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The added value of Planning Support Systems: A practitioner's perspective

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ABSTRACT

Planning Support Systems (PSS) are geo-information based tools to support planning. Since the term PSS appeared for the first time in the late 1980s it has evolved into a serious academic subfield. In this debate, little systematic attention has been paid to the added value of PSS for planning practice. In particular the perspective of users requires more empirical attention. This paper attempts to fill this gap by answering the question: What is the practitioner's perception of the added value of PSS? In doing so we first develop a conceptual framework including the most important added values of PSS observed in the literature. Next, we describe an empirical study of the MapTable PSS, a support tool that is relatively frequently used in the Netherlands. Fifteen interviews were conducted and a Group Decision Room workshop was organized in order to systematically gather perceptions of users about the added value of this PSS. Added values that particularly emphasized are improved collaboration and communication among stakeholders, something which resonates with recent trends in planning. The added value of a better informed outcome is, somewhat surprisingly, considered less important. In order to deepen our understanding, we recommend more research in different contexts and with different tools.

1. Introduction

Since the term Planning Support Systems (PSS) appeared for the first time in the late 1980s (Harris, 1989) it has evolved into a serious academic subfield. PSS can be defined as '... geoinformation technology-based instruments that incorporate a suite of components that collectively support some specific parts of a unique professional planning task' (Geertman, 2008, p. 217). This corresponds to Klosterman's conception (1997, p. 47 – emphasis in original), for whom PSS 'includes only the computer hardware, software and related information *used for planning*'. The focus of PSS studies in the last two decades has been mainly on instrumental characteristics (Geertman, 2006; Geertman & Stillwell, 2004), due to the fact that the enormous improvements of models, software and hardware have made it much easier to connect these instruments to planning practices in a more flexible way. For instance, calculation time has become vastly shorter, making it possible to directly conduct impact analyses during a workshop (e.g. Dias, Kuipers, Rafiee, Koomen, & Scholten, 2013). Moreover, hardware improvements have opened up new opportunities, such as map-based touch tables (e.g. Hopkins, Ramanathan, & Pallathucheril, 2004; Pelzer, Arciniegas, Geertman, & de Kroes, 2013; Vonk & Ligtenberg, 2010) and theatre-like settings (Miller, Vogt, Nijnik, Brondizio, & Fiorini, 2009). Another example is the advent of microscopic models, which according to some scholars have the potential to significantly improve decision making (Rasouli & Timmermans, 2013).

These technological developments are exciting and open up a wealth of new possibilities. However, they might also obscure a significant research question in PSS: to what extent does the application of PSS improve planning? In a recent contribution, Te Brömmelstroet (2013) shows that case studies about PSS tend not to systematically test the claims stated about advantages for planning. In other words, most research in the field of PSS lacks systematic and rigorous attentionto the *added value* of PSS for planning practice, something that was already observed fifteen years ago for the field of GIS by Nedovic-Budic (1999). Hereby it should be noted that several case studies do assess the added value of the PSS they describe, albeit often in an implicit and not systematized way (see for examples: Geertman & Stillwell, 2009; Geertman, Stillwell, & Toppen, 2013). Added value is defined in this paper as: 'a positive improvement of planning practice, in comparison to a situation in which no PSS is applied'.

Traditionally, starting from the scientific-analytical or rational approach to planning (e.g. Salet & Faludi, 2000), the added value of PSS was mainly seen as improving the outcome of planning.

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The assumption was that the input of rational analysis and scientific insight would lead to better decisions and plans. However, in the last two decades the focus has shifted to the process of planning. This 'communicative' or 'collaborative' turn in planning (e.g. Healey, 1992; Innes & Booher, 1999) emphasizes social aspects like social interaction, participation and group dynamics. This notion has also been picked up in the PSS debate (Deal & Pallathucheril, 2009; Geertman, 2006; Klosterman, 1997). According to Klosterman (1997, p. 51 – emphasis in original), 'Planning Support Systems should facilitate *collective design* – social interaction, interpersonal communication and community debate that attempts to achieve collective goals and deals with common concerns'.

A logical follow-up question is how this added value with regard to the process of planning should be realized and measured. Boroushaki and Malczewski (2010) developed a quantitative procedure to measure the consensus reached with the tool *ParticipatoryGIS.com*. In addition, experiments with PSS allow careful study of the usability of tools (e.g. Arciniegas & Janssen, 2012; Jankowski & Nyerges, 2001). We consider all of these to be very relevant and valuable approaches but they do not fill the omission in the PSS debate with regard to the 'user perspective' (Geertman, 2008). This omission has two aspects. On the one hand, experiments, often done by students, teach us a lot about the usability of tools but not necessarily about the perceptions and habits in planning practice. On the other hand, while possible added values from adjacent disciplinary fields like sociology (Jankowski & Nyerges, 2001) and group psychology (Te Brömmelstroet, 2013) are very relevant conceptual buildings blocks, it is not a given that they can be transferred to the field of spatial planning (cf. Campbell, 1995). Increasing our knowledge base in this specific field of enquiry could significantly improve PSS development and research. We hereby acknowledge the importance and relevance of process-related concepts like communication and collaboration but argue that the added value of PSS should also be understood in terms of outcomes. In addition, what the added value of PSS is can only be analyzed by focusing on the perspective of the actual users. As Campbell (1995, p. 104) states: 'technologies do not function independently of their environments, rather, they gain meaning only as individual staff members in a particular cultural and organizational context interact with them'. Hence, the central question of this paper is: What is the practitioner's perception of the added value of PSS?

