CORVINUS UNIVERSITY OF BUDAPEST
FACULTY OF LANDSCAPE ARCHITECTURE AND URBANISM
LANDSCAPE ARCHITECTURE AND LANDSCAPE ECOLOGY DOCTORAL
SCHOOL

THESES OF PHD DISSERTATION

ELABORATION OF AN INDICATOR-SYSTEM FOR RURAL DEVELOPMENT

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TABLE OF CONTENTS

1. OBJECTIVES

The **overall goal** of my research was to elaborate a landscape indicator system suitable for identifying landscape values in rural areas of Hungary, as well as to elaborate the forms of value-based landscape management and efficient rural development. To reach this goal I identified the following **objectives**:

1. To identify the different meanings of the landscape management, to explore the differences and the common features and to redefine the term based on the formers.
2. To analyze the relations and connections between the socio-economic and the landscape indicator based evaluations and classifications.
3. To elaborate a landscape value based, regional scale evaluation system and to delineate micro-region groups.
4. To identify the optimal level of the local stakeholder's participation during the preparation of the landscape management programs.

My research can be divided into **three** clearly distinguishable **pillars**, which have close connections to each other:
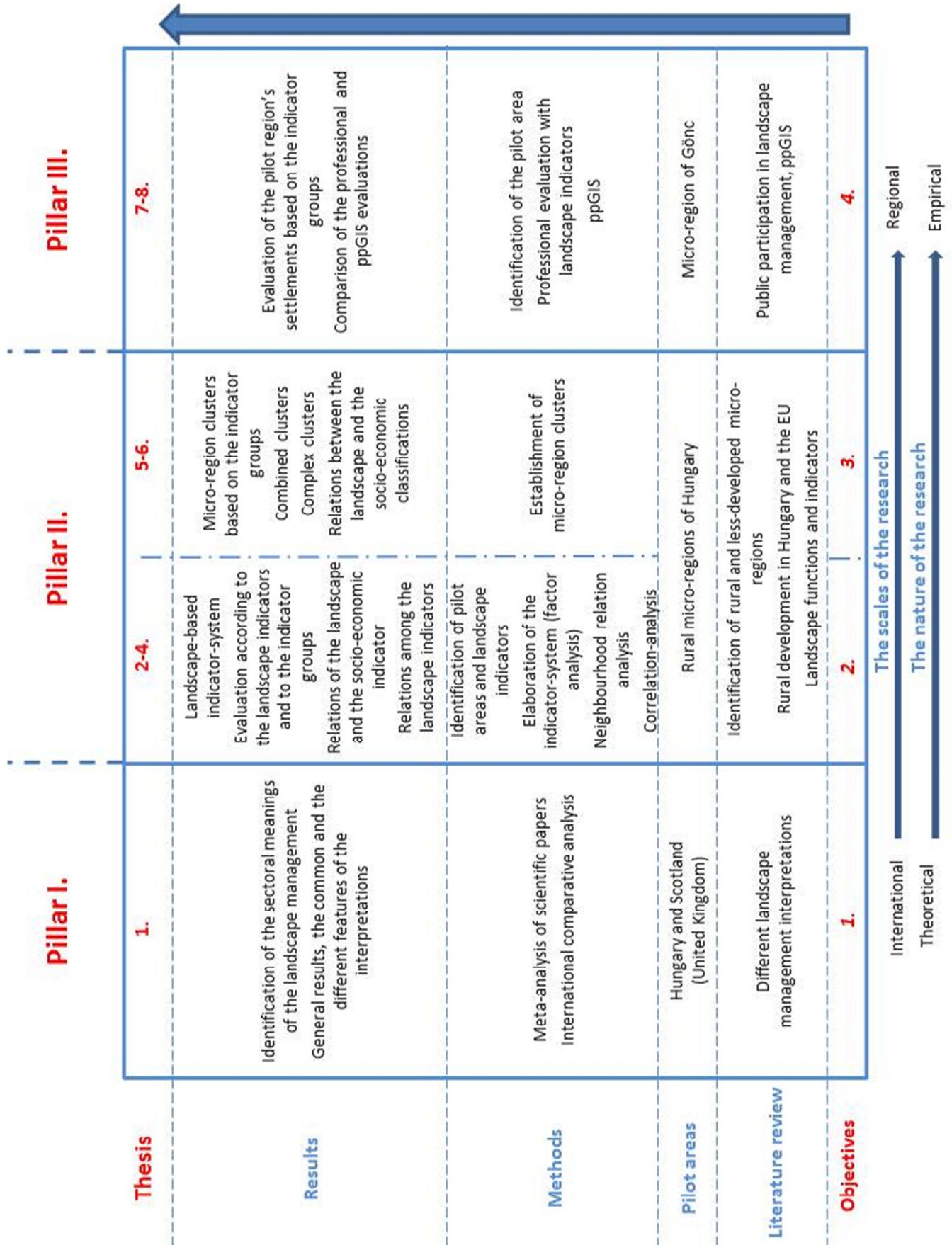
Pillar I: Identification and systematization of the meanings of landscape management (Objective 1);

