

## **INTEGRATIVE APPROACH IN THE DESIGN OF ALTERNATIVE WAYS OF TRANSPORT: A CASE STUDY<sup>1</sup>**

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### **Abstract**

By increasing degree of motorisation are more obvious the negative consequences of the same, as on the environment, directly on the individual road users in terms of time losses. Of course, there are huge benefits of ecological and above all – suitable for health modes of transport that are practical and desirable to use especially for tourist travels.

An integrative approach is a series of surveys, survey of the population of the region, consultation with experts from different fields, field research, analyses.

The integrative approach in the design of pedestrian and bicycle trails with all the necessary researches is conducted on a Case Study: A Study of pedestrian and bicycle trails in the Southwest during projecting walking and bike trails with all necessary researches is applied on a case study: A study for walk and bike trails in Southwest planning region.

Using the integrative approach in the design of transport infrastructure for alternative transportation, results with a complete design solution that meet the standards of all aspects – relief, tourist attractions, support from the local population, government and arguments for the proposal projected solutions.

***Keywords - Alternative transportation; design; pedestrian and bicycle trails; Southwest Planning Region***

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<sup>1</sup> Original scientific paper

## INTRODUCTION

Integrative approach in the design of pedestrian and bike trails is a complex projecting procedure which includes all the necessary researches, consultations, field researches and considering the public opinion with aim the designed trails to meet all demands, necessities and standards (touristic, law, construction, local).

Southwest region is an attractive touristic destination with rich integrated tourist offer, based on the sustainable use and conservation of cultural and natural heritage.

Southwest planning region is one of eight regions within the Republic of Macedonia, and it includes 9 municipalities: Vevcani, Debar, Debarca, Ohrid, Kicevo, Makedonski Brod, Plasnica, Struga and Centar Zupa. The region is second in the country with a relatively low index of aging and covers an area of 3,340 square kilometers, where in 286 settlements live 222 064 inhabitants.

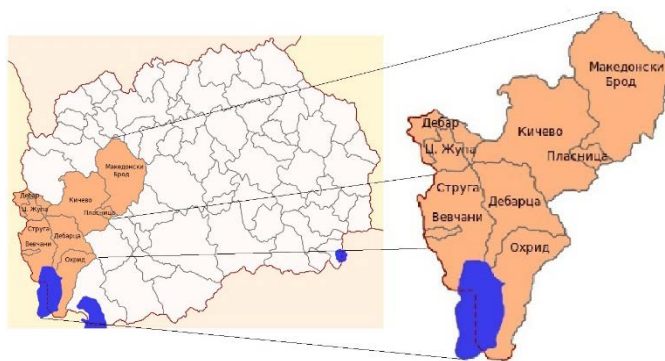


Fig. 1. Municipalities in Southwest Region

The material basis for the development of tourism is an organized activity of the community in which to undertake activities, shapes and forms of sustainable development. Since natural tourism resources are a treasure that is highly prevalent and is an indicator of tourism opportunities in the Southwest Region, main branch in the Region is tourism given the fact that from the all touristic rooms in the state - 26,503, even 16.400 or 61,87% are in this region. The most of them are in the most touristic centers in the state – Ohrid and Struga, which lie on the coast of the one of the oldest lakes in Europe, and also in the world – Ohridlake.

## INTEGRATIVE APPROACH IN DESIGN OF PEDESTRIAN AND BIKE TRAILS

The integrative approach is an iterative procedure consists of several steps. The complexity of each step individually depends on several factors: the area of coverage, complexity and purpose of the survey, stakeholders, etc. The general procedure of the proceedings in an integrative approach to the design of pedestrian and bicycle paths is shown in Fig. 2.

