

SPATIAL PLANNING PROSPECTS ON CHANGEABILITY PROCESS OF URBAN AND NATURAL (LAND)SCAPE RELATIONS - THE DYNAMICS OF ANCONA ON THE WEST AND RIJEKA ON THE EAST ADRIATIC COAST

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Abstract –The urban and natural landscape relations are temporal, spatial, and perceptive phenomena complemented by providing functions and holistic principles that arise from the spatial planning approach. The research aims to investigate how spatial planning guides the changeability process of landscape relations in the Adriatic cities of Ancona and Rijeka settled between two strong natural elements of the sea and the mountains. The research interconnects the Heritage Urbanism approach and the Urbanscape Emanation concept in establishing identity factors, evaluation criteria, and enhancement models.

Introduction

The process of urban and natural landscape relation testifies to 25 centuries of urban culture and tradition in the Mediterranean. The urban and natural landscape relations are comprehended as temporal, spatial, and perceptive phenomena complemented by providing functions and holistic principles that arise from the spatial planning approach. It is a heritage dimension that embodies landscape reality and its representation, as well as a layer of the Urbanscape Emanation concept [1] understood as the impact of the city-systems on the natural setting. The research theme is induced by the notion that urbanity emerged from the landscape, transforming the natural into a cultural landscape, and transmuting the landscape setting into the city. Interrelation and connections of the urban development process and natural landscape transformation [2] prove the entity wholeness and the changeability process of the urban and natural landscape relation.

Two components of contemporary landscape analysis are neglected – time and networks of relations [3] thus highlighting the need to research complex urban and natural landscape relations as multidimensional processes. The urban and natural landscape as well as the social framework of life is in constant change. It cannot be stopped at a certain moment to be analysed – therefore the constant change in the research domain is a challenge and a great motive for research. Contemporary tools for assessing urban development and expansion into the natural landscape are primarily focused on metrics modelling of spread dynamics - urban size and density, morphology and urban forms, distribution and growth patterns, population density and dynamics, loss of natural land, and land-use change - that are weakly integrated with spatial planning. The quantitative modelling research are focused on how the city spreads while directions of urban development and where (on what landscape) the cities are spreading to are generally under-represented. Data availability is

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considered a strong restraining factor in the widespread applicability of geographic information system and remote sensing modelling.

Relating quantitative physical factors to socio-economic, spatio-temporal, ecological, and environmental factors support the spatially transcendent and sustainable development of a balanced society, economy, and environment [4]. While computation and modelling methods focus on quantitative objectives, the perception methods regard interactions of natural processes and human activities [5] in fostering urban and natural landscape quality as a spatial planning objective. Contemporary approaches to protection, planning, and management of urban and natural landscape promote landscape networks as green infrastructure, core and belt approach from *UNESCO World Heritage* and *MAB Programme*, landscape characterisation from *Landscape Characterisation Assessment* and *Council of Europe Landscape Convention*, and phenomenological approach from *Historical Urban Landscape*. The landscape dynamics, complexity, and continuity of the city setting represent the changeability process of urban and natural landscape relation, which regarded from different perspectives can enable use in spatial planning and enhancement of landscape quality.

The landscape relations can be traced through the history of settling [6], from the prehistoric dwellings, proto-urban settlements, ancient cities, and medieval towns that developed in harmony with the landscape setting and with deep connections to inherited landscape values and characteristics. The processes of industrialisation, urbanisation, and touristification from the 19th century were further intensified by the rapid change in urban development pace from the second half of the 20th century – disrupting the historically balanced urban and natural landscape relation. Spatial problems of extensive urban spread into natural resources and loss of natural landscape, disbalance of urban development and landscape protection, land degradation and abandonment, and loss of urban identity arising from landscape setting indicate the disrupted relation between urban and natural landscape. In the specific context of the Mediterranean and the Adriatic, these spatial problems are further intensified in cities settled between two strong natural elements - the sea and the mountains. The cities of Ancona and Rijeka are selected as representative cases settled between the Adriatic Sea and the mountain hinterland of Apennines and Dinarides where the intensive relation of urban and natural landscape defines a unique place identity.

