

Application of urban sustainability indicators to the city of Coimbra

Andreia Soares

Master Student at the Department of Civil Engineering in the University of Coimbra

andrea_ssoares@hotmail.com

Anabela Ribeiro

Assistant Teacher at the Department of Civil Engineering in the University of Coimbra

anabela@dec.uc.pt

Abstract

In Portugal, the legislation associated with land management and urban planning is responsible for the quality of urban form and public space. The latest Municipal Regulations for Urbanization and Construction (Regulamentos Municipais de Urbanização e Edificação – RMUE's) allows municipalities to perform more precise planning rules in their territory at the level of urbanization and construction. However, it is still unclear how the planning criteria used include sustainability concerns.

Concepts such as sustainable construction, sustainable development, urban sustainability indicators, still have limited use and application in Portugal. However - given the importance that this issue has been winning worldwide, due to the combination of the three key components involved (environment, economy and society) - some sustainability Certification Systems have been created matching the growing needs to promote qualified and sustainable building environments. These systems are based on sustainability indicators on the three key components.

Although certification systems for construction are fairly consolidated, there is still some lack of definition in the indicators type and in the quantification methods, in respect to urbanization.

Nevertheless, at the city scale, several methodologies for the selection and quantification of urban sustainability indicators have been applied widely in the analysis of the existing spaces and begin to be incorporated in plans and urban development projects. In certain countries like UK, USA and Japan, between others, these methodologies have already been implemented in certification systems in order to recognize sustainable construction and building environment.

At the national level, and within this framework, a certification system developed by the Department of Civil Engineering and Architecture at the 'Instituto Superior Técnico' has been developed, called LiderA.

LiderA is a support system skilled for the evaluation and certification of sustainability in terms of buildings and in terms of exterior spaces and built-up areas, promoting the design, construction and management of sustainable spaces, based on the selection and measurement of sustainability indicators. LiderA is based in basic principles, which are divided into several areas of study which in turn are divided into many evaluation criteria.

Portuguese Municipal Regulations of Urbanization and Construction (RMUE's), operating at the local level of Portuguese municipalities, do not incorporate explicitly sustainability indicators.

This is the case of the Municipal Regulation of Urbanization and Construction of Coimbra.

Therefore, as one of the main objectives, this study develops an analysis aimed to find which of actual regulations in Coimbra RMUE correspond to sustainability indicators and/or are targeted to promote the quality of urban spaces. This set of indicators is compared with the available set of indicators already found by LiderA and in other published articles at international level.

The final aim is to have a list of urban sustainability indicators applied to sustainable urban planning (how to measure and which variables should be used) adapted to a municipality in Portugal, in this case to Coimbra. Then, with the results obtained it is possible to check which aspects require improvement and what measures must be implemented or adapted to achieve more effectively sustainable urban development objectives.

Moreover, a set of indicators for the parishes of Coimbra is choose, based on available statistical data (Census 1991-2001) and linked to the indicators commonly used in the certification of buildings and residential areas, in order to have an idea of some evolutionary spatial tendencies for these indicators.

The crossover between the indicators available in Census, its evolution and the list of indicators choose to characterize the urbanization sustainability, leads to an evaluation and forecast methodology to guarantee urban spaces sustainability, at the parish level.

Thus, through the case study of the Coimbra parishes, this research final aim is the definition, quantification and application of a set of indicators in the certification of urbanized areas.

This methodological approach could help to improvement the RMUE through a more precise definition of planning rules that allow the creation of more sustainable urban environment.

Besides the analysis to be performed at the parish level, some parishes that shows specific characteristics, in the point of view of sustainability, are chosen to be studied in detail.

The type of indicators used for the detailed study of one parish requires subdivision in statistical subsections, which apply the same type of indicators referred to the case of the parish, but also a new set of indicators to allow an analysis for a more detailed set of urban areas (neighborhoods, new lots and housing developments).

The analysis performed at the level of the parishes in the municipality of Coimbra make use to GIS software in order to highlight the differences in accordance with the indicators selected.

After this first exploratory analysis an econometric territorial study is conducted, showing trends in territorial performance for certain areas of the city, concerning the variables selected and its relations.

This analysis will be crucial for a city administration that advocates enforcement of municipal sustainable measures. Therefore it represents both innovation in Governance in Urban Policies and in Environmental Planning and Assessment.



Figure 1 – Coimbra municipality and its parishes – the case study

Keywords: urban sustainability indicators, sustainable development.