

## Chapter 35

# Design of Interactional Decision Support Applications for E-Participation in Smart Cities

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### ABSTRACT

*Nowadays, the number of human to application system interactions is dramatically increasing. For instance, citizens interact with the help of the internet to organize meetings spontaneously. Furthermore, standards such as Business Process Model and Notation (BPMN) and the Decision Modeling Notation (DMN) allow the creation of graphical models to document the (interaction) processes. Moreover, simulations and automations can be set up to encounter new technical challenges. Smart Cities aim at enabling their citizens to use these digital services. However, looking beyond technology, there is still a significant lack of interaction and support between “normal” citizens and the public administration. This article introduces an approach, which describes the design of enhanced interactional applications for decision support in Smart Cities based on Dialogical Logic process patterns. The authors demonstrate the approach with the help of a use case concerning a budgeting scenario as well as a summary and outlook on further research.*

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## 1. INTRODUCTION

This article is an extended version of (Ortner, Mevius, Wiedmann, & Kurz, 2015). Nowadays organizations and public administrations are strongly affected by the so-called digital revolution.

For example, the usage of instant messaging, social media, e-mail and wikis are common ways to transfer internal knowledge (Ortner et al., 2015). Therefore, information technology (IT) influences the interaction of people and leads to a faster exchange of information. As one result, also Smart Cities are confronted with these new challenges.

The term “Smart Cities” has been variously defined and discussed in the literature (Anthopoulos, 2015; Gaggioli, 2014; Neirotti, Marco, Cagliano, Mangano, & Scorrano, 2014; Santis de, Fasano, Mignolli, & Villa, 2014). These definitions have a common aspect of Smart Cities, which is the integration of information technology (IT) into the “daily life” of public administration and citizen interaction.

For this purpose, Smart Cities aim at enabling their citizens to use these digital services, e.g., by providing enhanced web applications and network infrastructures maintained by the public administration (e.g. “Code of America” (Code for America Labs, 2015) and “Free Wireless Hotspots Munich (Stadtwerke München GmbH, 2015)). Furthermore, Smart Cities provide different options of collaboration, e.g., in form of electronic governance (e-governance) to improve internal and external functioning (Boughzala, Janssen, & Assar, 2015). This leads to a closer interaction between the public administration and the citizens (Ma & Xi, 2014). For instance, decisions (e.g. how to use disposable budget) can be made more transparent and fair. Application systems provide a wide set of functionalities supporting the interaction processes of all participants. In fact, several web portals and mobile applications have been developed during the last period in the context of e-public administration.

However, looking beyond technology, a significant lack of interaction and support between “normal” citizens and the public administration still exists. Often, the development of application systems is just focused on the software and hardware implementation (Janssen & Estevez, 2013). Moreover, even if application systems have been used to support interaction processes, the decision making by consensus have not been satisfying. Therefore, the research question is, how the Dialogical Logic approach can enhance the Smart City application systems design?

This article describes an approach for using Dialogical Logic to develop enhanced interactional application systems for Smart Cities. Dialogical Logic can enhance the interaction between all participants, e.g., citizens and public administration. Especially, in areas with critical human work or high collaboration a detailed investigation of interaction is required to extract a fair and transparent result (cf. (Wegner, 1997)). Dialogical logic is based on the operative approach of constructive logic (Laurent, 2011; Lorenzen, 1987). In “dialogical games” two interaction partners compete with each other. For winning a dialog, the proponent (interaction partner who started the dialog) must not absolutely know if the elementary propositions are true or not (Görz, 2005). This option – having a “non liquet” status – can be used in the context of Business Process Management (BPM) too. BPM defines the management of business processes using methods to design, enact, control and analyze business processes (van der Aalst, W.M.P., 2004). Therefore, “non liquet” does not define an additional value. The term defines only that there is no definite status decided yet. Thus, modeled decision rules become more “flexible”. This constructive approach allows more creativity (Fischer, Grollius, & Ortner, 2010) within the interaction process activities and leads to a more understandable result of executed business processes.

In other words, the application development from a Dialogical Logic point of view is the next step toward interactional application system. Applying the rules of the Dialogical Logic, interactions (e.g.

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