The research aims to investigate how spatial planning guides and anticipates the changeability process of urban and natural landscape relations in the context of West and East Adriatic Coast cities. Three research levels - theoretical (existing knowledge), spatial (field research and case comparison), and spatial planning (criteria) regard three main research questions:

- What perspectives overlap in establishing the relation character of urban and natural landscape within the spatial planning approach?
- What forms the interrelation of urban and natural landscape on the West and East Adriatic Coast? Which criteria have to be used in evaluating the relation?
- How is the urban and natural landscape relation planned in historical and contemporary spatial plans of Ancona and Rijeka? Which planning provisions regard and which spatial planning criteria are already used to enhance the relation?

Materials and Methods

The urban and natural landscape relations present unified and non-renewable spatial and cultural resources that are explored by overlapping different perspectives. By comprehending landscape relations as heritage resources that emanate toward sustainable development, the research uses the Heritage Urbanism approach [7] to determine identity factors, evaluation criteria, and enhancement models. The landscape relations are explored as part of the Urbanscape Emanation concept of multi-layered values detection and use in spatial planning. The research interconnects the Urbanscape Emanation concept and the Heritage Urbanism approach to aim for a new dynamic in planning balance and achieving holism between multiple layers of the urban and natural landscape. Applied theory-, perception-, and desk-based research methods follow three levels of research – theoretical, spatial, and spatial planning levels, that are used in research synthesis (Table 1).

Table 1 – Structure of applied research methods and materials in setting theoretical (gray), spatial (turquoise), and spatial planning (pink) research levels.

	Research methods	Materials / sources	Application Research synthesis
Theory-based methods	Literature review	Scientific literature	Overlapping different perspectives in structuring groups of identity factors
	Documents review	Spatial planning documents and policies	
Perception-based methods	Structured observation	Field research data	Field surveys of case cities to identify evaluation criteria
	Photographs taking	Case photographs	
Desk-based methods	Data collection	Historical illustrations	Confirmation of evaluation criteria by case comparison
		Historical maps	
		Orthophoto maps	
	Data analysis	Spatial planning documents	Comparison of spatial planning documents for establishing enhancement models

The theoretical knowledge of landscape relations is based on a review of scientific literature and policy documents from various disciplines that provide different perspectives relevant to interconnecting the urban and natural landscape. The review provides a theory-based framework of current terminology and content that establish landscape relations as multidimensional processes. The determined groups of identity factors arise from comprehending the urban and natural landscape relations and the spatial planning approach to landscape assessment, protection, and planning.

The inclusive and holistic approach to spatial research of urban and natural landscape relations interconnects perception-based and desk-based methods in identifying and confirming evaluation criteria. The theory-based identity factors are recognised during field surveys by structured observation and documented by photographs. The identified

factors of urban and natural landscape relation are presented by data from historical maps and present-day orthophoto maps, from historical illustrations and contemporary photographs, that are used in the analysis of case cities. By comparing the representative cities of the West and the East Adriatic Coast, criteria for evaluating the relation of the urban and natural landscape are confirmed.

The spatial planning research of urban and natural landscape relations is conducted by detecting the established evaluation criteria in spatial planning documents of each case city. One representative historical and one contemporary spatial plan of regional level are selected for the West and the East Adriatic Coast site. The comparison of spatial plans is assigned to planning provisions that regard the established evaluation criteria of urban and natural landscape relations. The planning provisions are interpreted as existing spatial planning criteria that introduce missing criteria and assist in establishing spatial planning models for enhancing the urban and natural landscape relations.

Results

The research of urban and natural landscape relations introduces new meanings to existing knowledge, spatial values, and spatial planning provisions for evaluating and enhancing urban and natural landscape. It originates from determining the landscape relations as a core notion and evolves through incentives, levels, and scopes towards the Heritage Urbanism approach and Urbanscape Emanation perspectives in fostering the urban and natural landscape relations (Table 2).

Table 2 – Structure of research incentives, levels, scopes, Heritage Urbanism approach, and Urbanscape Emanation perspectives in fostering the urban and natural landscape relations in spatial planning.

