



Research Report

Relating motivation to information and communication technology acceptance: Self-determination theory perspective



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ARTICLE INFO

Article history:

Available online 1 June 2015

Keywords:

Human motivation
Information and communication technology
Technology acceptance
Self-determination theory

ABSTRACT

Despite a large body of research on motivation in psychology, few in information systems have related it to the information and communication technology acceptance research. This study investigates the relationship between the Self-Determination Theory of Motivation and the Unified Theory of Acceptance and Use of Technology (UTAUT) Model and confirms significant relationship across the two theories. In addition, this study investigates the effect of time sequential introduction of different types of motivation and finds the presence of the negative effect between intrinsic and extrinsic motivation is conditional on the type of extrinsic motivation. *Controlled extrinsic motivation* undermines intrinsic motivation that precedes it, but *autonomous extrinsic motivation* augments such intrinsic motivation. Implications of these findings are discussed.

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1. Introduction

Information and communication technology (ICT) has become a pivotal part of the daily work of knowledge workers (Arsal, Thatcher, Zagenczyk, McKnight, & Ahuja, 2009; Bloom, Garicano, Sadun, & Van Reenen, 2014). Since 1980s, about 50% of capital investment in organizations has been in ICT (Spiezia, 2013). However, despite the expectation of productivity gain and enhanced competitiveness through ICT, user acceptance of ICT in the workplace has been by no means universal (Hwang & Lee, 2012; López-Nicolás, Molina-Castillo, & Bouwman, 2008).

Theories of motivation could provide an important perspective from which to study ICT acceptance behavior as they could help us answer questions such as *What are the factors motivating the use of technology?* and *How do different types of motivation interact with each other?* Large bodies of motivational research exist in many disciplines including psychology (Deci & Ryan, 2000; Ryan, Huta, & Deci, 2013), economics (Festré & Garrouste, 2014), marketing

(Kim, Park, & Oh, 2008; Muk & Chung, 2015), and management (Osterloh & Frey, 2000; Reinholt, Pedersen, & Foss, 2011). Yet the relationship between a motivation theory and ICT acceptance behavior has not been studied much with some exceptions (Hung, Durcikova, Lai, & Lin, 2011; Shim, Chae, & Lee, 2009; Venkatesh & Speier, 2000). Investigating motivational factors and their influences are crucial since they can be directly implemented into applications to increase their usage.

This study has two research objectives. The first is to examine the motivational determinants of two major ICT acceptance variables such as *Performance Expectancy* and *Perceived Enjoyment* based on self-determination theory (Deci & Ryan, 1985). Typically in the ICT acceptance studies that examine the motivational aspect, *Performance Expectancy* has served as a surrogate construct for extrinsic motivation and *Perceived Enjoyment* as that for intrinsic motivation. However, there was little attempt to relate these constructs to the constructs of a specific motivation theory. Therefore, how motivation affects these surrogate constructs is yet to be investigated. Based on self-determination theory, a major theory in motivation research, suggesting three determinants of human motivation – *Autonomy*, *Relatedness*, and *Competence* (Vallerand, Fortier, & Guay, 1997), we investigate the relationship between these determinants and the ICT acceptance constructs.

The second objective of this study is to investigate the effect of sequential introduction of different types of motivation in order to gain a deeper understanding of the relationship between human

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motivation and technology acceptance. In previous ICT acceptance studies on intrinsic/extrinsic motivation, the sequential effect of the intrinsic and extrinsic motivation was never explicitly studied. However, there is substantial evidence from the psychological experiments performed by Deci and his colleagues (Deci, Koestner, & Ryan, 1999) showing the negative effect of extrinsic motivation on intrinsic motivation preceding it. Therefore, this study examines the potentially undermining effect of extrinsic motivation on intrinsic motivation in the ICT acceptance context when they are sequentially introduced. Furthermore, we examined the effect by dividing extrinsic motivation into autonomous and controlled extrinsic motivation, which has been speculated to provide different effects to intrinsic motivation (Vallerand, 1997).

2. Research background

Motivation theory is widely applied in psychology to explain human behavior. One of the main distinctions that motivational researchers make is between intrinsic and extrinsic motivation (Deci & Ryan, 1985). Intrinsic motivation is a drive that “deals with behavior performed for itself, in order to experience pleasure and satisfaction inherent in the activity” (Vallerand, 1997, p. 271). Increased intrinsic motivation is related to an individual’s willingness to spend more time on a task, creates an affective mood, results in effective learning, and leads to a certain behavior (Ho & Kuo, 2010; Hung et al., 2011; Parayitam, Desai, Desai, & Eason, 2010). On the other hand, extrinsic motivation is a drive that “involves performing behavior in order to achieve some separable goals, such as receiving rewards or avoiding punishment” (Vallerand, 1997, p. 271). Extrinsic motivation has been known to enhance performance and productivity (Ryan & Deci, 2000b). During the past three decades, over 800 studies have been performed on the effects of intrinsic and extrinsic motivation on behavior (Deci et al., 1999). Many of these studies have been based on and led to the refinement of the self-determination theory.