Pillar II: Comparison of the landscape and the socio-economic based evaluations and establishment of micro-region clusters (Objectives 2 and 3);

Pillar III: The role of public participation in landscape management (Objective 4).

The pillar II can be further distinguished into two sub-parts: the analysis of the connections between the landscape and the socio-economic based evaluations, and the establishment of the micro-region clusters.

2. STRUCTURE OF THE RESEARCH

	Pillar I. (1.)	Pillar II. (2-4.)	Pillar II. (5-6.)	Pillar III. (7-8.)
Results	Identification of the sectoral meanings of the landscape management; General results, the common and the different features of the interpretations	Landscape-based indicator-system; Evaluation according to the landscape indicators and to the indicator groups; Relations of the landscape and the socio-economic indicator; Relations among the landscape indicators	Micro-region clusters based on the indicator groups; Combined clusters; Complex clusters; Relations between the landscape and the socio-economic classifications	Evaluation of the pilot region's settlements based on the indicator groups; Comparison of the professional and ppGIS evaluations
Methods	Meta-analysis of scientific papers; International comparative analysis	Identification of pilot areas and landscape indicators; Elaboration of the indicator-system (factor analysis); Neighbourhood relation analysis; Correlation-analysis	Establishment of micro-region clusters	Identification of the pilot area; Professional evaluation with landscape indicators; ppGIS
Pilot areas	Hungary and Scotland (United Kingdom)	Rural micro-regions of Hungary		Micro-region of Gönc
Literature review	Different landscape management interpretations	Identification of rural and less-developed micro-regions; Rural development in Hungary and the EU; Landscape functions and indicators		Public participation in landscape management, ppGIS
Objectives	1.	2.	3.	4.

The scales of the research: International → Regional

The nature of the research: Theoretical → Empirical

3. MATHERIAL, PILOT AREAS AND METHODS

The scales and natures of the research vary in each pillar according to my objectives. The **scales of the research** (pilot areas) vary from the higher spatial level (more general) to the lower spatial level (more specific). I analyze the meaning of the landscape management on international level, and involve pilot regions from different countries. The scale of the pillar II is national; I analyze the Hungarian rural micro-regions. Finally, I use a regional pilot area (micro region of Gönc) to test the public participation method. The **natures of the research** vary parallel with the scales. The pillar I is theoretical research, while the pillar III is mainly empirical work.

