which are the prevailing characteristics of a microenvironment. Thus, for example, the space predominantly denoted by functional and symbolic characteristics in the user's mental image, gets coloured with the hues of orange. According to the Montgomery's theory succesful spaces are characterised by a combination of all the three fundamental categories which in terms of the colour wheel means that succesful places are close to black (equal representation of all three primary colours and physical, programmatic and symbolic characteristics respectively).

***Spreadsheed 1:** Sampling parameters for controlling the user's experience image of the open urban public space, including reasons given.*

***Spreadsheet 2:** Examples of questions for controlling the dimensions of individual open public spaces in the user's mental image and for checking hierachical relations between them.*

***Spreadsheet 3:** Examples of questions for controlling the impact of the way of use and direct environmental perceptions on the experience of hierarchical relations between individual open public spaces in the user's mental image.*

***Spreadsheet 4 with the legend:** Individuals experience different numbers of adjacent microenvironments depending on the starting microenvironment. The table displays cases in which user perceives 3, 4, 5, ..., or 10 adjacent microenvironments (Arabic numerals). In order to be able to make comparisons a conversion in comparable categories must be made (Roman numerals I-VII) depending on how strongly the user experiences his attachment to the starting microenvironment (during the interview he expresses this by numbering the adjacent microenvironment from 1 onwards – see also spreadsheet 2). Adjacent microenvironments which are experienced as the most linked to the starting microenvironment (statistically 100%) appertain to the category I, and those which are experienced as the least linked to the starting environment (statistically 0%) appertain to the category VII. In graphic displays each category is associated with the determined grey colour according to the principle that microenvironments experienced as more closely linked to the starting microenvironment have a darker hue of grey.*

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Scenarios: from knowledge to devising policies

1. Knowledge as basis for policy making and assessment

Our expectations about future are reflected in today's activities and assigning measures. However our knowledge about future can only be uncertain. Our predictions can only be based on assumptions instead on facts. One can only assume how the different factors will interact and manifest their consequences in the space in the future.

Landscape is being changed by natural processes as well as by public policy measures. These measures are either intended to change the landscape or have primarily other purposes, but have also side effects on the landscape. Even with the landscape-objective oriented measures we cannot exactly predict the effects of an individual measure in the real environment, either in synergy with or in contradiction to other factors. Even less controllable are the effects of non- landscape-objective oriented measures and natural processes. All these activities can have also unexpected or undesired effects on the landscape.

Knowledge about impacts and the assessment of their acceptability is a key base for devising and confirming policies and their measures. Slovenian and European legislation distinguish two types of assessments that are also obligatory and legally defined. Environmental impact assessments (EIA) are used for appraisal on a project level as a part of administrative procedure of issuing building permit, while strategic environmental assessments (SEIA) assess the hierarchically higher documents (plans, programmes and policies) and are a part of procedure of devising and passing these documents. The role of SEIA is mainly optimization of policy making and should therefore be performed parallel to the document preparation. It should also be ensured that the findings of SEIA are adequately considered in the document contents. This type of assessment is called integrated SEIA. EU has recently recognized the need to assess public action on highest levels – level of policies. Strategy of sustainable development of the EU (the Gothenburg strategy) assumes the impact assessment for all policy proposals and their measures, to ensure adequate evaluation of their economic, social and environmental effects. Different needs and varied professional practice in EU countries have resulted in different forms of policy assessment, which differ regarding their aims and focus. Besides environmental impact assessments are these mainly Impact assessment, Territorial impact assessment, Regulatory assessment, Sustainability assessments. The assessments, which concern actions more general than project, necessarily require consideration of all three aspects of sustainable development (economic, social and environmental), larger geographic areas and longer time horizons. Consequently these assessments become complex, loaded with uncertainties and full of conflicting interests. To cope with these issues, the SEIA toolbox is becoming more diverse, involving other techniques besides traditionally used impact

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matrices and indicators. Overlay or GIS techniques, originating in land use planning, provide a semi quantitative and at the same time practically useful decision making support, but are applicable only when the policy intervention is location sensitive. Traditional quantitative methods, such as cost benefit analysis, are being complemented by indirect assessments (hedonic pricing, contingency evaluations) to include non-financial costs. Alternative quantitative approaches, such as ecologic footprint gain increasing attention (von Schomberg, 2002). Forecasting and scenario development have also become a regular part of the analysis to support future, strategic and quality type of thinking and risk analysis to deal with uncertain events (Dalal-Clayton and Sadler, 2004).