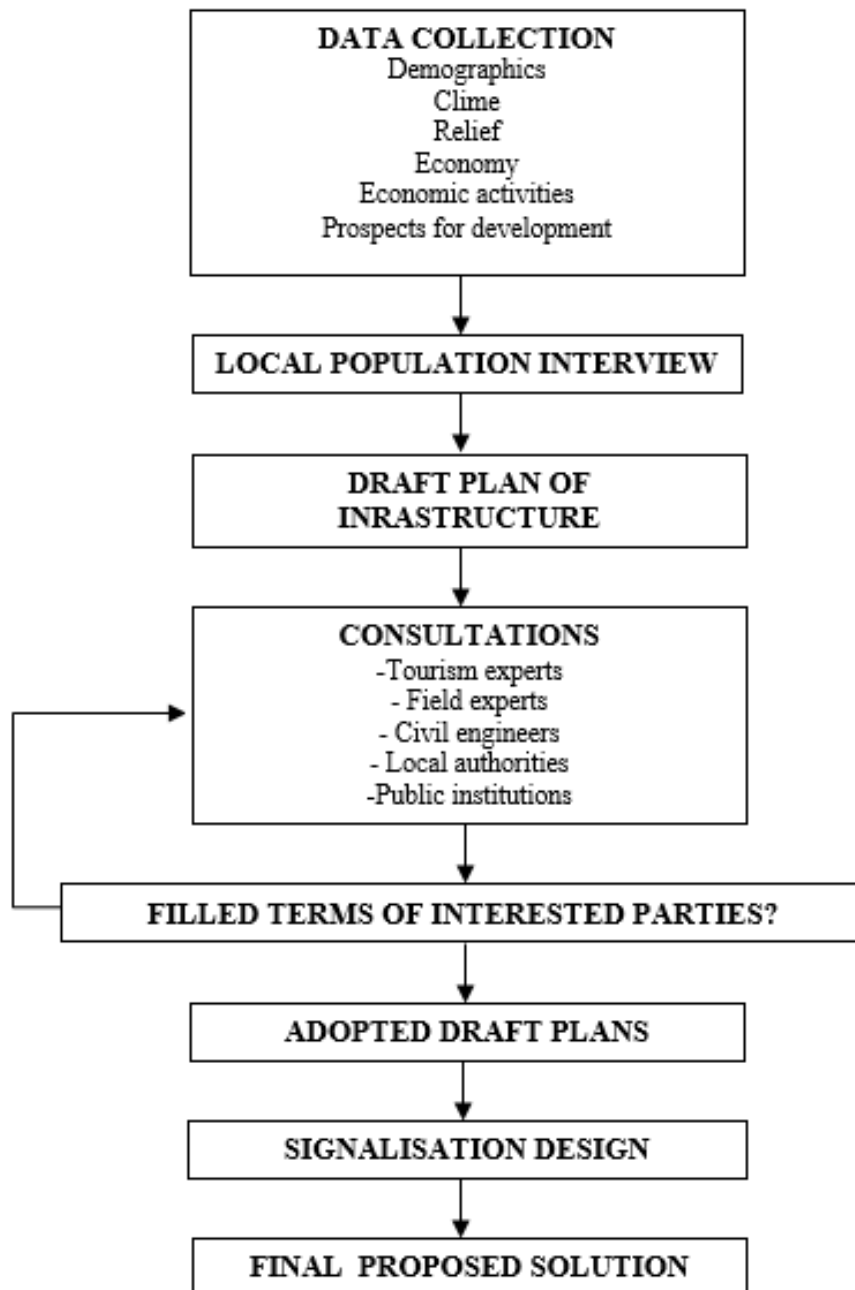


Fig. 2. General procedure of an integrative approach

The survey refers to general questions about the use of transportation of interviewees and their opinion on current and future infrastructure of

alternative transportation / tourism (pedestrian and bicycle paths). Respondents who are tourists or not residents of the settlement in which the survey is carried out, do not answer the questions which are marked with purple.

During the local population interview, biggest accent was set on the last question: „Which natural and anthropogenic landmarks from your municipality should include the pedestrian and bike trails?“in order to determine frequency of touristic attractions, and from results to select which of them the trails should cover.

