

THE SYNTHESIS OF SYSTEM-ANALYSES IN THE DEVELOPMENT OF RURAL AREAS

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A b s t r a c t. We often face the question how a development strategy can be maintained. What sustainability means and is there a general approach which is able to describe these condition systems in any region or community of a country. Each area has different physical and mental characteristics and one certain development concept may be applied in one country but the same concept causes damages to the other (and it can be true even for the different regions and communities of one country). Our paper outlines general guidelines that are suitable for describing complex problems. The development of rural areas can be defined as an interdisciplinary field of science synthesizing more scientific fields and built from different approaches due to its complexity. These approaches often have system theory roots and their overall review is required very much.

INTRODUCTION

A lot of studies and research discuss the topic of sustainability and try to find the best alternatives of permanent sustainable development, therefore such a paper can be started from several approaches. By recognizing the limits of endless growth [Meadows 1972], the ideas of harmonic development and improvement have become into the limelight. The efforts that aim solely the economic growth seem to be a failure and are replaced by new approaches which underline the importance of the role of environment and society. Statement of Korten [1996] according to which the economy is for the society and not the society is for the economy seems to be confirmed. The human society is closely fit into the natural environment and if the environmental boundary conditions are damaged, the human society is endangered, too. Therefore the possible outcomes of interventions, their positive and negative impacts should also be considered in the implementation of developments. A development project will not bring any resounding success for a region or a local community if the intervention was not cautious enough. The output of actions and reactions can be realized in many forms, so it would be impossible to model all the combinations, therefore a general approach is required which can serve as a basis for each intervention.

There is no perfect pattern for introducing investment ideas, and individual measures cannot be concretized because it would easily result distortions in the communities coping with different problems. Our paper starts from the system approach and accepts the principles of general systems theory. The general systems theory of Ludwig von Bertalanffy is introduced as a coherent axiom system. It is the backbone of the dissertation and the starting point of a new approach that is entitled general spider web theory. The essence of the theory is that it regards the local community as a specific „spider web” arrangement. The interventions made in this arrangement are like in case of the spider web: when one point is touched all the points are trembling.

METHODS

The method of analysis systems can be grouped and the systems can be typed in many ways, so that each analysis method in the repository can be an infinite number. In our paper we introduce a generally accepted way of grouping systems. Our goal is to give example for the already existing systems theoretical approaches in the regional sciences. Not all systems theoretical approach will be taken inventory, but rather to the systematic presentation of the different type of system approaches.

Based on our former researches we introduce five approaches of system analysis. First we define two general approaches for the study of systems, namely the cross-sectional and the development approaches. Then we investigate the holistic, functionalist and reductionist approaches – that can be used for the analysis/evaluation of subsystems of systems – from the aspects of rural development. At the end we define the general spider web theory, which is suitable for the synthetization of these five methods of system analysis [Walonick 1993].

RESULTS

CROSS-SECTIONAL SYSTEM ANALYSIS APPROACH

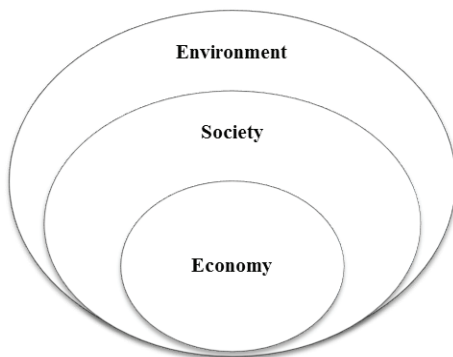


Figure 1. The dimension of Sustainable Development
Source: [Scott Cato 2009].

First system analysis approach as we want to show the cross-sectional approach. The cross-sectional view examines the relationship between two or more systems. The sustainability model can be conceptualized as a cross-sectional approach, which tries to understand this through the operation of each system and the relationships among them, the possible formation of equilibrium.

The cross-sectional system analysis approach helps us to understand the different outputs of relations and interactions between individual systems and underlines the importance of harmony between individual systems and the limits of growth regarding economic, social and environmental systems.

DEVELOPMENT SYSTEM ANALYSIS APPROACH

While the cross-sectional approach views the interactions between systems the development approach intended to examine the changes within the system. Enyedi [2004] divides environment in his system-approach as follows. Physical environment (natural environment) is one of the sub-system of the environmental major system. Further sub-systems of that are the natural environment and the transformed environment. The social-economic environment is another sub-system of the environmental major system, and there are further three sub-systems of the social-economic environment: the artificial, the economical and the mental environment. It is ecology what deals with the integration, relation and interaction of live organisms and environmental systems. The one the best-known system-based approach may be the tetraeder model. It demonstrates the balance and the cooperation of the natural-social-economical and infrastructural spheres of a settlement. These four spheres are demonstrated with a tetraeder:

- $ABC\Delta$ – natural sphere,
- $ABD\Delta$ – social sphere,
- $BCD\Delta$ – economic sphere,
- $ACD\Delta$ – infrastructural sphere.