2.1. Self-determination theory

Self-determination theory (Ryan & Deci, 2000a, 2000b) assumes that “humans have the basic propensities to be intrinsically motivated, to assimilate their social and physical worlds, to integrate external regulations into self-regulations, and, in so doing, integrate themselves into a larger social whole” (Ryan & Deci, 2000b, p. 14). The theory consists of two sub-theories: Cognitive evaluation theory and organismic integration theory. Cognitive evaluation theory investigates the driving factors of human behavioral motivation and the conditions that undermine or elicit intrinsic motivation, while organismic integration theory examines different types of extrinsic motivation and conditions that promote or hinder extrinsic motivation.

2.1.1. Cognitive evaluation theory

Cognitive evaluation theory (Deci & Ryan, 1985) specifies factors that affect variability in motivation and explains the undermining effects of extrinsic motivation on intrinsic motivation. The theory proposes that the needs for *Autonomy*, *Relatedness*, and *Competence* are three facilitators of human motivation. Vallerand (1997) defined the three facilitators as follows:

The need for *Competence* implies that individuals have a desire to interact effectively with the environment in order to experience a sense of *Competence* in producing desired outcomes and preventing undesired events. The need for *Autonomy* reflects a desire to engage in activities of one’s own choosing, to be the origin of one’s own behavior. Finally, the need for *Relatedness* involves feeling

connected (or feeling that one belongs in a given social milieu) (Vallerand, 1997, p.300).

The effects of these factors have been verified through previous experimental and field studies. For example, Akbari, Pilot, and Simons (2015) found that the effects of *Competence* enhanced intrinsic motivation and extrinsic motivation. Custers, Westerhof, Kuin, Gerritsen, and Riksen-Walraven (2012) found a positive relation between *Relatedness* and intrinsic motivation. *Autonomy’s* significant positive effects to intrinsic motivation are also addressed through several studies (Brophy, 2004; Ryan & Deci, 2000a).

Deci and his colleagues (Deci & Ryan, 1985; Ryan & Deci, 2000a, 2000b) also found a negative effect of extrinsic motivation on intrinsic motivation when extrinsic motivation is introduced for a task that is intrinsically motivating. For example, when experimental subjects received rewards, such as money or prizes for participating in an interesting activity (e.g., completing puzzles or drawing), they tended to lose interest in the activity and were less willing to work on it after the extrinsic rewards were terminated. This result is supported by cognitive evaluation theory, which asserts that when a person comes to perceive his/her behavior as controlled by external motivation, it will lead to a decrease in intrinsic motivation. That is, the provision of an extrinsic motivation drives a shift in locus of causality for the original task from internal to external (Chen & Jang, 2010; Deci & Ryan, 1985). This undermining effect has been supported by several meta-analyses (e.g., Deci et al., 1999).

2.1.2. Organismic integration theory

Based on the proposition that extrinsic motivation can vary in its relative autonomy (Vallerand, 1997), organismic integration theory identifies and defines different forms of extrinsic motivation, and addresses the contextual factors that either promote or hinder internalization and integration of the regulation for those behaviors (Ryan & Deci, 2000a). Vallerand (1997) classifies and proposes four types of extrinsic motivation: *external*, *introjected*, *identified*, and *integrated regulation*. The *external regulation* and *introjected regulation* are called a controlled motivation composite, and *identified regulation* and *integrated regulation* are called an autonomous motivation composite. Each extrinsic motivation is defined as follows:

External regulation refers to the behavior for which the locus of causality is external to the person, for example, the offer of rewards. . . *Introjected regulation* refers to behavior that taking in a regulation but not fully accepting it as one’s own, for example, promised rewards. . . *Identified regulation* occurs when the person has come to value the behavior and has identified with and accepted the regulatory process, and thus it becomes fully a part of the self. . . *Integrated regulation* involves emitting an activity choicefully, and fully integrating it with the individual’s coherent sense of self such as values, needs, and identities (Deci & Ryan, 1991, pp. 328–330).

These different types of extrinsic motivation have been known to have distinct effects on intrinsic motivation. In particular, previous studies (Ryan & Deci, 2000b) have found that: when the extrinsic motivation is perceived as a controlling aspect (*external* and *introjected regulation*), it undermines intrinsic motivation. On the other hand, when the extrinsic motivation is perceived as an autonomous aspect (*identified* and *integrated regulation*), it has been found to enhance the intrinsic motivation. The theory proposes that the controlling aspect of extrinsic motivation stimulates external perception of locus of causality (i.e., the sense that the behavior stems from a source outside the self (Ryan & Deci, 2000b), while the autonomous aspect of extrinsic motivation stimulates the internal perception of locus of causality (i.e., the sense that the behavior stems from sources inside the self).

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