The Iron Curtain Approach: Methodology and toolset for integrated regional development planning in heterogeneous transboundary regions

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1 INTRODUCTION

The goal of the EU-5th framework funded IRON CURTAIN project (IC) is the development of a tool set that supports decision making in planning and development processes on a local and regional level. In this context it is important for the project to establish a regional model representing the typical characteristics of rural and remote areas, typical for those along the former Iron Curtain. This IC model should finally be used to explore regional development options within the framework of scenario testing. Special attention is given to the compliance with the principles of sustainable development, democracy (UN-Agenda 21) and Territorial Competitiveness (TC) [8].
As there is only limited scientific and almost no practical experience with this type of trans-border regions, "simple" top-down planning concepts, which are available for more homogeneous regions or in national contexts, do not accommodate the complexity of this type of region. Instead new and proven tools should be combined in an innovative bottom-up planning approach, thus following the recommendations of AGENDA21 for participatory development planning. One of the main challenges was the consensus building about common goals among local actors and end users working under different administrative and legal conditions with a diverging historical background and value system. The project is implemented in 6 Reference Areas (RAs) via partnerships with local and regional transboundary plattforms (e.g. EUREGIO, MAB Biosphererereserves etc.). The RAs, attended by 8 project partners (INTERCONSULT, UNI-JENA, GEO, UNI-SALZBURG, UNI-MISCOLC, GEONARDO, UNI-LEOBEN, UNI-THESSALONIKI) are located in *Norway-Russia* – Svanvik/Nikl; *Germany-Germany* – Rhön Mountains; *Germany-Czech Republic* – Sumava/Bayerischer Wald*; Austria-Czech Republic* – Waldviertel/Trebon Basin; *Austria-Hungary* – Central Burgenland/Sopron and finally between *Greece-Bulgaria* – Macedonia/Rodopes Mountains.

2 DESCRIPTION OF THE TOOLS

The project embarked on a bottom-up planning approach in which different tools were applied and tested. Together with a local stakeholder working group the following steps were taken: As in integrated problem solving [11] the starting point was the detailed and structured identification of problems followed by an analysis of their interrelationship. A desired future situation was formulated and options for problem solutions were collected and combined with scenarios to formulate strategies. Indicators were developed and tested in order to measure achievements. In one Reference Area the implementation of solution strategies was simulated and the results were assessed leading to a recommendation. Figure 1 gives an overview of the interplay and mutual dependency of the tools used. The reason for working along a sequence starting with the analysis of problems and ending at data models originates from the necessity to develop a consistent system where models are logically linked to specific problems. The European rural intervention strategy LEADER and its program perspectives (e.g. Territorial Competitiveness) are providing the directives according to which model and indicator parameters are aligned. Leader is one of four initiatives financed by EU structural funds and is designed to help rural actors consider the long-term potential of their local region. Encouraging the implementation of integrated, high-quality and original strategies for sustainable development, it has a strong focus on partnership and networks of exchange of experience[12].