2. Scenarios – tools for describing the future

The term scenario was first used to name the long-term visions of the future by Herman Kahn in 1950. In broad sense the term incorporates different techniques and studies that are aiming at investigating the future, for instance trend analysis, prognosis, strategic thinking. Various researchers (Ducot in Lubben, 1980, Heugens in van Oosterhout, 2002, Hirschhorn, 1980, van Notten, 2001) developed precise typology and structure of the scenarios. However the extensive range of use and possibilities of combining different techniques resulted in a wide scope of scenarios (Shearer, 2005). Different aims of future studies and different approaches lead to a variety of scenario definitions. After Van den Berg and Veeneklass (1995; quoted by Tress and Tress, 2003), scenario is a description or image of the present, expected or preferred future state or a series of events that lead from present towards expected or preferred future state. Scenario-based investigations of possible futures have been used since the middle of the 20th century, their use in landscape/and environmental planning has strongly increased since the early 1970. Lately most significant aspect of the scenario use has been their ability to facilitate exchange of information and improve cooperation of researchers, policy makers and stakeholders in the search for optimal solutions (Tress and Tress, 2003, Shearer, 2005).

Scenarios are generally divided into two groups, proactive (normative) scenarios, and prospective or roll forward scenarios. The division is based on different understanding and motivation for investigating the future, as defined by Ackoff (1981, quoted by Shearer, 2005). In proactive scenarios the future depends on the present actions, development is treated as positive and we are active in facilitating the changes. Prospective scenarios represent a different point of view, individuals and organizations can not essentially influence the future, as it depends mainly on external factors that are supposed to be beyond our influence. Both types of scenarios are used in decision making process, but for different purposes. Proactive scenarios help us to define preferred future development, prospective aim to forecast the possible routes of future development, taking into consideration all relevant driving forces and transformation processes. Proactive scenarios are usually aiming towards certain objective, usually they are defined by values; they can as well be formed as framework plans for the future, where the decisions are implemented following the assessment of different options. Prospective scenarios use alternative options to examine a particular decision. The better a decision proves to be in alternative scenarios, the more it is adapted to different uncertainties of the future development. Scenarios are also useful for representing new development possibilities and drawing attention on eventual risks. Prospective scenarios are known as neutral, but they can implicitly include different values of their authors (Shearer, 2005: 74). Prospective scenarios are more scientific, differing from proactive scenarios that are explicitly normative.

Use of the scenarios for the purpose of public informing and education proved to be a very helpful tool to promote understanding of the links between planned intervention and environment/space, land-use and changes in living conditions. Many cases showed (e. g. Wollenberg et al. 2000, Shearer 2005) that the use of scenarios in participative process fosters informed decisions and behaviour and helps to significantly improve communication between planers and stakeholders, as they can easily imagine effects of certain activities on future landscape (Tress and Tress, 2003). Researchers (Wollenberg et al., 2000, Bruns et al., 2000) are warning that scenarios are only legitimate if they are location sensitive and verified or completed by local pubic and stakeholders. Trough informing public about unwanted consequences researchers can also examine their responses and the willingness to cooperate. In this way they are able to contribute to the planning procedure by developing measures to diminish negative consequences and strengthen efficiency of spatial and environmental policies.

In Slovene research practice there have been several projects that applied prospective scenarios, e.g. for assessing the effects of different policies on space or environment (Golobič et al., 2005), forecasting the changes of cultural landscape in the Alpine area regarding regional development (Golobič et al., 2003) and forecasting the influence of structural changes in agriculture as consequence of accession to the European Union (Ogrin and Simonič, 1999).

3. Case study – scenarios in policy making and assessment

Transport policy is considered to have important consequences on the space and environment. The effects include the increase of (mainly) road traffic, and consequently increased emissions and noise, construction of the infrastructure and related fragmentation of the space, effects on habitats, indirect effects on settlements and assigning of different land uses.

