of simple indicators must produce *indicators with a more and more complex content, as correctly expressive as possible, the most representative for the targeted*

objective, as accessible as possible for applicative finalities). For example, on the first integration level of the construction of the indicator of the natural offer we find (among others) the indicator of the hydro-geological safety/favourability (coming from the integration of five categories of simple indicators – positional, dimensional, dynamic, qualitative); on the same integration level we find the wind favourability indicator (which comes also from the integration of four simple indicators); on the third integration level, the ground stability indicator results from the integration of two second degree indicators, of five first degree indicators, and of twenty simple indicators etc.

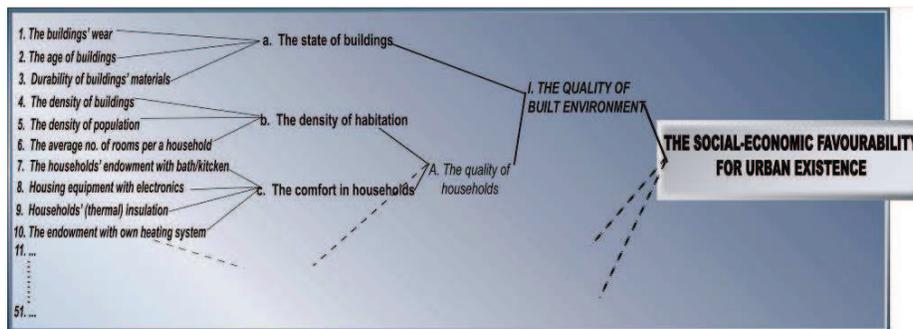


Fig. 1 - The example scheme of the integration of the social-economic favourability indicators

With a graphically simple appearance, the integrations organized into a hierarchy allow a progressive visualisation of a complex identity (fig. 2), expressed through a clear territorial bordering, of the natural favourability for habitation, of the social-economic one for urban existence etc. But, sometimes, the exigencies of a correct integration, corresponding to the natural interactions, generating favourable/unfavourable characteristics and behaviours, imply serious *calculation and graphic representation difficulties*, which required creative methodological efforts (such as the calculation and graphic representation of the first degree indicator of the *relief energy*, or the whole proceeding of the *progressive visualisation*). Identically exigent are the integrations in various degrees of the social-economic indicators, as their great number makes extremely difficult a judicious selection, this one being obligatory not exposed to reductionisms or simplifications and not distorting the final result (for example, among the socio-demographic indicators, have been selected only those referring to the age and gender structure, to the natural and migratory dynamics so as to the occupational structure). The difficulties in the graphic representation of the indicators related to

the social-economic favourability for development come also from the lack of an official framework as regards the (sub)division of the urban space.

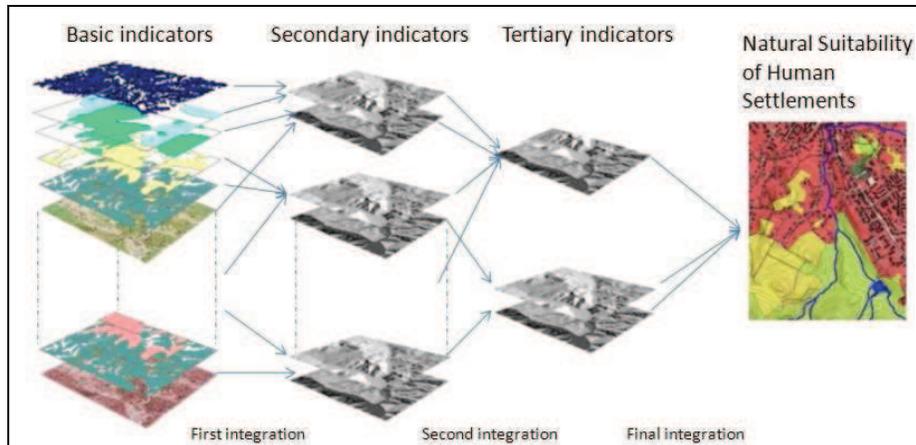


Fig. 2 - The natural suitability (favourability) of human settlements

The individualization of the functional areas or of the territorial reference units (R. T. U) in the urban planning plans is not always correct, both subdivisions being tributary to certain reductionisms due to the unjustified small number of criteria (socio-economic or urbanistic), depending on which, the respective units have not been identified, but artificially created. For an approach such as we are proposing, we consider useful to identify, within the urban space, the inhabitation neighbourhoods, as areas with an elementary local identity, within can occur the majority of the daily activities. These spaces constitute the smallest subsystems, with their own decision centres, conditioned by the multitude of social-economic factors that we take into account. Of course, within these micro-units too, may be identified lacks of homogeneity, segregations, differentiations, which nuance the favourability for the urban development.