Less developed and more developed branches and regions are present along the sides of the tetraeder. Along the edges, where the spheres meet, interactions come into existence. In this way the tetraeder illustrates a living, harmonized settlement in a unity. If each spheres of a settlement are balanced, the construction of the tetraeder is stable. If any of the spheres gets damaged, the development of the settlement slows down, the tetraeder becomes distorted, and consequently the other spheres' function will decrease [Tóth 1981].

The development system analysis approach emphasizes that an area can be defined as a system, too. The inappropriate interventions may cause distortions in the systems and the ideal tetraeder-like theoretical system will be upset.

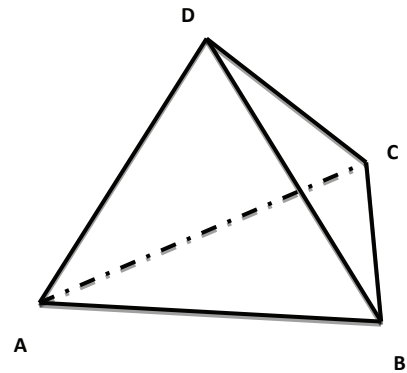


Figure 2. The tetraeder model of settlements
Source: [Tóth 1981].

FUNCTIONALIST SYSTEM ANALYSIS APPROACH

Functionalism roots deep in sociology. The functionalism examines the society as a whole and examines the function of each element within the operation and relations between the elements. It describes the parts of society as a living organism and these parts are functioning as a part of a body [Urry 2000]. Parsons [1975] proposes that functionalism is not a separate school to be seen as a science but rather a certain stage of development. We agree with this view in part because of the functionalist approach, although many criticized [Giddens 1984], yet the existing system is now seen as attitudinal approach.

The functionalist approach can be perceived as a regional sociological approach. The functionalist approaches in rural development can be found in the researches of Nemes [2005]. He built up an integrated rural development model based on the principals of functionalism.

The functionalist system analysis approach tries to define the functions within the system. The definition of functions within the system is inevitable for drafting the development. In order to ensure the most efficient utilization of development sources, the functions of subsystems and their possibilities within the system should definitely be understood.

HOLISTIC SYSTEM ANALYSIS APPROACH

In chemistry and biology, mechanical models are being substituted by holistic – dynamic models. James Lovelock and his Gaia Theory is a significant representative of the holistic – dynamic approach. The World is a uniform, self-regulatory system, and a community of mutually related systems on the level of planets [Komor 2005]. This change of paradigm is present in the social sciences as well. Bassie [2003] explained the essence of this approach as follows. The holistic approach is based on the General System Theory and on cybernetic. It contains the holistic interactivity, flexibility, dynamics and multidisciplinary developments. This strategy gives a significant role to the enhancements of co-operations, by the help of which the holistic and sustainable development can be reached. The goal is, by mobilizing the society, to create a plan and a vision on every level able to reach the integration, the unity and the economical increase in a community. To understand the whole concept we have to open this model. The holistic integrated model consists of eight integrated steps which can be used in several subjects. According to the General System Theory this model can be adapted in numerous activities like: situation analysis and diagnosis, planning and policies, technological development and diffusion, micro and macro-economic development. The holistic system analysis approach focuses on the complexity of an area and helps to learn the system as a whole. The theory tries to consider all those elements that can be involved in the development and aims to describe these system elements in their complexity.

REDUCTIONIST SYSTEM ANALYSIS APPROACH

Based on the works of Polkinghorne [1991] the biggest different between reductionist and holistic approach is while the reductionist approach argues that complex systems do not matter, but the sum of its parts, the holistic approach says the whole is more than the sum of the parts. The reductionist approach in the sociology breaks the social phenomena its parts and after that it tries to analyze together. The quantitative reductionism describes the reality from the reduced complexity and diversity of the qualitative differences [Ratner 2008].

One of the most elaborated reductionist approaches in the development of the rural areas is the Dimensions of Rural Development model from Heilig [2001]. The reductionist system analysis approach takes apart the system to its elements and aims to draft development concepts from the totality of the components. The reductionist analysis of system elements helps us to find the smallest element of the system that is worth examining and the qualities of this smallest element leads us to learn the features of the other elements within the system.

