

Chapter 19

Modelling and Simulation

Perspective in Service Design: Experience in Transport Information Service Development

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ABSTRACT

This chapter discusses the development of improved citizen services taking into consideration integration of agent-based modelling and simulation experience into conceiving, design and implementation activities with a strong focus on technology enabled service systems. Service design is formalized here towards the integration of customer experience, validated through service interaction modelling. Integration of user experience at design stage in the value co-creation process is a possible immediate evolution direction of projects in the Smarter Cities perspective. Guidelines for integrating a modelling and simulation perspective in service design are presented along with the Socio-Technical Systems Engineering process. The case study presented here is dedicated to Smart Transport. The chapter opens a larger discussion on specific research directions and knowledge transfer related to Smart Transport as highlighted in EU projects.

INTRODUCTION

The speed at which cities are developing to become larger crowded ecosystems is raising several questions on future urban sustainability. The Smarter Cities concept is considered today a development framework to foster urban sustainability (Angelidou, 2014; Wolfson, Mark, Martin, & Tavor, 2015). A city may be called smart “when investments in human and social capital and traditional (transport) and

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modern (ICT) communication infrastructure fuel sustainable economic growth and a high quality of life, with a wise management of natural resources, through participatory government” (Caragliu, Del Bo, & Nijkamp, 2009).

A large infusion of ICT is generally considered to be needed in order to integrate services that position cities as promoters of citizens’ well-being. Their quality of life is definitively increasing as a result of service interactions that are supported through the development of different types of service systems (Spohrer, 2010). At the same time, many solutions that are imagined and introduced in common practice today to solve the problems confronting cities involve *systems of systems* (SoSs) integration (Zeigler & Sarjoughian, 2013). Among these one can mention complex information and technology based systems dedicated to business, engineering, integrating infrastructures to support social needs, in diverse domains like healthcare, education, transport, water management, energy, environmental monitoring, manufacturing, to name but a few.

In each of these domains, in the Smarter Cities perspective, specific solutions are aiming to integrate urban systems, to streamline resource utilization and improve user experience, specifically conceiving new service interactions to innovate the way of engaging with service customers (Dörner & Edelman, 2015; Drăgoicea, 2016). This development direction strives to use smart technologies in order to create personalized service customer journeys, to increase the level of automation in service interactions, and to innovate interaction modes able to create more information and foster value co-creation processes to support urban sustainability.

Already gained experience in Smarter Cities projects reveals different stakeholders’ perspectives, such as those ones regarding people living in cities, technology and service companies, or city governance authorities. Citizens’ increased awareness about environment, about services they benefit from city governance, about interaction with these service systems at city level, or about costs of using resources and installing service technology is challenging. In this development direction, designers imagining Smarter Cities solutions are facing many questions, such as: What is the best way to select and deploy technology? Where to deploy it? At what costs? Is it fostering service customer engagement? Does it support customer interaction through real-time automation of service activities? Are people provided with tools to increase citizens’ awareness and shape their urban environment?

As a consequence, the focus of future cities is reoriented today from high-tech to people-centric approaches, and sustainable support is dedicated to the creation of environments best suited for the well-being and comfort of the primary category of stakeholders of smart cities, the citizens (Monsoor, 2015).

This book chapter suggests that the integration of user experience at design stage in the value co-creation process is a possible immediate evolution direction of projects in the Smarter Cities perspective. This activity requires *information based design for improved interaction in services*. The promoter that fosters the design of the requirements of the new and innovated services is agent technology. Specifically, this chapter deals with the domain of city transport, which is approached from the point of view of urban mobility.

The chapter describes the application of the Socio-Technical Systems Engineering (STSE) process introduced in (Drăgoicea, Cunha, & Patrascu, 2015) for smart transport service design and development. The STSE process, a Modelling and Simulation Based Systems Engineering (M&SBSE) process, guides improved design aiming to capture value co-creation service interactions embedding customer experience in service design and delivery activities. Socio-technical systems research evolved lately as an exploration direction aiming to define the concept of smartness from three related socio-technical systems perspectives: polycentric systems, viable systems, and service systems (Spohrer, Bassano, Picicocchi, &

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