The **material** of the thesis can be divided into four groups: written sources, map databases, statistical data, and survey data. I used various **methods** in the different parts of the research. International comparison and meta-analysis were used during the identification of the landscape management meaning. For the establishment of the landscape value-based micro-region classification system I built up a unique indicator-structure mainly from adapted existing indicators, and I elaborated a country-scale GIS-based evaluation and afterwards I used statistical methods, such as factor and correlation analysis. In the most empirical part of the research, I used the combination of expert-led evaluation and a special public participation mapping method. For this the adapted version of so-called Public Participation GIS (ppGIS) was used. The literature review, in which I summarized the results of the similar works and gave the scientific, empirical and regulatory framework of my dissertation, provided a base of my whole work.

4. THESES (NEW SCIENTIFIC RESULTS)

Thesis 1 I identified seven scientific fields, in which the term of the landscape management is commonly used, and I gave summaries of the interpretations in each fields. I re-defined the landscape management interpretation of the European Landscape Convention based on the identified common features. Furthermore, I defined the scientific field and geographical area in which the term is the most frequently used.

I elaborated a specific literature research method to identify the meanings of landscape management. This research is partly based on the meta-analysis of scientific papers, and partly on the international comparison of political documents (in Hungary and in Scotland, UK). During this work I identified the **main scientific/political fields**, which use the landscape management term. These are the followings: landscape architecture, agriculture, forestry, environmental protection and energy, spatial planning and land uses, nature protection, regional and rural development. I collected and synthesized the existing landscape management interpretations according to the scientific and political fields.

Based on the detailed and structured analysis of **56 scientific journal papers** (from the ScienceDirect database with keyword searching method) and **54 Hungarian and 42 Scottish political documents**, I **identified the** following **common features**:

— **sustainability:** in each case the goal of the landscape management is to reach a desirable status or maintain the currently favorable conditions;

— **regional scale:** the majority of the analyzed scientific works, researches interpret the term in regional scale;

— **importance of the locals:** during the preparation and implementation of the landscape management plans and programs the local knowledge and the opinion of the local community are extremely important;

— **integration of protection objectives:** during the landscape management the integration of the environmental-, nature- and landscape protection into other political fields (e.g. environmental friendly agriculture);

— **role of traditions:** the landscape management term is very often strongly connected to the traditional agricultural activities;

— **interdisciplinary character:** every scientific/political field has got its own interpretation.

Based on my researches I found out, that the term of the landscape management **is used mostly in Europe** (35 scientific papers). Take account the European Landscape Convention definition and the above listed common features, I **re-defined the landscape management**: it is an interdisciplinary term, which means the regular maintenance of the landscape, the coordination of the different changes, and the sustainable utilization of landscape values in regional context. During the landscape management the local knowledge and traditions, as well as the protection have got important roles.

Comparing the scientific and the political sides, I identified significant differences among various fields in terms of the distribution of the landscape management term usage. Among the scientific fields landscape architecture and planning fields use the term the most frequently. In the case of the policies in Hungary the regional- and rural development, while in Scotland the spatial planning apply the term of landscape management most often.

Thesis 2 Based on the scientific literature and statistical analysis I built up a landscape value-based evaluation system. With this system the rural micro-regions of Hungary can be qualified, and the results of this evaluation can be a strong base of the landscape management plans and programs.

I elaborated an **evaluation system consisting of 18 complex landscape indicators (148 variables)**, with which the rural micro-regions of Hungary (population density is below 120 persons/km^2) can be qualified based on their landscape values. I ordered the indicators along **professional judgments and statistical analysis** (principal component analysis). Finally, I created **six value-groups**: Environment–Biodiversity, Nature Protection, Cultural–Historical, Visual–Perceptional, Agriculture, and Tourism.

This indicator system (and the calculation methods) can be a **guide** for the planners and decision makers **during the national and regional analysis, as well as the elaboration of the landscape management programs**. The method is suitable for evaluations both with one single complex indicator and with indicator groups. I **tested** the method in all of the **137 rural micro-regions in Hungary**.

Thesis 3 During my statistical analysis I explored the relationship between the landscape values, indicators and the socio-economic development in rural regions of Hungary.