Research incentives	Research levels	Research scopes	Heritage Urbanism approach	Urbanscape Emanation perspectives
Research gap	Theoretical level	Theoretical review of existing knowledge	Identity factors	Landscape relations character
Spatial problems	Spatial level	Case studies evaluation of spatial values	Evaluation criteria	City setting
Spatial planning approach	Spatial planning level	Comparing provisions of spatial planning documents	Enhancement models	Spatial planning prospects

Landscape relations character as theory-based groups of identity factors

The Urbanscape Emanation perspectives on connections between urban and natural landscape arise from determining the core notion and forming a structure for literature review. The landscape relations are established as temporal, spatial, and perceptive phenomena

complemented by providing functions and holistic principles that arise from the spatial planning approach. The spatial, social, and symbolic dimensions of landscape identity as well as the Heritage Urbanism approach to landscape relations as heritage dimensions confirm the structure of theory-based knowledge on the connections of the urban and natural landscape.

The dimension of time and layers of history are essential to understanding the urban and natural landscape relations as a process [3] and the heritage dimension [1, 8] where the history of landscape as the origin of the urban can be traced back as far as the history of man [6]. Inherited values of landscape continuity and the constant of landscape transformations are embodied in the three natures by Cicero [9] - the first (primeval) nature of wilderness, the second (cultivated) nature of the cultural landscape, and the third (horticultural) nature of designed parks and gardens. The three natures are also regarded physically in the practice of garden theory by Hunt, metaphysically in the Buddhist philosophy on the three natures of being, and further explored by the fourth nature of designed wilderness and restored ecosystems as a response to the Anthropocene era.

The complexity of landscape embodies the perceived reality and the representation of it, which is closely associated with the notions of place and identity. The threefold dimensions of the spatial, social, and symbolic landscape are regarded in the identity of place [10], sense of place by Montgomery, visual perception of landscape by Parris, three ecologies by Guattari, spatial discourse by Foucault, trialectics of social space by Lefebvre, and thirdspace by Soja. In the landscape concerns, as aims of landscape design and spatial planning objectives, the threefold division originates from Vitruvius' *firmitas*, *utilitas*, and *venustas* as aims of the design process [11] and evolves in areas of landscape architecture knowledge by Thompson, aims of landscape architecture by Turner, landscape patterns by Bell, and concepts of landscape architecture by Fein.

In the inclusive and holistic approach, the connections of the urban and natural landscape are interpreted as the equivalence of all landscape. The approaches that regard the whole as more than merely the sum of its parts is identified in notions of wholeness and universal value [12], authenticity, vivacity and landscape quality, sustainability [13], resilience and adaptive capacity of landscape. The holistic nature of landscape serves as an integration concept for a wide variety of perspectives to study it [5]. The principles of economic and social cohesion, conservation of natural resources and cultural heritage, as well as balanced territory are reflected as European spatial planning objectives [4]. An inclusive and holistic spatial planning approach to exploring the changeability process of the landscape relations is achieved by overlapping temporal, spatial, functional, and perceptual factors of the urban and natural landscape.

The theoretical review on landscape relation knowledge concludes five (5) groups of identity factors as landscape relation characters: (i) temporal character of the landscape as heritage, (ii) spatial character of landscape form, (iii) functional character of the social landscape and use, (iv) perceptual character of landscape symbols, (v) holistic and inclusive character of the balanced urban and natural landscape.

Perception of the urban and natural landscape settings on field research of Ancona and Rijeka

The field research of Ancona and Rijeka urban and natural landscape settings have been conducted from 2018 to 2021 covering the research on coastal maritimescape,

urbanscape, and hinterland mountainscape. The theory-based factors are recognised during structured observations and photographic documentation of perceived connections of the urban and natural landscape. The interpretation of field research is done in a descriptive way that is not restricted only to the pre-defined identity factors but allows the recognition of perceived parameters that form the landscape relations.