Slovene transport policy mainly focused on the road transport for past two decades, with construction of the highways as the main component of transport policy. A significant shift towards development of railway infrastructure happened only recently. One of the planned projects is a high speed railway (HSR) in the fifth European transport corridor.

The initial discussion in the screening and scoping phases of the SEIA for high speed railway has shown that the assessment of this project needs to take into account the integral transport policy, since the decisions are being made on several levels. For example the decisions about the location of the transport nodes and connecting infrastructure are related to other modes of transportation as well as regional development (Kontić et al., 2005). It also showed that the technical, developmental and environmental aspects

Table 1: Short descriptions of the three HSR routes and alternative with no construction (alt.0)

HSR alternative route	A	I	M	0
Connecting points	Ljubljana–Logatec–Vipava– Sežana–Slovene/Italian border	Ljubljana–Postojna–Divača– Sežana–Slovene/Italian border	Ljubljana–Postojna–Divača–Sežana–Dolina–Slovene/Italian border	No construction of HSR route
Total vs. subsurface length (km, number of tunnels)	71/49 (2 tunnels)	75/36 (4 tunnels)	82/49 (4 tunnels)	–
Characteristics	The shortest route The shortest length of open lane The least intervention in landscape Junction in Vipava valley Includes two tunnels, crossing karst region and geologically unstable area, Unpleasant, mostly subsurface ride for passengers The route does not connect Koper	Medium length of the route The largest number of tunnels and bridging objects Many interventions in landscape and consequences on environment/habitats Impacts on the towns near the lane The route does not connect Koper	Mostly the same route as alternative I Tunnel crossing karst region Sections with partially exceeded maximum recommended slope (17 ‰ resp. 12.5 ‰) Route includes connection to Koper	Space left for other activities and land uses High opportunity costs due to diminished competitiveness of the region Increased traffic on existing road and railway network

Table 2: Summarized scenario description

	Scenario 1 – HSR route / alt. A, I, M	Scenario 2 – no HSR route / alt. 0
Primary econ. activities	Benefits for the development of primary activities – effective export-import of goods and products Decreased accessibility to agricultural land Route A: benefits for the development of Vipava valley (HSR junction)	No impact on primary activities.
Economy and tourism	Economic growth due to improved competitiveness. Increased number of workplaces. Increased role of tourism – visits of sites near HSR stations, especially of Ljubljana and Slovenian coast. Route A: development of Vipava valley, Routes A, I: decline of trade in Koper harbour and loss of workplaces, Route I: development of Postojna, Divača, Sežana Route M: daily commuting to Trieste – development of harbours in Koper and Trieste.	Steady economic growth. Slowed development of Koper and Trieste – one of the harbours looses its importance. Decrease of workplaces in industry. Increased (road) traffic is a disturbance for tourism.
Urban development	Urbanization, expansion of existing settlements. Route A: Immigration to Vipava valley, Route I: Immigration and further urbanization of Postojna, Divača, Sežana, Route M: Immigration and further urbanization in Slovenian coast and hinterland, Routes I, M: karst villages turning into dormitory settlements.	Immigration and urbanization of south-eastern part of Slovenia due to road network improvement. Increased road traffic. Improved (public) services. Expansion of existing settlements.
Environment / nature	Changed living conditions near the HSR route. Destruction of habitats on the HSR route. Disturbed (migration) corridors in Ljubljana marsh (routes A, I, M), Vipava valley (route A), near Postojna (routes I, M). Route I: destruction of habitats and extinction of threatened species in Planinsko polje.	Increased pollution due to road traffic. Improvement of road network – disturbed local (migration) corridors.
Landscape (appearance)	Landscape changes due to building of viaducts and dikes. Local changes in landscape for fences, entrance/exit points. Damaged subsurface and surface karst phenomena. Routes I, M: Diminished scenic value of Planinsko polje due to viaduct crossing.	Change of traditional cultural landscapes due to intensity of agriculture and increase of forested areas. Agglomeration of settlement areas and dispersed settlement.
Cultural heritage	Disturbance for nearby monuments. Increased number of visitors due to HSR accessibility.	No impacts on cultural heritage

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are closely interrelated. The inconclusiveness about the railway technology (e.g. the speed, the type of transport: passenger/freight/mixed) namely affects the assessment of benefits and environmental impacts of the project. High speed railway turned out to be a typical project, where the expected benefits to a high degree define the level of acceptability of environmental costs. In case of only one station in Slovenia, the benefits are limited to Ljubljana, which considerably lowers the acceptability of the negative impacts.