> **3. A) I did not identify any relationship with the socio-economic development in the case of the following indicator groups: Environment–Biodiversity, Nature protection, Visual–Perceptional, Agriculture.**

Based on the results of **my correlation analysis cannot be justified any relationship between the economic development and the quality of the environment** in the rural areas of the country, so in general, the economically less-developed micro-regions do not have better environment quality. In summery I found out, that **the current rural development programs**, strategies have not reached their objectives, since they do not deal in an appropriate manner with the landscape features, they are **not area-specific** and they do not utilize the landscape values properly.

> **3. B) I identified national level relationship with socio-economic development in the case of certain elements of the following indicator groups: Cultural–Historical, and Tourism.**

As the results of the correlation analysis of the **socio-economic development** I found out, that from my previously defined 18 landscape indicators, the **most significant relationship** exist **between the recreational potential and amount of the cultural heritage** (positive significant correlation). Based on the formers I determined that the existences of the touristic primer infrastructure, as well as the other favorable recreational potential facilitate tourism profitability, and that is why they contribute to the development of certain micro-regions. With the correlation between the economic development and natural heritage I justified, that in general, those micro-regions are more developed economically, which have got significant cultural traditions and values. Consequently, the micro-regions, which are nowadays more developed, were in better position in the past as well, so my results show **"historical determinism"**.

I completed a correlation analysis between socio-economic development and landscape values, indicators **in case of two special rural region-types (34 farmstead-type and 45 small village-type micro-regions). I received similar results** as in the case of the national-wide analysis.

Thesis 4 **I identified those landscape features, values, which can express the uniqueness of the micro-regions in the most, and indicate the greatest deviations from the values of the neighboring areas.**

According to the elaborated method, **I corrected the indicator values of all of the rural micro-regions with the values of their neighbors**. Based on the **correlation analysis** of the original and the corrected values I identified the indicator groups, with the **weakest relationship/correlation between the neighboring regions: Nature protection, Historical–Cultural, Tourism.**

During landscape-scale planning and preparation of landscape management programs, the in-depth **analysis of the neighboring areas is very important** regarding landscape values, features of the above mentioned three groups. If the neighboring areas have favorable conditions, it is strongly recommended to utilize them, as well as make and strengthen the connections with the wider surroundings. However, if the micro-region

has outstanding values compared to the surroundings, these advantages can be utilized for **strengthening the uniqueness**.

My research results showed that the touristic primer infrastructure is very concentrated in the rural regions of Hungary, and the positive effects of them are less perceptible in the wider surroundings.

Thesis 5 I built up landscape value-based micro-region clusters, which have similar features according to one landscape value group, or the combination of them (combined and complex clusters). These clusters can be helpful for the planners and decision makers to define the main directions of the landscape management programs.

Based on the national evaluation I created **micro-region clusters** according to the formerly introduced six landscape indicator groups. **The values of these clusters are above the average, or outstanding**, thereby the landscape management and rural development activities have to focus on the utilization of these landscape values. Beside of the **clusters based on the single indicator groups**, I built up **combined clusters**, which have outstanding values **in more indicator groups**, as well as **complex clusters**, which are based on **the summarized landscape value**. I combined all of the clusters with the groups, which include the less-developed micro-regions (socio-economic values are below the average), since in these cases is highly important to utilize the landscape values.

During the clustering I built up a database, which defines those micro-regions, in which the sustainable utilization of the landscape values can be particularly important and useful. This database also **appoints the main directions, focus points of the landscape management programs, plans**.

Thesis 6 I identified the connections, relationships between those clusters, which are in the best or worst positions according to the landscape value-based and the socio-economic evaluations.

The analysis of the clusters with the highest and the lowest summarized landscape values and their socio-economic development I found, that **the less-developed micro-regions from the socio-economic point of view are more often in the clusters with the lowest landscape values**. This relation varies contrary to the summarized landscape values in the case of the complex clusters.