The field research results highlight that settings form landscape relations – thus different city settings are established as evaluation criteria for the urban and natural landscape relations. Five (5) perspectives on landscape relation characters of Ancona and Rijeka are intertwined to determine settings criteria: (i) landscape setting of different levels and characters, (ii) historical setting of continuity, (iii) heritage setting of tangible and intangible cultural, and natural heritage, (iv) setting transformations of four natures, (v) scenic setting of visual landscape, and (vi) communication setting of historical and contemporary roads and paths.

Confirmation of settings criteria by Ancona and Rijeka comparison

The comparison of case cities has introduced two additional settings: (i) administrative setting as an introduction to the city cases and (ii) spatial planning setting as a concluding structure of historical and contemporary spatial planning documentation relevant for the evaluation and enhancement of urban and natural landscape relations. Eight (8) setting criteria are applied in research catalogues to evaluate urban and natural landscape relations of case cities and to initiate and focus the questions for verification in spatial plans of Ancona and Rijeka.

Ancona and Rijeka are compared as regional centres, similar in size of urban area and population, opening the question of how administrative levels are referred to spatial plans. The landscape settings differ macro-regional, regional, and micro-regional settings, the character of geographic setting, and settlement types for maritime-, urban-, and mountainscape, thus opening the question of how different levels of landscape, specific characters of urban structures, and landscape forms, spatial problems of urban pressures on the natural landscape, and inaccessible urban coast, are reflected in spatial plans. The continuity of the historical setting is detected in the historical core of Ancona and the two urban cores of Rijeka and Sušak (Figure 1), raising the question of how to promote endogenous planning that respects the authenticity of urban continuity. The heritage settings differ protected natural, tangible cultural, and intangible cultural heritage, thus opening the question of additional possibilities for a network of heritage protection by spatial plans that integrates natural, tangible, and intangible cultural heritage, traditional heritage, and associated cultural places. Confirmed primeval, evolved, planned, and deprived nature of landscape as settings transformations in Ancona and Rijeka raise the question of recognising areas of protection, development, and recovery as different levels of consolidation in spatial plans. The scenic settings of urban vedutas, view corridors, depth of view, and evoking places of iconic views open the question of promoting visual values of interacting urban and natural landscape as identity protection in spatial plans. The compared networks of communication settings in Ancona and Rijeka raise the questions of recognising and protecting historical roads and traditional paths as cultural heritage, and access roads as the urban identity of gateway-pathway heritage, as well as the question of contemporary roads along and across the coast and hinterland as lines of urban spread into natural resources that need to be regarded in spatial plans. The overview of historical and contemporary spatial plans of Ancona and

Rijeka opens the opportunity to learn from different spatial planning continuities, traditions, and structures of programmatic, strategic, operational, and implementation plans. The reflection of formal planning on the activity of informal initiatives exposes the raised objectives of public welfare to be involved in spatial plans.



Figure 1 – Historical illustration (up) and contemporary representation (down) of the urban and natural landscape of Ancona (left) and Rijeka (right) (photo: Authors).

Spatial planning criteria for enhancing relations of the urban and natural landscape as spatial planning prospects for Ancona and Rijeka

The initiated questions from comparing settings criteria for evaluating landscape relations in Ancona and Rijeka have focused on the verification of existing and progress towards missing spatial planning criteria for enhancement of urban and natural landscape relations. The existing spatial planning criteria are assigned to planning provisions that regard the evaluation and enhancement of urban and natural landscape in compared spatial plans. Four (4) spatial planning documents are selected as representative of case cities: (i) General Urban Plan, Municipality of Ancona, 1963, (ii) Coordinating Physical Plan of the Upper Adriatic Region, 1972, (iii) Integrated Territorial Project, Middle Adriatic Metropolitan Area, 2013, (iv) Spatial Plan of the City of Rijeka, 2019.

The planning provisions indicate spatial planning prospects as development tendencies that distinguish integral development of the Metropolitan Area for Ancona and partial development for Urban Agglomeration of Rijeka. The planning prospects interconnect spatial planning criteria for enhancing urban and natural landscape relations, settings criteria for evaluating landscape relations, identity factors as landscape relation character (Table 3), and assist in promoting spatial planning models for enhancing landscape relations.