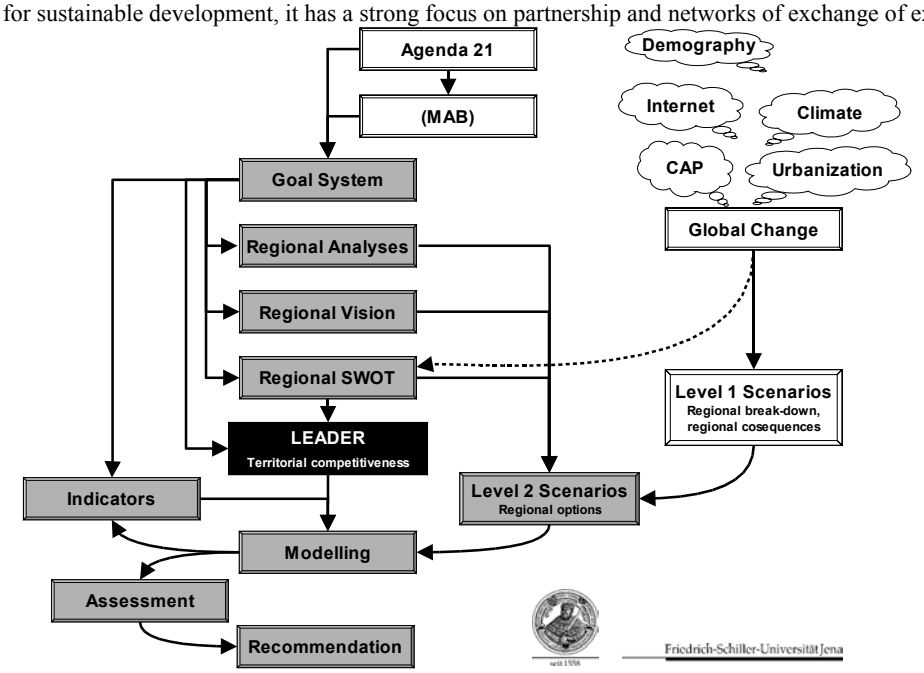

Figure 1: Interaction of tools in the reference area analysis; grey boxes hold the toolset applied in the reference area, white boxes show impacts on the area from outside, LEADER is the basic intervention strategy investigated in the project

2.1 Identification of problems and analysis of problem interrelations

The methodology for problem identification followed the recommendations of the Logical Framework Approach (LFA) [2, 5] and had been implemented successfully during a sequence of cross-border workshops on regional development in each of the six reference areas (RAs). The results of these workshops were problem trees, causal relationships between the problems mentioned, hierarchically ordered in a tree-like manner. Thus the solution of each problem requests the underlying problem(s) to be solved and shows possible starting points for intervention strategies. It must be stressed here that the perception about a problematic issue is subjective for the members of the working group therefore including experts from different fields broadens the working group's knowledge base. Nevertheless the causal relationships need to be examined by experts of the project in order to verify their validity. For example the reason for people leaving the German-German RA proved to be not the lack of job opportunities.
A further step performed were the SWOT analyses identifying the internal (Strengths – Weaknesses) and the external (Opportunities – Threats) positive and negative factors for regional development in the area. In several RAs the elements of the SWOT were positioned in a plane defined by four half-axes (S, W, O, T, see figure 2). The stronger the element was perceived within one category the farther away from the axes' origin it is located. The position inside the quadrants reflects the perception of the factor as e. g. strength and opportunity at the same time. Other RAs used a matrix by putting S and W as rows and O and T as columns. The SWOT analysis can be used for mapping out strategies whereby a good strategy would build on strengths while eliminating weaknesses and take opportunities while avoiding threats.