#### A. Tourism experts consulting

Consulting the experts from the field tourism is especially important during designing in regions with developed tourism, or they that intend to be. Tourism expert meaning actually is validation of results from the interview, to see if something is exaggerated or something is not covered from tourist attractions in the region.

For the needs of STUDY FOR PEDESTRIAN AND BIKE TRAILS IN SWPR are consulted tourist experts from the Faculty for tourism and catering in Ohrid.

#### B. Local population survey

First and maybe the most important step in designing alternative ways of transport is the survey of local population and tourists. They are direct and most common users of the local infrastructure.

Survey form for SWPR<sup>2</sup> is shown in Table 1.

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<sup>2</sup> SWPR – SouthWest Planning Region

Table 1. Survey form<sup>3</sup>

Date.. ..... Hour. .....	Settlement..... ..... Municipality .....	Note:..... .....Tourist Phone:..... .....
1.	Sex and age: • m • f • under 30 years • from 30-60 years • over 60 years	
2.	Profession: (Company/University) • employed • unemployed • student • pensioner _____	
3.	Highest education level • basic school • high school • higherschool • bachelor • master • PhD	
4.	Number of members in family? •1 •2 •3 •4 •5 •6 •over 6	
5.	Do you use alternative ways of transport? • bike • rollerblades • walking • I don't use	
6.	Which is the motive of traveling (with alternative ways of transport)? •work •shopping •visit •recreation •other	
7.	How many times a week do you use alternative ways of transport? _____	
8.	Number of family members who use alternative transport? _____	
9.	Which transport mean you use commonly? • walk • bicycle • motorbike • car • taxi • public transport • other	
10.	Do you thing that the infrastructure for alternative transport/tourism in your municipality is enough developed?•yes• no	
11.	How many bicycles owns your family? • no one • one • two of more	
12.	Would you increase the use of alternative transport – walking or bicycle transport if there is a quality infrastructure?• yes• no	
13.	For which purpose would you use the quality infrastructure for alternative transport / tourism? •for mobility•for recreation•for work travel	
14.	Would the existence of integrative walk and bike trails in SWPR will attract tourists? •yes• maybe• no• I don't know	
15.	If there are properly marked pedestrian and bike trails in mountains, would you use them for recreation? •yes•no	
16.	Do you agree with the idea to be built a bike trail for extreme cycling in SWPR? • yes• no	
17.	Which natural and anthropogenic landmarks from your municipality should include the pedestrian and bide trails?	

<sup>3</sup>Questions marked with purple color are only for local population (not for tourists)

### C. Consulting field experts

Consultation with field experts are necessary for finding optimal traces for newly designed trails, because they are familiar with the field, relief, and they have already used as such even if they were not marked. This type of consultation are made with bicycle associations Z'shTochak and Vi Bike.

### D. Consulting civil engineers

Cadastral civil directions in designing alternative ways of transport are useful expert advices about maximal grades for construction of the trails, slope for drainage, possibilities/obstacles for constructing the proposal trails from relief reasons (different relief restrictions). In this case study are consulted civil engineering offices Geo Maceski and Premer Kichevo.

### E. Consulting local authorities

Local authorities consulting are needed for harmonization with their plans for development of alternative ways of transport with planned trails in the case study, and for opinion and disposal survey for activation of authorities for constructing of infrastructure.

For the Case study are contacted mayors, architects, civil engineers and managers of urbanism department in all municipalities in SWPR.

### F. Consulting of public institutions

Public institutions like National Park Galichica and GTZ RED are consulted because the already have designed and planned trails. This kind of consultations are made with aim already existing trails to be integrated with designed planned trails to be obtained one celery.

## TRACING THE TRAILS

After the full consulting, final decisions are made on the basis of initial designs, by adjusting according the advice of experts in their professions, in terms of natural constraints (slopes, impassable terrain, etc.), inclusion of tourist attractions, coverage of the entire region and integration of the tracks.