Discussion

Research synthesis introduces spatial planning models that are summarized from spatial planning criteria for enhancing landscape relations (Table 3) and grouped according to common notions that promote relations of urban and natural landscape (Table 4). The understanding of (i) layers depth, (ii) network structures, (iii) endogenous, (iv) tendency, and (v) archetype models reflect the contributions to scientific research and approaches, spatial planning practice, enhancement of spatial relations, education to relation values and quality, and awareness towards landscape resilience.

Table 3 – Structure of identity factors, evaluation, and enhancement criteria of urban and natural landscape relation.

Landscape relation character		Spatial planning prospects
Identity factors	City settings Evaluation criteria	Spatial planning criteria for enhancing relation of urban and natural (land)scape
Temporal character	Administrative setting	_scope of spatial plans in line with urban systems, scape levels, and city setting.
	Landscape setting	_maritime plans for the public coastal belt. _structures, forms, topography equal to use.
Spatial character	Historical setting	_accessible network of public places. _urban spread balanced with natural resources.
	Heritage setting	_indigenous planning of city setting values. _integral network of heritage protection.
Perceptual character	Setting transformations	_planning transformed scapes into heritage. _planning deprived scapes as recovery areas.
	Scenic setting	_protecting visual values as scape identity. _depth of layers as scape homeostasis.
Holistic character	Communications setting	_access roads as city identity entrance. _learning from spatial planning tradition.
	Spatial planning setting	_local initiatives indicate welfare objectives. _educating the community to gain relevance.

The landscape is understood as a palimpsest of urban development, an active substratum of the city providing depth, and fostering insight into the whole city understood as a landscape. The landscape always expresses and reflects relations - the networks, connections, and mobilities that drive the ongoing process of place-making. Thus, it should be planned by directing process tendencies and by respecting their evolution. The endogenous development proceeds from within and is derived from internal conditions of landscape organisation rather than externally caused. It plays a decisive role in developing acceptance and ownership by local people, which are essential for their long-term commitment. The notion of archetype helps us to deal with the complex notions of the landscape by acknowledging the values found in different intensities in all landscapes. The urban and natural represent the prime archetypes of landscape as all the shades in between

are present in the relations of the urban and natural landscape. The wider context of research results enables the appreciation of all city settings in protected, everyday, and degraded landscapes.

Table 4 – Understanding spatial planning models of enhancing landscape relations by promoting urban and natural landscape notions.

Spatial planning models for enhancing landscape relations	Promoting urban and natural landscape notions	Understanding the model
Layers depth model	diverse readings, perspectives recognition, overlying, insight layers, strata, zones, areas, belts, assets, phenomenon, levels	Overlapping diverse layers and notion levels forming depth and providing insight
Network structures model	integration, interconnections, synchronicities networks, systems, organisation, infrastructures, structures, forms	System of interconnected and integrated constituents of a complex and unitary whole
Endogenous model	balance, homeostasis, coherence, coexistence, continuity background, tradition, genius loci, inherited values, authenticity	External balance of landscapes that arise from internal, inherited values
Tendency model	tendency, direction, adaptive cycle, threshold, course, dynamic processes, growth, transformation, development, progress, evolution	Planning by directing process tendencies respecting their evolution
Archetype model	education, understanding, awareness, reflections, identity, conceptualisation, abstraction groups, types, classes, places	Education in abstract examples of groups, a conceptualisation that upholds landscape values

Conclusion

The expanded understanding of the urban and natural landscape relation as a process is complemented by the depth of landscape layers, the structure of versatile urban and natural networks, endogenous landscape balance, tendencies of landscape processes, and education in landscape archetypes. These are conducted as the spatial planning models for enhancing landscape relations that provide depth and insight, raise awareness of landscape values, and resist landscape delineation and boundary setting. The dynamics of urban development and natural landscape evolution interconnect the past and present landscapes with spatial planning tendencies. Thus, the research contributes to proposing spatial planning principles that acknowledge the individual and common characteristics as well as the connections that complement urban and natural landscapes as a whole in which one benefits from the other.

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