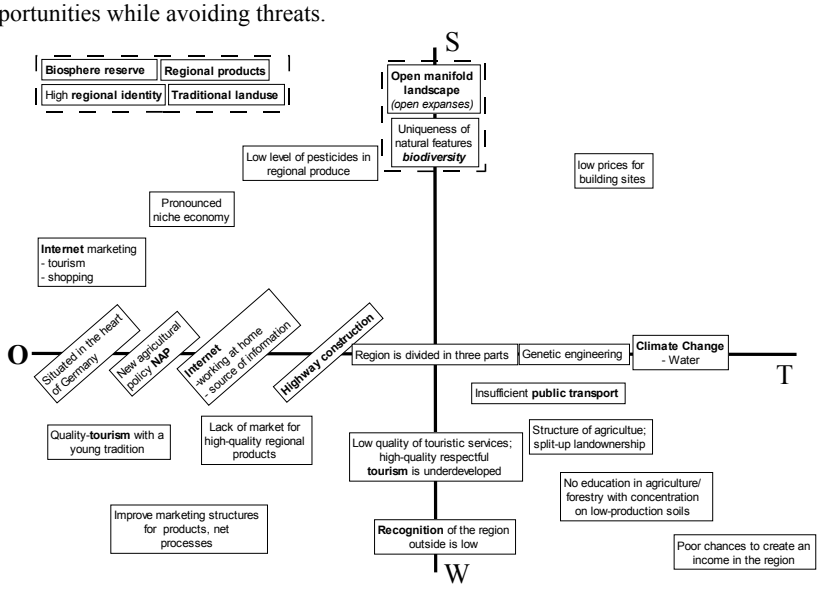

Figure 2: SWOT Analysis of RA2, dotted lines indicate equal position of factors

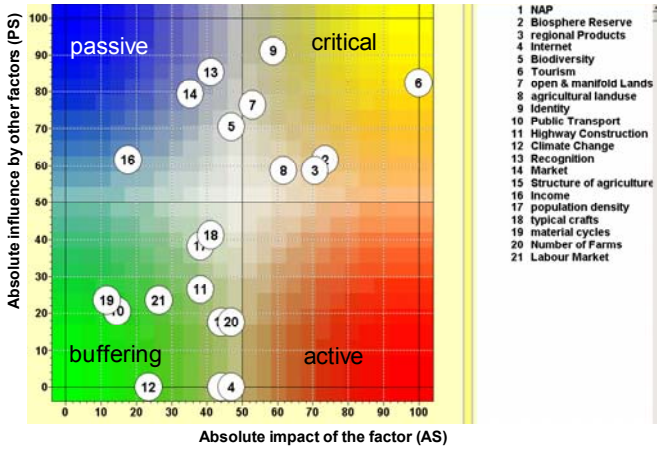

Figure 3: results of analysing the interrelation of the SWOT elements in RA2

Some RAs additionally applied a matrix approach known as paper computer [17] to further analyse the interaction of the SWOT elements. The paper computer was developped by Frederic Vester, who was known as pioneer of *Networked thinking*, a combination of cybernetic and systemic ideas with complexity issues. Central ideas of network thinking included seeing a system as a network of interlinked effects, leading to emergent behavior of the system as a whole. These networks can be described with the help of methods like protocols, mathematical networks, computer software, so that even someone without much understanding of networks will see the relations, including positive and negative feedback loops. Simulations of systemic networks can help to decide the long-term effects of singular measures. According to this all elements can be grouped into active, passive, critical and buffering depending on their specific influence on each other. The values range from no influence (0) to strong influence (3). Total impact (active sum AS) and influence by other factors (passive sum PS) can be calculated and displayed (figure 2). Although the method has some weaknesses [11] it is easy to understand and produces immediate results, which is very valuable in a stakeholder-workshop setting. Additionally the method provides deeper insight in the problem structure of the area and thus helps to identify strategies further in the process.

2.2 Normative future

After the problems had been identified they were reformulated as objectives for the development of the region. By keeping the tree-like structure a new tree evolved showing the means with which to achieve the ends (i.e. top-level objectives). General provisions always guide the formulation of planning objectives. This can be national and international legislation as well as general or sector-specific planning goals that apply for the area. By merging them with the tree the Goal System was formulated for each RA.
In order to formulate strategies, an integrated goal for regional development is needed. This is often referred to as a vision. A vision is a description of the future as it should be and thus is of normative nature. Although a vision is sometimes also called a scenario it was agreed that the term scenario is used differently in IC (see below). There is only one vision for a RA! As a matter of fact the vision is related to the goal system.
The RA's vision (see box for an example) is the result of a creative process and commonly agreed on by the stakeholders. It covers all relevant aspects of the RA. It is very important for a successful visioning process that the members of the working group free themselves from current restrictions. For this a visioning horizon of about 15 years (i.e. until 2020) proved to be very helpful [10]. This has two additional advantages: On the one hand the time span is long enough for real changes to happen on the other hand it is short enough to be still linked with the presence thus not making it a playground for fiction.

Box: Vision for RA 3 (Bavarian Forest / Šumava)

> Trans-border conservation area (with similar protection status) surrounded by a buffer zone with tourism and a strong regional market based on innovative technologies and renewable resources.