SYNTHETIZATION OF THE FIVE SYSTEM ANALYSIS APPROACHES

All the five system analysis methods that were introduced are suitable from their own aspects to highlight the problems of an area and to provide basis for drafting the future developments. The detailed examination of individual models, however, showed clearly that they have weaknesses and they try to describe the problem not in its complexity but according to a randomly chosen logical system. As the synthetization of the five system analysis approaches the general spider web theory can be used. The spider web theory forms a theoretical spider web of five pillars around the local community. These five pillars give the spider web of a local community. These pillars are as follows: tourism/external relations, social activity, local economy, infrastructure and environment. Each pillar is an open system that is able to interact with its environment, affect others and can be affected. The theory underlines that if we want to carry out improvements in the local community, we cannot concentrate on one pillar only because it would result holes (distortions) in the web. The harmony is very sensitive within the community's spider web and this harmony may disappear from the system due to a careless intervention. In other words, the spider web of a community is as sensitive as a real spider web. If we touch a sub-system within this system, it will affect the other sub-systems and thus change the transformation process of the whole system. Three elements connect the systems to each other: the theoretical, practical and adjusted cohesion. The sum of them gives the transformation ability of the whole spider web while its structure is responsible for the order (entropy) of the spider web. If there is a hole on the web, or the elements do not work properly, the transformation ability of the whole system declines.

Each pillar has its own political, economic, social, environmental and technological dimension, out of which the sustainability of the pillars can be determined [Goda et al. 2008].

CONCLUSIONS

On the basis of the above, such a situation analysis and strategy development attitude is required which is able to synthetize the individual system analysis methods appropriately. The general spider web theory can be regarded the synthetization of the five types of system analysis approach. These main characteristics are as follows:

1. Each pillar is considered an open system that is able to make contact with its environment, affect it and be affected (functionalist system analysis). These pillars are linked to each other like a spider web.
2. The spider web is regarded a new open system, the subsystems of which are the pillars (holistic system analysis).
3. If we intend to carry out a development in a local community, we should not deal only with one pillar and develop only one because a hole can be created in the web (development system analysis). The harmony within the system is very sensitive and this harmony may disappear from the system due to a careless intervention.
4. Each pillar has its own political, economic, social, environmental and technological dimension, out of which the sustainability of pillars can be determined (cross-sectional and reductionist system analysis).

LITERATURE

- Enyedi G. 2004: *Regionális folyamatok a poszt-socialista Magyarországon*, "Magyar Tudomány", 9, 935-941.
- Giddens A. 1984: *The Constitution of Society. Outline of the Theory of Structuration*, Cambridge.
- Goda P., Tóth T., Kollár K. 2008: *How to use the reductionist approach for evaluating subsystems to research the elements of the development*, "Bulletin of Szent István University", 172-182.
- Heilig G.K. 2001: *Dimensions of Rural Development in Europe, A synthesis of research perspectives*, [in] *European Rural Development, Problems, Chances, Research Needs*, Warsaw.
- Komor L. 2005: *Gazdaságpszichológia*, Gödöllő. Szent István Egyetem, Gazdaság és Társadalomtudományi Kar, Vezetéstudományi Tanszék.
- Korten D.C. 1996: *Tőkés társaságok világalma*, Kapu Kiadó, Budapest.
- Meadows D.H. 1972: *The Limits to Growth*, New York, Universe Books.
- Parsons T. 1975: *The Present Status of "Structural-Functional" Theory in Sociology*, [in] *Social Systems and The Evolution of Action Theory*, Talcott Parsons (ed.), New York, The Free Press.
- Polkinghorne J.C. 1991: *Reductionism*, [In] *The Problem of Reductionism in Science*, E. Agazzi (ed.), Kluwer, Dordrecht.
- Ratner C. 2008: *Reductionism*, *Sage Encyclopedia of Qualitative Research Methods*, Sage.
- Scott Cato M. 2009: *Green Economics*, London: Earthscan, 36-37.
- Urry J. 2000: *Metaphors, Sociology beyond societies: mobilities for the twenty-first century*, Routledge, 23.
- Walonick D.S. 1993: *General Systems Theory*, <http://statpac.org/walonick/systems-theory.htm>
- Wessels S. J. B. 2003: *Case Study: An Holistic Integrated Approach as a possible modell to address the challenges faced*, Bloemfontein, MUCPP.

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SYNTEZA ANALIZ SYSTEMOWYCH W ROZWOJU OBSZARÓW WIEJSKICH

Streszczenie

Często zadajemy pytanie, jak strategia rozwoju może być utrzymana. Co oznacza zrównoważony rozwój oraz czy jest ogólne podejście, które umożliwiałoby opisanie zbioru warunków w każdym regionie lub społeczności danego kraju. Artykuł przedstawia ogólne wytyczne przydatne do opisywania złożonych problemów. Rozwój obszarów wiejskich może być zdefiniowany jako interdyscyplinarna dziedzina nauki łącząca więcej dziedzin nauki i zbudowana z różnych podejść w związku z jej złożonością. Te podejścia często mają korzenie w teorii systemów, a ich ogólny przegląd jest wymagany.

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