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ScienceDirect
Decision Support Systems 45 (2008) 228–241
Decision Support Systems
www.elsevier.com/locate/dss

Examining the effects of cognitive style in individuals' technology use decision making ☆

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Available online 20 February 2007

Abstract

In this study, we examine individuals' acceptance of a new technology by proposing and testing a factor model that incorporates cognitive style and specifies its plausible effects on essential acceptance determinants. The data from 428 subjects fit the model satisfactorily and support all of its suggested hypotheses. Cognitive style shows significant direct effects on perceived usefulness, perceived ease of use, and subjective norms. Both perceived usefulness and subjective norms affect actual technology usage significantly. People with innovative cognitive styles are more likely to perceive a new technology as useful and easy to use than are those with adaptive cognitive styles.

Keywords: Technology acceptance; Technology use; Cognitive style; Individual differences

1. Introduction

Investigations of technology acceptance by target users have received considerable attention from information systems (IS) researchers and practitioners. Several theoretical models and frameworks attempt to explain or predict a person's decision to accept a new technology. Of particular prevalence are the technology acceptance model (TAM) [25], the theory of planned behavior (TPB) [5], the self-efficacy theory (SET) [9], and the innovation diffusion theory [66]. A review of extant literature suggests a common focus on the effects of individual characteristics, such as innovativeness [2], intrinsic motivation [83], self-efficacy [23], anxiety [34], gender [81], and age [57]. The cumulative evidence from prior research suggests that these characteristics can affect people's attitudinal beliefs, perceptions, and assessments of a new technology.

According to cognitive appraisal theory, individual cognitive traits, the social environment, and information use can affect a person's interpretation of an ambiguous environment [68]. To examine the potential impacts of cognitive traits on people's interpretations of an environment, previous research has taken a cognitive perspective toward organizational information processing and suggested the relevance of cognitive style, a fundamental personal trait generally referring to the relatively stable mental structures or processes that a person prefers to use when perceiving or evaluating information [41,58]. Results from prior studies show that cognitive style can affect a person's decision making and behavior significantly [e.g., 29,34,53,84]. Conceivably, people vary in their cognitive style, and such differences may influence their technology acceptance decision making.

☆ A Research Manuscript to Appear in *Decision Support Systems*.
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doi:10.1016/j.dss.2007.02.003

Accordingly, it is important to investigate the relationship between cognitive style and technology acceptance decision making. Equipped with a better understanding of that relationship, technology professionals and business managers could design more effective training programs or management interventions to foster technology acceptance among targeted users.

Cognitive style has been studied in the context of organizational technology implementation (e.g., [14]), but its effects on technology acceptance by individuals have received little research attention. Several previous studies, including [32,37,85], point to the importance of cognitive style in the context of individuals' technology acceptance decision making, which deserves continued research efforts for both conceptual analysis and empirical testing. We propose a factor (variance) model to explain individuals' acceptance of a new technology. Our model incorporates the effects of cognitive style and is tested empirically using evaluative responses from 428 undergraduate students. The technology we study is Microsoft (MS) ACCESS™, a commonly available database technology capable of addressing our subjects' data management needs at work or school (e.g., school assignments, organizing data/information of interest). Our model development synthesizes relevant previous research and analysis of important acceptance determinants that are specific to the user acceptance phenomenon under investigation. From a theoretical aspect, our model is rooted in the TAM, the TPB, and SET. We conducted a large-scale survey to test the model holistically and the individual causal paths it suggests. Overall, we posit that cognitive style has important direct effects on perceived usefulness, perceived ease of use, and subjective norms, and that perceived usefulness and subjective norms jointly explain an individual's actual use of a (new) technology.

The remainder of the paper is organized as follows: in Section 2, we review relevant previous research and highlight our motivation. In Section 3, we describe our research model and discuss the specific hypotheses tested in this study, followed by details about our study design and data collection procedure in Section 4. We discuss important analysis results and their implications in Section 5. We conclude with a summary, discussions of the study's contributions and limitations, and some future research directions in Section 6.

2. Literature review and motivation

User technology acceptance has been examined from different theoretical aspects. Of particular importance is the TAM, a generic model specifically developed to explain or predict individuals' acceptance of computer-based systems in various scenarios or organizational contexts [25]. The TAM is adapted from the theory of reasoned action (TRA), an established social psychology theory capable of explaining a wide range of human behaviors [30]. The cumulative empirical results pertaining to the TAM are reasonably strong and exhibit satisfactory power to explain initial user acceptance across different technologies, organizational contexts, and user groups. According to the TAM, perceived usefulness and ease of use are critical to an individual's technology acceptance decision making. In general, perceived usefulness reflects an individual's subjective estimation of the job performance enhancement that is likely to result from the use of a new technology, whereas perceived ease of use refers to the degree to which he or she expects the use of the technology to be free of effort [27].

Although it remains popular and has accumulated reasonable empirical support, the TAM has been criticized for its parsimony. Do perceived usefulness and perceived ease of use provide sufficient utilitarian value for advancing our understanding of individuals' technology acceptance decision making or improving technology design and management practices? According to some previous studies (e.g., [56]), the TAM is easy to use and can measure general-level user acceptance across a broad range of users and technologies, but it does not provide sufficient insights into why people accept or reject a new technology or generate specific results that can lead to better system designs. This suggests the importance of investigating and empirically testing the essential determinants of perceived usefulness and perceived ease of use in a targeted user acceptance scenario.

Considerable prior research that conceptualizes decision-making processes neglects important characteristics of individual decision makers by assuming that people process information or arrive at decisions in a similar manner [cf. 50]. Consequently, the resulting analyses or models exclude those factors representing individual differences that might in effect influence the actual decision-making process and its outcomes [18,65]. In the context of user technology acceptance, the TAM is limited in the particular factors that determine perceived usefulness and perceived ease of use [78]. Similarly, important variables that can represent individual differences are not included in either the TAM or the TRA, though the TRA attempts to capture the effects of individual differences through an expectancy belief formation [2,3]. Therefore, research models should consider and test essential individual