Before planning tracing itself, it is necessary to know the number of citizens (hikers, cyclists, pedestrians) that would use the paths and their expectations, appropriate panorama view spot, attractions that take place in that part of the track, track length and accessibility.

Creating an infrastructure network of pedestrian and bike trails which integrate the numerous churches, monasteries, caves and other attractive locations in the most touristic region in the Republic of Macedonia, and in the same time represent the connection of all municipalities in SWPR, is shown on Fig. 3.

On the picture are presented two types of trails: current (with dotted line) and designed (with full line) The color of the trails represent its type: combined (red), pedestrian (blue), cycle (yellow) and trail for extreme cycling (black). The data for current trails are gained from relevant sources that have worked on their tracing.



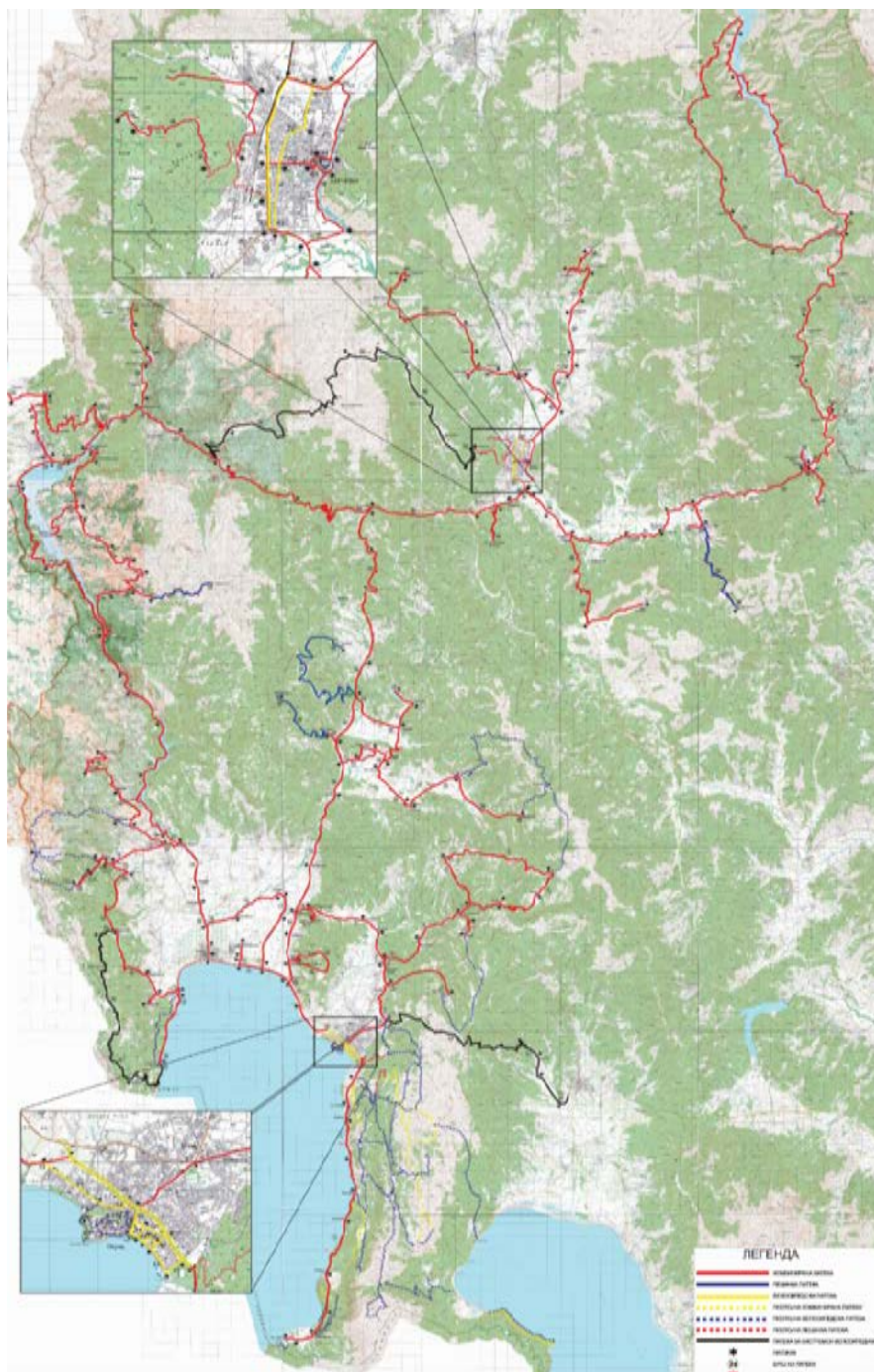


Fig. 3. Designed trails

## SIGNALIZATION

Signalization is actually a part of infrastructure for alternative transportation trails, which guides the user for that what he/she can, what is forbidden, how to safely use the trail and to orientate to get the aimed destination. Types of signalization: identity signs, use signs, safety signs, private property signs, interpretative and protective signs and direction signs.

Types of signalisation:

- Identity signs(containing the name, type the path (combined, pedestrian, cycling)) distance in certain places, points of interest along the path and level of skills required to master it. They locate Use signs(containing information on the use of slopes, legal or illegal actions on the track access conditions, areas with special purpose and other prohibited activities)
- Signs of hygiene (are set on a certain distance along the fairways)
- Safety signs (containing the display warning underpasses, intersections, curves and vertical sublimations that follow, information on availability of drinking water along the path). They are located where they are needed
- Private property signs(placing on a certain distance along the trails)
- Interpretative and protective signs(have an educational function because they describe the characteristics and values of the source and contain labeling of natural resources, historical sites and sensitive areas)
- Direction signs(containing information about the length of the track, and placed at strategic locations, intersections, and a short distance along the routes to direct traffic to the slopes or otherwise to settlements).