To answer this question, the paper is structured as follows. In section two, we will conduct a literature review, describing the state of the art in the literature with respect to the added value of PSS and then develop a conceptual framework. Next, we will describe a study of the experiences of frequent users of a PSS in the Netherlands, in which we analyze the perceived added value through a combination of semi-structured interviews and a digitally supported group interview in a Group Decision Room (GDR). In section four, the findings of this empirical study are presented. Next, we will reflect on these findings and relate them to the existing literature and the chosen method. The paper will end with conclusions and recommendations for future research.

2. Literature review: the added value of PSS

In the last decade a significant body of literature has been developed about PSS, in particular in edited volumes (e.g. Brail, 2008; Brail & Klosterman, 2001; Geertman & Stillwell, 2003; Geertman & Stillwell, 2009; Geertman et al., 2013; Stillwell, Geertman, & Openshaw, 1999) and journal articles (e.g. Geneletti, 2008; Pettit, 2005). Two kinds of contributions can be discerned in this debate. On the one hand there are case studies describing an application of a PSS in a specific context. These studies often focus on the technical and instrumental aspects of a PSS, such as the underlying models (e.g. Geneletti, 2008; Klosterman, 1999). On the other hand, there is a range of overview articles, attempting to interpret trends in the field and connect PSS to abstract and theoretical considerations (Couclelis, 2005; Geertman, 2006; Geertman & Stillwell, 2004; Klosterman, 1997; Vonk, Geertman, & Schot, 2005). In these studies added value is often conceived as 'potential', implying that, compared to current practice, PSS can be much better utilized to support planning than is the case at present. Conversely, the question permeating these studies tends to be how PSS could be used more and in a better way. In this paper, we approach this issue differently. Rather than framing the issue in terms of underutilized potential, we ask the question: given that a PSS is applied, how do its users perceive the contribution (i.e. added value) to their daily planning practice?

In a relevant recent contribution in this journal, Te Brömmelstroet (2013) develops a framework to measure the added value of PSS.[1] This framework is based on an overview study by Rouwette, Vennix, and Van Mullekom (2002) about Group Model Building (GMB). GMB applies collaborative modeling in order to better understand the problem at hand, support group processes and develop interventions. Although it has a different focus – in particular: it isn't GIS-based – it has a lot in common with PSS. The fields of GMB and of PSS are both about supporting policy development processes through the use of dedicated instruments. Inspired by these studies, we developed a framework consisting of three levels: the individual level, the group level, and the outcome level. Below, we describe the main added values at each of these three levels.

2.1. Individual level

The central added value of PSS at the individual level is learning (Amara, Ouimet, & Landry, 2004; Innes, 1995). Two main types of learning can be distinguished:

(1) Learning about the *object* of planning. What is the problem and what are its causes? And what is the possible effect of planning interventions? Van der Hoeven, van der Aarts, van der Klis, and Koomen (2009, p. 162), for instance, show how their Land Use Scanner PSS helps individuals to gain more insight into flood risks: 'The system is developed to support the discussion on the long-term adaptability of the Netherlands to flood risk. It aims to facilitate the learning of the user on the subject, instead of giving unambiguous answers on what management strategy is preferable'.
(2) Learning about the perspective of *other stakeholders* in planning. For instance, an expert could learn about a resident's perspective (Kahila & Kyttä, 2009), a land-use planner about a transport planner's perspective (Te Brömmelstroet, 2010), whereas a designer has much to learn about a geographer's perspective (Steinitz, 2012). An example of these perspectives are 'frames' held by different stakeholders, such as 'analysis', 'design' and 'negotiation' (Carton & Thissen, 2009, cf. Pelzer et al., 2013). Reflecting on these frames provides more insight into how other stakeholders act and think (Innes & Booher, 1999; Schön & Rein, 1994).

2.2. Group level

Based on literature about PSS (e.g. Boroushaki & Malczewski, 2010; Te Brömmelstroet, 2013; Vonk & Ligtenberg, 2010), planning (e.g. Innes, 1998; Innes & Booher, 1999) and GMB (Rouwette et al.,

[1] Note that Te Brömmelstroet (2013) uses the term 'performance' rather than 'added value'. However, we consider the two terms to be essentially identical.