Investigating E-Planning in Practice: Applying the Unified Theory of Acceptance and Use of Technology Model

Wayne Williamson, Faculty of the Built Environment, University of New South Wales, Kensington, NSW, Australia
Bruno Parolin, Faculty of the Built Environment, University of New South Wales, Kensington, NSW, Australia

ABSTRACT

In the authors' previous article (Williamson & Parolin, 2012) the authors used data collected through case studies and the application of Actor-Network Theory (ANT). In this article, the research approach taken is an online questionnaire of staff in government and private practice. The questionnaire data was analysed using the Unified Theory of Acceptance and Use of Technology (UTAUT). The UTAUT results found that in order for Information and Communication Technology (ICT) applications to be widely accepted by planners, the organizations in which they work need to address performance expectancy and facilitating conditions as priorities. Although the research methods of ANT and UTAUT used in this research are vastly different, results have been found to be somewhat complimentary.

Keywords: E-Planning, Geographic Information Systems, Information Technology Adoption, Planning Support Systems, Unified Theory of Acceptance and Use of Technology (UTAUT)

INTRODUCTION

Research suggests that a mismatch exists between the supply and demand of Planning Support Systems (PSS) that result in an underutilization of software by planners (Geertman, 2008). Further, Vonk et al. (2005) argues that because demand is lagging behind the supply, PSS are not reaching maturity due to a slow product life cycle that does not benefit from an information feedback loop from real-world examples, which may be referred to as the PSS implementation gap. While research addresses the utility of PSS in research-based scenarios, there is limited research on the demand side factors involved in the adoption and use of PSS in practice (Geertman, 2008).

This article seeks to address the following question: How does the application of socio-technical research methods enhance our understanding of the acceptance and use of Planning Support Systems. The approach taken by this research to data collection and analysis is an online questionnaire of planners.
and Geographic Information Systems (GIS) staff working in local and state government and private practice in the Australian state of New South Wales (NSW). The questionnaire data was analysed using a structural equation modelling (SEM) technique under the Unified Theory of Acceptance and Use of Technology (UTAUT) framework. The results of this analysis technique and results from Williamson and Parolin (2012) are then compared.

LITERATURE REVIEW

PSS are typically designed to support the planning process and are usually based on several technologies, while using a common interface (Harris, 1989; Harris & Batty, 1993; Klosterman, 2001; Geertman & Stillwell, 2004; Geertman, 2006). There are three general types of PSS distinguished by the literature; informing, communicating and analysing PSS (Geertman & Stillwell, 2004; Klosterman & Pettit, 2005). Informing PSS aim to make information accessible through a flow of information to the user. Communicating PSS aim to facilitate communications and discussions amongst participants in the planning process, while analysing PSS attempt to facilitate advanced processing of data for simulation and evaluation purposes.

Klosterman (2001) predicted that increased use of PSS would be aided by the rapid development of computer hardware and software; however, an inventory of PSS conducted by Geertman & Stillwell (2004), concluded that the majority of PSS had not progressed past the prototype stage, with little evidence of PSS reaching stages of maturity and use in planning practice. The situation is considered somewhat surprising as a small number of PSS have reached a level of maturity that allows them to be sold as off-the-shelf software tools, typically as ArcGIS plug-ins (Klosterman & Pettit, 2005; Geertman, 2008). Couclelis (2005) argues that the role of land use modelling remains problematic, especially in respect to future orientated scenario planning. Furthermore, PSS developers have some role to play in this situation as they have not provided the tools that planners really need. Geertman & Stillwell (2004) concluded that PSS should meet user and context requirements, including multiple levels of expertise, interdisciplinary perspectives, effective outputs for users, flexibility to focus on different problems and finally a need for more real-world experiences.

Vonk et al. (2005) found in their initial survey results that planning practitioners have little awareness of PSS type tools, which leads to low intentions to start using PSS among possible users. Vonk et al. (2007a) then built on these initial findings with follow-up interviews and a literature review, which concluded that PSS is in an early growth stage, with evidence of this found in some positive experiences by planners with PSS, and more critically, PSS tools are quite complex, while planners are calling for simple tools.

Vonk et al. (2007b) turned their attention to applying an information systems research theory known as the Technology Acceptance Model (TAM) to investigate the formal and informal paths of adoption in a select group of planning organizations in the Netherlands. Their conclusions highlighted that informal employee innovation pathways are used for geographic and information-based software tools in these organizations. Staff are reluctant to use formal pathways because they perceive the formal strategy as less rational than their own ideas; secondly, they do not experience enough social pressure to pursue formal pathways and finally, their own ideas do not have a great influence on formal pathways. The authors concluded by suggesting that organizations need to adopt a learning culture using knowledge management and employ staff with innovation management skills. Pettit et al. (2008) also found that planners struggle to understand the outputs of PSS and that the introduction of PSS into planning education may help.

More recently, te Brömmelstroet and Schrijen (2010) suggests that PSS developers do not understand the relevance of PSS to daily planning activities; therefore, planners must be heavily involved in the design and analysis

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