The lack of such analyses, detailed but which doesn't lose sight of the territorial ensemble, integrating in a trans-scalar manner the urban identities within the regulatory urbanistic documents (**General Urbanistic Plans, Integrated Plans of Urban Development, Zonal Urbanistic Plans, Detailed Urbanistic Plans** etc.), makes them relatively inefficient, if not even with dysfunctional effects, making place to the arbitrariness and to local voluntarisms, or even to the reign of somebody's will. The lack of coherence, the (often serious) errors, and favouring certain private interests are the main responsible for the chaos which governs the

recent transformations of the urban environment. This structural deficiency of the urban planning and administration is also visible regarding the accessibility or even the existence of the statistical data at the level of the urban sub-systems (i.e. neighbourhoods), fact which makes equally difficult any large scale systematic geographical study of the urban environment.

Finally, the conceptual and methodological basis of our demarche cannot neglect the objective reality of the city – element of a network of settlements.

This way, from an extrovert perspective, it is not singular, the socio-spatial behaviours and reactions found again by the internal geo-urbanistic analysis being the echo of some territorial contracts where the urban centre, regardless of its size or rank, gets involved, participates, empathises, consumes and is consumed.

Identifying the insertion degree of the city in the surrounding territory supposes a delicate methodological demarche, indicating a systemic approach within which the town is treated as the interface to express attitudes, concurrences, inequalities, indifferences.

The quantification of such hypostasis or evolving relations imposes an integrated analysis, the central challenge being the way in which we can get a ammonic relation between the taxonomy and the hierarchy, the final product of this methodological demarche being a complex indicator, named the *territorial favourability indicator*.

The integration logic of the partial indicators is similar to the ones mentioned above, starting from simple, reviewable indicators (variables) and arriving, in the final part of the statistical integration process, to composite indicators, each of them supposing the final pooling level for the afferent taxonomic category.

The investigation, accompanied by a synthesis, confirms the presence of seven integration levels, at the basis being placed simple variables (potential accessibilities to different services/externalities calculated in distances-time or in distances-cost, urbanistic facilities; technical, industrial, social and cultural equipments, human resources etc.), whereas at the top is placed again a synthesis indicator which, at least from a statistical point of view, offers the formula of a maximum absorption for the variables of the basis of the hierarchy, for this one being proposed the denomination of *territorial capital*.

In the intermediary segment of the integration process we are interested in the levels V and VI, where the scheme of the territorial favourability identifies three quantification taxons: *the spatial, the human, and the economic capital*.

The synergic interaction of the advantages/disadvantages, of the opportunities/vulnerabilities offered, on one side, by the geographic space – as matrix of the anthroposphere and by its intrinsic characteristics, on the other side, builds an ensemble of relations, functions, reactions and contra-reactions which confer to the space personality, dynamism, concreteness and pragmatism,

transforming it into a “product” which is possessed, lived and perceived and that is named “*territory*” by the geographers.

Conclusions

What we can *certainly assert* (in the frame of these conceptual and methodological preliminaries), based on our older work experience (the validity duration as newness/originality of the produces of the scientific research is more and more reduced nowadays) and on the more recent one, that the *sets of indicators (either simple or resulted from successive integrations) are always susceptible of modifications/adjustments/completions*, because the *structural and functional variability* of the systemic entities falling under the incidence of the geographic investigation is *extremely great*, and the spatial identities have frequently *labile characteristics and behaviours, dictated by complexes of factors with frequently little controllable or uncontrollable dynamics*.

In order to constitute, as close as possible to the objective functional reality, of a solid documentation, strictly necessary in all the evolution phases of any urban settlement (especially if it is oriented towards a sustainable development, and it has to meet certain quality standards which are hard to impossible to achieve, for example, in our country), *the involvement of the geo-systemic research is an objective necessity*.

The progressive conceptual and graphic integrations achieved through this type of research may generate synthesis expressions of the real premises of the urban evolution. By integrating the natural favourability for habitation with the social-economic one for an urban existence, and with the territorial capital – as reference point for the balance within the network, the indicator we have named geographic favourability for sustainable development is a complex reference point, conceptually relevant (thus interesting for the fundamental environment research) and, at the same time, extremely *necessary and useful in applications, where its detailed graphic expression, up to the level of the scales of the detailed surveys (1/5.000 ; 1/2.000), makes it very accessible*.

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