

Chapter 7

InViTo: An Interactive Visualisation Tool to Support Spatial Decision Processes

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ABSTRACT

Since spatial decision processes have to deal with large number of actors, opinions and interests, literature commonly agrees in recognising data sharing and communication as essential in achieving decisional tasks (Van den Brink et al., 2007; MacEachren et al., 2004). The following chapter describes a methodological instrument for managing data, namely the Interactive Visualisation Tool (InViTo). InViTo aims at supporting spatial decision-making processes by proposing a framework for data knowledge. Principally based on Grasshopper, a free plug-in for McNeel's Rhinoceros, InViTo combines GIS data with CAD drawings and raster images for generating interactive spatial visualisations. It is conceived to display in real time the relationships between the territory and planning choices; thus, it is particularly indicated for stimulating discussions and sharing information in collaborative processes. Its high flexibility allows its use in different case studies with a variety of purposes and scales. Innovative elements in approaching spatial decision processes are discussed.

INTRODUCTION

Spatial decision processes have to face several questions such as the number of tasks and interests, the uncertainties on scenarios and alternative options or the large variety of actors involved. This

wide range of issues to be considered makes spatial decision process a complex procedure. Meanwhile, this multifaceted framework goes against its own purpose, that is clearness and shared agreement among all participants. Building a common knowledge results a very difficult goal to achieve.

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Therefore, spatial decision processes have to use a mixed and confused income for generating a clear, fair and comprehensible outcome.

It has been generally agreed that spatial data visualisation, as known as geovisualisation, can provide a very useful support in such decision problems. Geovisualisation is largely used to create a common grammar among involved actors and a shared basis for generating discussions (Batty, Steadman & Xie, 2004). By the use of visual communication, it enables intuitive human skills, so that it proves to be a valid tool for showing information and thus supporting the spatial decision-making processes. In particular, geovisualisation enhances the process of evaluating alternative options and improving the information sharing among professionals (Van den Brink et al., 2007; MacEachren et al., 2004).

Although geovisualisation can be used to support planning and decision making processes, the sharing of information can often be limited by two main factors. Firstly many users have difficulties in reading data, especially if explained by tables, matrixes or databases, but even if represented by maps, diagrams and charts. Secondly, the presence of many actors means also different disciplines, knowledge, interests and, overall, different languages.

This chapter is intended to investigate the contribution and use of geovisualisation in supporting planning and decision-making processes as methodology for information sharing and data knowledge. In this context, a new methodology is presented for supporting the reasoning and enhancing the awareness in spatial decision processes. Based on the interactive visualisation of spatial data such as GIS ones, the method will propose a system for relating the questions to be solved with their spatial effect on land, thus improving the discussions and enabling the information sharing among participants involved within the decision processes.

BACKGROUND

Within the field of visualisation, there is a specific branch dedicated to spatial data visualisation, known as geovisualisation. It finds its deepest roots in cartography, but has developed together with computer science as a field of research and application since the eighties. In 1995 the International Cartographic Association (ICA) stated a Commission on Visualisation and Virtual Environments, after renamed Commission on Geovisualisation, establishing geovisualisation as a science which studies, by definition, the exploration and analysis of spatial information through interactive visual interfaces (<http://icaci.org/commissions>).

Geovisualisation, and more generally visualisation, is indeed considered a scientific discipline because it is not just a means of communication, but an instrument to build a path for arriving to knowledge (Van den Brink et al., 2007). Experience demonstrates that visualisation increases the assessment capability and the comprehension of urban dynamics during the decision process (Simao et al., 2009). It can enable forms of intuitive knowledge and can be a fruitful method to engage citizens and decision makers and make them aware of the elements under discussion (Kwartler & Longo, 2008).

Recently the concept of Visual Analytics (Thomas & Cook, 2005) and, even lately, the notion of Geospatial Visual Analytics (Andrienko et al., 2007, 2011) strengthened the conversation between human and computers conceiving the analytical reasoning as product of a multi-disciplinary research. Scientists from different disciplines such as statistics, geography, modelling, data mining or urban planning, convey their efforts in increasing the role of tools' users so that the solving of spatial problem could be facilitated by different techniques and technologies. Due to this cross-disciplinary research, geo-visual studies can expand user's gaze within highly complex

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