Thesis 7 Based on the results of the applied ppGIS method, I defined the optimal degree of the public participation during the identification of the various landscape values.

I **adapted to the Hungarian conditions** a special public participation-based mapping method, the so-called **ppGIS**, with which I evaluated the pilot area. **By comparing** the results of the ppGIS with the results of the **professional evaluation**, I identified those indicator groups from the formerly presented six groups, in which the applied two methods showed different results: **Environment–Biodiversity, Cultural–Historical, Visual–Perceptional, Agriculture**. In the case of these landscape features **the most important the involvement of the local stakeholders**. I gained my results from **264 maps**, which were created with the adapted ppGIS method (this is the number of the involved people from the pilot area).

I explored the possible reasons of the differences between the results of the two evaluations, and these established the optimal degree of the public participation during the preparation of the landscape management programs, plans. I defined **four combination-groups**:

— the applicability depends on the available monetary and energy resources: Nature protection, Tourism;

— the professional evaluation is the primary, the involvement of the local stakeholders can be only additional: Environment–Biodiversity;

— the correction of the professional evaluation method is necessary based on public participation methods: Agriculture;

— the application of both methods is optimal in the same time: Historical–Cultural, Visual–Perceptional.

Thesis 8 I proposed to renew and supplement the professional evaluation of the cultural and visual landscape features based on the public participation mapping method.

Based on my ppGIS research in the pilot area I found, that **the local knowledge is the most important** in the case of the evaluations related to the Historical–Cultural and the Visual–Perceptional topics. In the case of the former the involvement of the locals into the preparation of landscape management plans, programs is important to preserve the local culture and traditions, and awareness raising. During my researches I justified, that **those key landscape elements can be identified** with the participation methods, which are not protected, however, **preserve the culture and values of the region and the locals** (e.g. folk architecture).

I proved with the results of the applied ppGIS method, that for the locals **exist those landscape elements, which can define the landscape and its value most markedly** (e.g. castles, ruins, sacral buildings, sculptures, memorials in high places). **There is not any national, homogenized database**, which collects, organizes these landscape elements with their surroundings, landscape contexts. That is why in the case of Visual–Perceptional-type evaluations during the planning and strategy development the involvement of the local stakeholders is necessary to identify the determinative elements. According to my results, I recommend **the clarification and supplement of the method used for the landscape protection zones delineation** with the elaboration and integration of a database including these determinative landscape elements.

5. LIST OF PUBLICATIONS

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8. <u>Valánszki István</u> – Filepné Kovács Krisztina (2015): *Evaluation of the green network in Gönc micro-region*. In: Gazdálkodás és Menedzsment Tudományos Konferencia előadásai, Kecskeméti Főiskola, Kecskemét, 2015. augusztus 27–28. (in press)

9. Filepné Kovács Krisztina – <u>Valánszki István</u> (2015): *Effects of landscape changes on the social-economic structure of micro-region of Csorna*. In: Gazdálkodás és Menedzsment Tudományos Konferencia előadásai, Kecskeméti Főiskola, Kecskemét, 2015. augusztus 27–28. (in press)

Conference proceedings, abstract

10. <u>Valánszki István</u> – Munoz-Rojas Jose – Aalders Inge (2015): *Are times changing for landscape management following the European Landscape Convention? Insights from Hungary and Scotland*. In: Martin Boltižiar, Andrey Bača (Eds.): 17th International Symposium on Landscape Ecology. pp. 84. 27–29 May 2015, Institute of Landscape Ecology, Slovak Academy of Scinece, Bratislava–Nitra, Slovakia. ISBN 978-80-89325-27-6

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13. <u>Valánszki István</u> (2012): *Sustainable landscape management in North-Eastern Hungary*. In: „EURORURAL'12" Multifunctional Rural Development Conference. Mendel University in Brno, Brno, Czech Republic, ISBN 978-80-7375-642-0

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