2.3 Measuring achievements

Having set the frame with objectives it is necessary to measure their achievement. The objectives generated from the analysis steps were linked with indicators to display the situation as it is and to assess steps forward into the direction of a commonly agreed vision. Each RA created its own set of indicators specifically linked with the problems and objectives in the area.
In general indicators are used to relay information on subjects where no direct measurement methods exist. Thus indicators can reduce complex objectives to measurable values. According to [1] they summarize complex information of value to the observer. However, these essential sets of indicators (or system descriptors) are not always obvious for the local decision makers. Trying to handle a complex system like a (transboundary) region means learning to recognize a specific set of indicators, and to assess what their current state means for the viable systems of the region (local economy, the social or ecological circumstances) while always paying attention to the mutual biasing characteristics of each system. In a nutshell: indicator sets are determined by (1) the observed system itself, and (2) the interests, needs, or objectives of connected systems [1].
These first indicator sets were described according to recommendations by the UN Commission for Sustainable Development CSD [16] and had to be broken down to meet the needs of the EU guidelines to evaluate Territorial Competitiveness (TC). The indicators as well as individual knowledge on their usage, parameterisation and data requirements (meta information) were subsequently inserted into the indicator database Navigator for regionalized Indicator Calibration (NEIC). The database search focuses on functionalities along the three primary CSD domains (environment, social issues, and economic aspects) and the use of keywords. The search output is ordered according to the number of users, which gives a first hint regarding popularity and therefore usability of the indicator to measure development processes in a specific regional context. The user is presented with the meta information regarding the usage of each indicator in its specific environment. Moreover, the NEIC system provides the user with the possibility to create an amoeba-like profile, a graphical representation of the individual regional characteristics in view of TC, based on the evaluation of respective indicator performances.

2.4 Setting the frame: scenarios

In order to understand the approach applied in IC, a short introduction to the term scenario is useful. When looking at its usage the term itself is fuzzy but all approaches agree that scenarios draw pictures of the future. Thus a multiple future [7] is accepted. This separates scenarios from prognosis, which assume that the future can be predicted with knowledge from the past [9].
The picture of the future can either be desirable or only possible, separating normative and explorative scenarios. Normative scenarios are created in order to help to decide on a strategy to be applied in imminent decisions and are called vision in the project. Defining a vision does not include a strategy to reach it, which would be necessary if planning is perceived as a future oriented process [3]. Therefore both, a vision and explorative scenarios are needed; the latter enable the decision makers to adapt their strategies by describing what happens if the factors determining regional development behaved in a certain way. For usage in regional development planning, it is further necessary to differentiate between factors that cannot be influenced on a local level and those that can. This differentiation is also referred to as exogenous drivers and management fields [17]. Ignoring this difference leads to confusion and makes it difficult to create a strategy for regional decision-making.
The IC project agreed on referring to a possible development (explorative scenario) of the factors, which cannot be influenced as level-1 scenario. Scenarios can be created along the following scheme [4]: The determining factors for the system under investigation must have been identified and their interrelation understood (see problem analysis above). After that their tendential development can be predicted, assumptions changing this development can be formulated and their results described (process of if-then reasoning). This leads to several images of the future for each factor. The assumptions for the different factors can than be combined in a reasonable and logically consistent way [9] to form scenarios.
The consequences of these level-1 scenarios must be estimated for the RAs in order to show the boundaries for decisions on the local level. In the course of the project the EU's common agricultural policy (CAP) proved to be an important influence in many of the Ras.

2.5 Creating a strategy for problem solution

Having set the frame, a strategy can be mapped out trying to solve the problems raised in the analysis phase in a way that makes the vision come true. For each factor several options can be drafted. Such options describe the possible alternatives that can be taken for

each field of decision (see table 1 for an example). Each reasonable and logically consistent combination of options for all relevant factors forms a strategy and is called level-2 scenario in the project. The results of the strategy's implementation can be described either quantitatively using mathematical models (see paper on decision support in this volume) or qualitatively.

Table 1: Options to increase the added value for quality-wine production in RA5

Option	***Do nothing***	***Keep the grape!***	***Market it!***	***Replantation***
Description	No additional effort (i.e. tendential development)	Reduce the share of high-quality grapes that are exported from the region to be processed elsewhere (currently 11 %) to 0 %	Increase the expenditures for marketing high-quality wines	Replant with high quality grapes in a state-of-the-art manner

The tools described so far assume that the future is not a fate but can be shaped. Planning in this sense means taking decisions in order to influence the region in a way that its future state is closer to the vision.

