Doctoral School on Engineering Sciences
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Extended summary

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Socially useful and eco-friendly infrastructures

CURRICULUM: ANALISI E PROGETTO DELL'ARCHITETTURA E DEL TERRITORIO

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Abstract

The Ecological Footprint revealed by the climate changes shows that our society has now to face issues involving global urbanization, which are affected both by "planetary" scale projects, and interventions on a smaller size.
On the grounds of such awareness, the present study outlines operational measures and interventions on a regional and town scale, proposing guidelines for the sustainable design of infrastructural works that may be able to affect the quality of city life and represent strategic components for the protection of the territory.
Significant is the case of historic towns in the Marche region, a prototype of urban sprawl, investigated in the present research through the aspects connecting sustainable infrastructures and urban transport networks to the quality of city life. The concept of sustainability is declined in order to meet the contrasting demands of conservation and growth by addressing the issue of defending the balance of the smaller towns and their social matrix, yet including the necessary endowment of services and infrastructures for city welfare, socio-economic growth and adaptation to the needs of contemporary life.
The new paradigms of growth that the results of the research suggest are centered on the revolution of the mobility culture and on project planning logics able to transform infrastructures in opportunities to regenerate the territory.

Keywords

Sustainable territorial regeneration, Mobility culture, Architectural design of infrastructural centers, Urban hub, European mobility networks, Energy resources saving.

1 Problem statement and objectives

The research addresses the issues of improving the existing architectural and environmental heritage, particularly in smaller towns, entrusting infrastructures with further roles besides that of primary use, in order to integrate the possibilities of the operation of economic and social networks within which the smaller towns have to find a functional reuse.
The prolonged economic crisis and the ecological crisis in progress have highlighted the heavy difficulties of a model of unsustainable development.
The present study juxtaposes to exaggerated urban consumerism and regime of competition among metropolitan areas that caused the congestion and the crisis of the development model, the energetic quality of individual "minor" places. To the latter one would like to give added value and better usability, by proposing potential structures to make the facilities inscribable in the term "infrastructure" permeable to their gravitational area, thus making the infrastructural works useful to the tourism, culture and logistics system.

2 Research planning and activities

Given the breadth of the issue, the scope of the research is defined through the analysis of the aspects that weld the cultural landscape and the universe of mobility. To that end, experiences binding traffic to the history of modern towns are described, and so are the new signs that the communication axes bring in the organization of the urbanization nets to which the landscape is the backdrop, and the weight of infrastructures on the territory. In addition to that, recent data about the consumption of natural assets are assessed.
The PhD thesis takes as a study case the Marche region in order to develop tools in aid of re-designing the harmonious development of local potentialities, through project planning that combine operation of the infrastructural works and exploitation of the smaller towns heritage, which stand for elements of high environmental quality and competitiveness as to the dominance of metropolitan civilization.
An analysis is performed of the potential of the infrastructural system in the Marche region as concerns national policies, structure of the Adriatic-Ionian Macro-region and the flows dictated by the cross-border programming for the creation of the European Mobility Network. Such analysis is carried out in compliance with regional and national plans for logistics, studies of the Commission of the European Communities, the ESDP-European Spatial Development Perspective (CEC 1999), and the policies expressed in the White Paper 2011 (White Paper on Transport, European Commission).
Within the international scenario, cases of interventions which combine architecture and the use of infrastructures in accordance with the principles of sustainable mobility, are also selected. The cases studied allow a variation in enlightened modes of crossing the territory and in adapting to the local resources, summarized in a series of categories: *sharing, daily mobility, re-use, waterways, inspiring places, personalization.*
The principles and strategies identified serve as a theoretical support for the application of new measures for controlling the transformation of the Marche territory, investigated through a process of critical reading through 'systems' that represent the articulation of what is real in its environmental, infrastructural, constructed, and productive-commercial components.
The assessment of the current state of the overall system is performed via a graphic schematization of the regional territory. That is functional to the identification of noteworthy areas and points where the proposed intervention concentrates new structures

within an overall strategy of sustainable regeneration and re-balance of the polycentrism that characterizes the Region.
For this purpose, the territory is divided into main macro-areas where new functional units are placed, in accordance with an in-depth strategic design through a Masterplan, and on the basis of a hierarchy of hubs of the first, second and third order, depending on the level of interconnections that the new magnets of attraction establish with the existing one.
The logistic centers identified are put to use in a dialogue between various interest generating terminals- the smaller urban centers- and the infrastructural frame, establishing new circuits of relations in the fragmented settlement system of the Marche region.
These new cells set themselves in contrast to the anonymity of *"non-lieux"* (airports, train stations, shopping centers), because to the explication of the main role of the traffic flow axes, they add the further value of adjusting the system of accesses to the area, of intersecting the paths of alternative routes and of promoting the values of the places you go through.
The cells structure is simplified through a planning exploration carried out in the central coast area of the regional territory, by the town of Loreto, destination of international tourist flows, and the smaller towns nearby.

3 Analysis and discussion of main results

The current system of mobility infrastructures requires an urgent revisiting in compliance with the principles of energy resources saving and through the contiguity with new structures, able to associate to the primary role of the flow axes, the further function of interaction with the territory, contributing to the town liveability through the decompression of the road traffic and the intersection with the connections of "sweet" mobility.
As regards the above mentioned matter, the present research proposes concrete future scenarios through the role of the planned centers. Within the territory in question and, more generally, in contexts of cultural, historical and landscape value, like the Italian one, they act in fact as a center of modal interchange fit to filter and drain the flows that cross the region and- at the same time- allow the development of and the acquaintance with the places you pass through by integrating the already well-established functions of the infrastructural frame linked to the trading-commercial nets.

4 Conclusions

The study returned a proposal indication for alternative ways to use the territorial resources and a study of structures meeting the needs of a sustainable society and of ecosystems stability, suitable for establishing a more advanced relationship with the territory. The research methodology and the tools applied have allowed defining the infrastructural works as "osmotic", on the grounds of their response to social demand and ecological sustainability.
Further research development could allow the indication of parameters for measuring the "Osmosis Degree" that infrastructural systems establish with their own surroundings through the proactive involvement and participation of the social parts.

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