High complexity and demanding research linked with numerous uncertainties lead to application of scenarios as an input for modelling the intervention and consequences of HSR construction in the environmental impact assessment. Vulnerable and affected components of the environment were defined on scenario basis. The next step in the research was to model the vulnerability of each component, to define the effect of planned construction of HSR and to assess, which of the three alternative routes would bring the most optimal solution.

Planned HSR across the Slovenian territory is a part of the fifth European transport corridor, which connects Barcelona and Kiev via Lyon, Turin, Milan, Venice – Trieste/Koper, Ljubljana and Budapest (fig. 1). In the presented study (Kontić et al., 2005) HSR has been meant as a double-line railway for mixed transport (but mainly passenger transport), velocities should be 250–300 km/h (passenger transport) and 100–250 km/h (freight and combined transport). In western Slovenia, the area with mostly karstic characteristics, the railway should overcome approximately 300 m altitude on the length of only 6300 m, by maximum slope of 12 ‰. Construction of routes (from Slovene/Italian border to karstic edge) would require vast subsurface interventions. The effects of the HSR on karst have therefore been the most emphasized part of the strategic impact assessment.

Scenarios that were used in the study (Kontić et al., 2005) give only rough idea of »what could happen if« one of the three HSR routes would be constructed (see Table 1) or if there would be no HSR construction. Scenarios concentrate only on six main variables, which were neither further described by indicators nor quantified. One could argue that such rough description of scenarios has no considerable scientific value. Nevertheless they indicate a set of possible changes in space and draw attention to secondary, induced, synergetic, etc. impacts, which may be of much greater importance than construction of the rails itself. As such they are an important input for a strategic level of environmental impact assessments.

4. Discussion / conclusion

The use of scenarios in environmental impact assessment requires answering the question how reliable and credible are the assumptions about future development. These assumptions fundamentally affect the results of the assessment and consequently the (potential) change of policy actions. The answer to this question depends on the level of assessment and the impact it has on policy decisions. As stated in Dalal-Clayton in Sadler (2005), SEIA can be either a guideline and recommendation for policy implementation or formal consent to concrete document. In fact SEIA can only seldom unambiguously confirm the decision, most often it functions as a framework for negotiating different public interests and optimization of measures. The relation between the environmental assessment and policy development is therefore a dynamic one and does usually not resemble the linear flow of rational decision making.

The results of the environmental impact assessment for subsurface sections of alternative HSR routes between Trieste and Ljubljana indicate that the routing of the fifth trans-European corridor should be reassessed in the view of its high environmental costs (Kontić et al., 2005). Recommendations include the consideration of other possibilities for routing HSR through Slovenia. Main arguments for such a conclusion are extremely long tunnels through the karst area. This circumstance requires an in-depth consideration of subsurface environment and also highlights some open questions regarding the assessment of subsurface environmental impacts. In addition, the uncertainties considering karst vulnerability raise a question about benefits of the HSR construction for the uncertain economical and cohesion benefits for Slovenia. The optimization of the project should search for solution that would bring most benefits for Slovenia, such as improved traffic connections, decreased freight transport on the main roads and other. Also other traffic corridors with comparable strategic importance for Slovenia should be considered, and different options, considering the speed and the number of stations (for passengers), that bring along the question of usefulness for Slovenia.

If these guidelines are ignored, the results of spatial planning could be really disputed. Figure 3 shows alternative spatial lay-outs of fifth European corridor (and HSR), which by-pass Slovenian territory. They could be a basis for reconsideration of strategic HSR directions, since it is evident, that Slovenia could be by-passed, not importantly prolonging a route between Venice and Budapest!

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