3 CRITICAL KEY INDICATOR SET

Today various international/national assessment paradigms and programmes (e. g. Sustainability, Competitiveness) and respective schemes (TC, Local agenda 21 etc.) are competing to evaluate the implementation of sustainability and competitiveness on the regional and local level. In this situation, it has been a challenge for the project to establish a methodology to identify (1) several exclusive regional indicator sets, describing the unique characteristic problems and goals found in one area, but also (2) one transferable indicator set, describing common characteristics, problems and goals typically found in regions located along the former Iron Curtain (see below).
Indicators represent semantic concepts, having attributes and thus cover different domains of regions' natural and anthropogenic aspects. As indicators serve as communication tools for the mediation process in politics and planning, a common understanding of the expressiveness of individual indicators is essential. Particularly for the practitioner it is important to identify overlaps regarding the thematic coverage of each indicator's expressiveness in its regional context.
The treatment of concepts and the logical description of linkages between object and attribute have a long tradition in philosophy. With the Formal Concept Analysis (FCA) [6], a methodology was introduced to describe these object-attribute relations in a mathematical way and present them in form of structured graphs (figure 4). The methodology of the conducted approach is based on recent work on FCA elsewhere [13, 14, 15, 19].

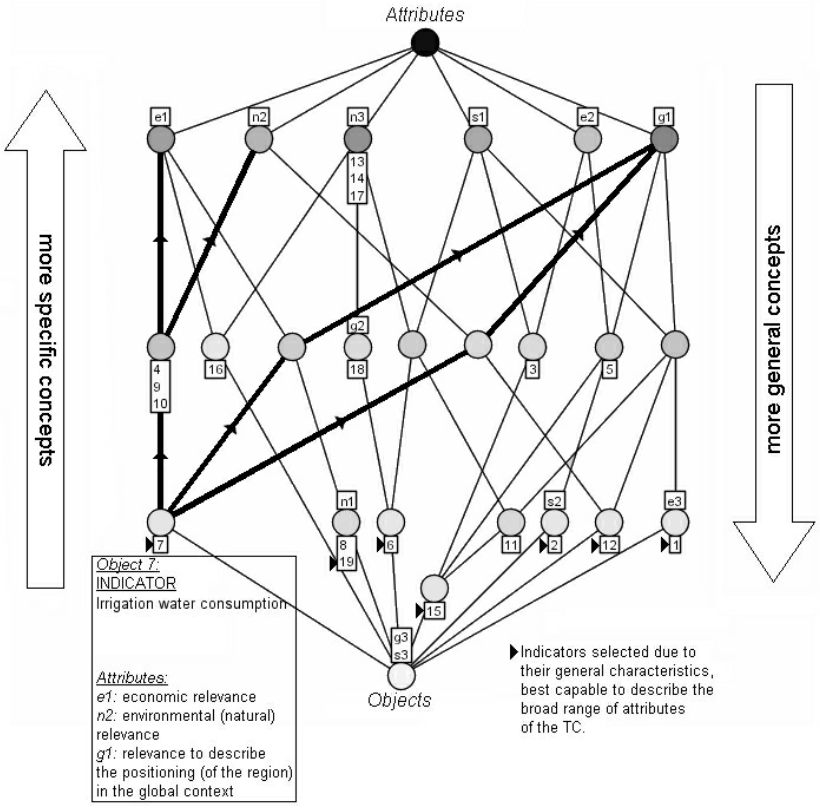

Figure. 4**: Lattice representation of indicators in RA 6 (Greece/Bulgaria)**

Every node (Point) **represent one concept. The concept is defined by its content (the set of attributes) and its extent (the set of objects). These two aspects define uniquely the given concept for a concrete incidence matrix, above which the set (aggregate) of concepts is constructed (*Begriffsverband)* . If the input for the matrix is changed, the *Begriffsverband* also changes and with it also the conceptual lattice and the calculated concepts.**

Letters **represent the domains of the assessment scheme (in this case EU's TC concept): e (economical), s (social), n (environmental), g (positioning in the global context). Numbers next to the letters (e1, n3… etc.) represent the weight given to the individual indicators in the respective domain. Numbers without letters are index numbers for indicators.**