- Information boards (containing brief and clear explanation of trail, photos and map of the trail)

Information that are given on the signalization should be clear, concise and unambiguous. It is desirable to be made from natural materials.



Fig. 4. Signalization

## SWOT ANALYSIS

Benefits and limitations of integrative approach in design of pedestrian and bicycle paths are represented by SWOT analysis, created by analyzing national strategies and studying the situation on the field.

Table 2. SWOT analysis

<b>Strengths</b>	<b>Weaknesses</b>
<ul style="list-style-type: none"> <li>- Satisfied needs and requirements of all users and participants</li> <li>- Obtain a greater number of expert opinions</li> <li>- Obtaining optimal solutions</li> <li>- Increased intermunicipality cooperation under leadership of The center for development of SWPR</li> <li>- More criteria analysis resulting in the optimal solution</li> </ul>	<ul style="list-style-type: none"> <li>- Longer time for finishing the project</li> <li>- Bigger funds</li> <li>- Conflicts of interests and opinions between the parties involved</li> <li>- Unequal representation percentage of paths for municipalities</li> </ul>
<b>Opportunities</b>	<b>Threats</b>
<ul style="list-style-type: none"> <li>- Expansion of the project in regional, national and international frameworks</li> <li>- Promotion of alternative tourism</li> </ul>	<ul style="list-style-type: none"> <li>- Possibility of not realizing because of the involvement of more local authorities</li> </ul>

## CONCLUSION

Integrative approach in designing pedestrian and bike trails is a crucial part in projecting because of its practicality, applicability, comprehensiveness and eligibility from all interested sides. The approach creates proposal solution that is supported with data, facts and arguments about the design solution.

In the Republic of Macedonia for the first time is used integrative approach in this type of designing.

Integrative planning contributes in development of quality transportation infrastructure through creating a professional basic starting point for any further traffic steps – basic traffic projects and their implementation on the field. Moreover, integrative planning with the created quality infrastructure contributes for development of all other society and economic branches – industry, tourism, and results with improved quality of life of the population.

Integrative approach would give reasonable results in every type of traffic designing, of course with additional customization.

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