Table 2: Regional indicator set for RA 6 Greece/Bulgaria and its explanatory power within the TC framework (results from FCA according to estimation from local experts)

No.	Indicator	Scale unit	Main aspect of TC
1	GDP per capita	€	Economic Structure
2	Unemployment rate	%	Economic Structure
3	Sustainable development strategy available	Yes / No	Institutional Capacity
4	Irrigation water consumption	l	Markets and external relations
5	% of population with adequate sewage/waste-water treatment facilities	%	Physical resources and their management
6	Annual withdrawal of ground and surface water as a %of total renewable water	%	Physical resources and their management
7	Annual catch by major fish species (mullet, daurade,	kg	Environmental conservation
8	Concentration of DO, N, P in water bodies	mg/l	Physical resources and their management

3.1 Minimal Indicator Set

In order to provide a certain level of comparability and evaluation for the international perspective, the project attempted to create a common set of indicators that address the typical problems in IC regions (Minimal Indicator Set MIS). For this subsequent step the presumption was that the MIS is already contained in the combination of the preliminary indicator sets that describe the broad scope of surveyed regional characteristics. The sets were compared and duplicates identified in order to arrive at a set being sound for all six RAs. By crosschecking all original indicator sets from all RAs, indicators were grouped and the group was represented by one member or by a well-established national indicator (aggregation). Additionally some of the indicators needed to be redefined in order to make them comparable. The sustainable availability of regional data to monitor selected indicators turned out to be the most crucial point, eliminating most potential candidates from the MIS. Such a top-down approach to derive the MIS out of bottom up developed indicator sets was done to level the inequalities in regional characteristics and lacks in individual surveys (problem analysis and definition of objectives). The result is an indicator set for decision support on a national or European level.

Table 3: examples for indicators in MIS

Indicator	**change in population 1990 – 2001**	**net migration rate, average 1996 – 2001**	**share of pensioners**	**share of arable land**	**share of grassland**
unit	%	‰	%	%	%
data source	regional statistics			satellite imagery	

4 CONCLUSION

The diversity of the reference areas has been a major challenge for the development and application of a unified method. An analysis approach had to be used which offered the required precision for assessing details and, at the same time, was flexible enough for a modern management tool dealing with uncertainties in problem and goal definition. After three years the project demonstrates the advantages and disadvantages of different approaches realized in several cross-border areas.

The diverse state of the economic, social and political development, the volume of already existing cooperation and the degree of mutual trust are all factors enabling or hampering joint planning processes. With the objective to support regional development efforts and to assess progress the IC project was conceived to built on existing trans-boundary platforms. In reality however these platforms partly had to be formed, facilitated or sometimes even replaced by separate communication with individual actors. Accordingly the resulting regional analyses had different focus points. Often the stakeholders, as general practitioners, were rather interested in methods to solve their most urgent problems than on cooperating in the development of rather abstract planning models and tools. In front of this background the project was neither a regional development action nor a pure research study.

As planning is understood as a process, the problem analysis and goal system of a region are neither complete nor final. The project developed a general method based on management tools to approach these issues, tested it in six case studies and thus demonstrated its applicability. The results are transboundary analyses, visions, scenarios and data sets – in some cases for the first time – which laid the ground for further projects.

More individual results and their incooperation into local and regional decision-making processes in the RAs, demonstrating the applicability of the developped toolset in detail are planned to be compiled in the upcoming time. Indicators need a strong explanatory power if they are to influence regional politics. Innovative methods to identify these indicators were introduced (FCA) but the resulting sets are only a recommendation and need to be continuously questioned and revised especially if stakeholder rounds need to be expanded. We expect that there is a need for such small but meaningful indicator sets for regional planning, monitoring and evaluation of all parties involved in such an effort. Furthermore an initial common indicator set (MIS) was created that, when finished, allows the assessment of rural regions under the paradigm of Territorial Competitiveness. This MIS calls for further refinement, test applications and enlargement in follow-up projects, especially concerning the inclusion of qualitative indicators.

REFERENCES

[1] BOSSEL, H. (1999): Indicators for Sustainable Development: Theory, Method, Applications. A Report to the Balaton Group. Winnipeg, Manitoba : International Institute for Sustainable Development
[2] Commission of the European Communities, Directorate General for Development, Evaluation Unit (1993): *Manual Project Cycle Management. Integrated Approach and Logical Framework* (= Commission of the European Communities, Evaluation Unit Methods and Instruments for Project Cycle Management No 1, February 1993)
[3] COUCLELIS, H. (2003): Where has the future gone? Rethinking the role of integrated land use models in spatial planning. In: DIJST, M. ; SCHOT, P. ; JONG, K. de (Eds.): *Framing Landuse Dynamics: reviewed abstracts international conference 16-18 April, 2003*. Utrecht, The Netherlands : Faculty of Geographical Sciences, Utrecht University, p. 27-28
[4] DE JOUVENEL, H. (2000): A Brief Methodological Guide to Scenario Building. In: *Technological Forecasting and Social Change* 65, p. 37-48
[5] European Training Foundation (1996): *Tempus Tacis Project Management Handbook*. Luxembourg: Office for Official Publications of the European Communities
Online: http://www.etf.eu.int/Tempus.nsf/Pages/tachand? OpenDocument
[6] Ganter, B. & R. Wille (1996): *Formale Begriffsanalyse – Mathematische Grundlagen*. Berlin : Springer
[7] KIRCHNER-HESSLER, R. (2004): Die formative Szenario-Analyse in der partizipativen Raumplanung und Regionalentwicklung. In: *GAIA - Ecological Perspectives in Science, Humanities, and Economics* 13, p. 121-130
[8] LEADER European Observatory (1999): *Creating a territorial development strategy in the light of the LEADER experience. Part 1: Territorial competitiveness*. - Rural Innovation Dossier No 6 - Part 1
[9] MEYER-SCHÖNHERR, M. (1992): *Szenario-Technik als Instrument der strategischen Planung*. Ludwigsburg; Berlin : Verl. Wiss. und Praxis (Schriftenreihe Unternehmnesführung 7)
[10] Mitchell, B. (2003): Keynote at Framing Landuse Dynamics, International Conference 16-18 April 2003, Utrecht University, The Netherlands
[11] MÜLLER, A. (2000): *Strategisches Management mit der balanced scorecard*. Stuttgart; Berlin; Köln : Kohlhammer
[12] European Union.. (2004): Definition of structural fund LEADER on:
http://europa.eu.int/comm/agriculture/rur/leaderplus/index_en.htm
[13] Röder, H., M. Döllerer & H-D. Quednau (1998): *Nichthierarchische Klassifikation von Standorten und deren Visualisierung in einem GIS*. In: Internationale Biometrische Gesellschaft, Deutsche Region, Tagungsberichte der AG Ökologie, Heft 9. p. 22-32.
[14] Snasel, V., T. Skopal & D. Durakova (2002): *Navigation through Query Result Using Concept Order*, Technical University of Ostrava, Czech Republic.
[15] Toscanaj Project (2003): University of Queensland/Australia and technical University of Darmstadt/Germany, Online: http://toscanaj.sourceforge.net
[16] UNCSD – United Nations Division for Sutainable Development, Online: http://www.un.org/esa/sustdev/natlinfo/indicators/isd.htm
[17] Vester, F. (2002): *Die Kunst vernetzt zu denken.* München : Deutscher Taschenbuch Verlag
[18] WENZEL, V. (2004): An Epistemic Approach Applied for Integrated Water Quantity and Quality Problems - Case Study of Berlin. Proceedings of Bridging Scales and Epistemologies: Linking Local Knowledge and Global Science in Multi-Scale Assessments. Alexandria, Egypt, March 17-20, Online: http://www.millenniumassessment.org/documents/bridging/papers/wenzel.volker.pdf
[19] Wormuth, B. & P. Becker (2004): *Introduction to Formal Concept Analysis*, 2nd International Conference of Formal Concept Analysis, February 23 – February 27, 2004, Sydney, Australia.