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# Antecedents of computer self-efficacy: A study of the role of personality traits and gender

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ABSTRACT

Empirical evidence suggests that computer self-efficacy plays an important role in one's acceptance and use of new information technology. Little is however known about the antecedents of computer self-efficacy. This paper reports on a study of 143 non-users of a self-checkout library system available at a large Canadian university which was conducted to investigate the relationships between stable personality traits and gender with computer self-efficacy. Results indicate that four of the five stable personality traits, as measured by the Big-5 factors of personality, contribute to explain computer self-efficacy. Taking gender into account, results show that the traits of neuroticism, extraversion, and agreeableness are significantly related to computer self-efficacy for women but not for men. Implications for research and practice are discussed.



## 1. Introduction

Information technology (IT) has become ubiquitous in organizations where an enormous expenditure of time, capital, and effort is invested yearly in IT. However, no information technology regardless of its quality and technical merits can be effective if it is not used (Mathieson, 1991). As the benefits and impacts of IT are contingent upon the extent to which users appropriate and use these technologies in their ongoing work activities, performance gains can be impeded by individuals' unwillingness to use the available IT (Beaudry & Pinsonneault, 2005). Furthermore, the problem of underutilized IT has been widely researched and low usage has been listed as one of the underlying causes behind the productivity paradox (Venkatesh & Morris, 2000).

Given the importance of individual acceptance and usage in relation to IT impacts, the development and testing of models that may aid in predicting IT use has been a primary concern for IT researchers since the mid-eighties. Furthermore, understanding the conditions under which information technology is accepted and used within organizations remains one of the most prominent issues in IS research (Beaudry & Pinsonneault, 2005; Venkatesh & Morris, 2000).

Many models of user acceptance can be categorized as intention-based models, which build their analyses on how characteristics of the technology and its use are perceived by the target users (Chau & Hu, 2002; Davis, Bagozzi, & Warshaw, 1989; Sánchez & Hueros, 2010). Computer self-efficacy (CSE) is defined as a "judgment of one's capability to use a computer" (Compeau & Higgins, 1995, p. 192) and thus focuses on users beliefs regarding their own abilities. The study of CSE with respect to behavioural intention to use new IT is particularly interesting because it presents a more humanistic viewpoint to the discussion. It provides a distinctive approach from the more techno-centric models, such as the Technology Acceptance Model (Davis, 1989) which examine how users perceive the characteristics of the technology.

Computer self-efficacy has been shown to play an important role in one's decision to use a new IT (Compeau, Higgins, & Huff, 1999; Shih, 2006). It also has been shown to both directly (Venkatesh, Morris, Davis, & Davis, 2003) and indirectly (Kwon, Choi, & Kim, 2007; Venkatesh & Davis, 1996) influence behavioural intention to use new IT. While several studies have examined the relationship between computer self-efficacy and IT acceptance, little is known with regard to the antecedents of computer self-efficacy (Agarwal, Sambamurthy, & Stair, 2000; He & Freeman, 2010).

Dispositional factors such as personality traits and gender, accounted for in disciplines such as education, management, organizational behaviour, and psychology, are left largely unexplored in the IT literature. Some research has nevertheless shown that gender differences play an important role in the relationship between individual perceptions and intention to use new IT (Gefen & Straub, 2000; Sanchez-Franco, 2006; Venkatesh & Morris, 2000).

Some others have looked at the links between personality factors and the use of some IT applications like a commercial collaborative system (Devaraj, Easley, & Crant, 2008), Facebook (Ross et al., 2010) or cyberloafing (Krishnan, Lim, & Teo, 2010). However, relatively little is known about the role of such factors in the formation of IT-related beliefs, such as CSE. In order to gain a better

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understanding of the role of personality in IT-related behaviours, research is needed to examine how different stable traits, both broad and situation-specific, relate to constructs such as CSE that influence eventual computer use (Thatcher & Perrewe, 2002). The present study therefore aims at answering the following question: *What is the relationship between stable personality traits and CSE and does gender moderate this relationship?*

This paper is organized as follows. The next section summarizes the state of knowledge about CSE and stable individual differences, namely personality traits and gender. The research model is presented next along with the research hypotheses. The subsequent section discusses the research method and data analysis. Results are presented next followed by a discussion of their implications for research and practice.

## 2. Theoretical background

### 2.1. Computer self-efficacy

Self-efficacy is defined as "people's judgment of their capabilities to organize and execute courses of action required to attain designated types of performances. It is concerned not with the skills one has but with judgments of what one can do with whatever skills one possesses" (Imhof, Vollmeyer, & Beierlein, 2007). Self-efficacy not only reflects an individual's belief about his or her ability to perform a particular task, but is also a major influence on future intentions (Marakas, Yi, & Johnson, 1998). Self-efficacy beliefs cause individuals to weigh, integrate, and evaluate information about their capabilities and, subsequently, regulate their choices and efforts accordingly (Bandura, Adams, Hardy, & Howells, 1980).

However, while general self-efficacy has been positively related to measures of performance (Barrick & Mount, 1991) and motivation (Judge & Ilies, 2002), it has been found that the predictive capability of self-efficacy is strongest and most accurate when determined by specific domain-linked measures rather than with general measures (Bandura, 1989). Thus, IT researchers have developed the construct of CSE which has been studied in relationship with computer use (Compeau & Higgins, 1995). Empirical evidence indicates that individuals with a high CSE are more likely to form positive perceptions of IT (Venkatesh & Davis, 1996) and use IT more frequently (Compeau et al., 1999). CSE has also been showed to be positively related to playfulness and negatively related to computer anxiety (Hackbarth, Grover, & Yi, 2003), which are determinants of IT acceptance. Vijayasarathy's (2004) results indicate that CSE is positively related to individuals' intention to use Internet-based applications. Munro, Huff, Marcolin, and Compeau (1997) found CSE to be significantly related to breadth, depth, and finesse of IT use.

General computer self-efficacy (GCSE) refers to "an individual's judgment of efficacy across multiple computer domains" (Hasan, 2006). GCSE has been shown to be significantly related to individuals' intention to use various applications (Hasan, 2006; He & Freeman, 2010; Vijayasarathy, 2004) and to play a significant role in the ease with which many of the skills associated with effective computer use are acquired (Marakas et al., 1998).

System-specific computer self-efficacy (SCSE) has been defined as "an individual's belief of self-efficacy in performing a defined task using a specific computer application" (Hasan, 2006). Hasan's (2006) results indicate that SCSE is a better predictor of IT acceptance than GCSE. Furthermore, an individual's confidence in his/her ability to use a given IT has been shown to be a strong predictor of the person's actual ability (Munro et al., 1997).

#### 2.1.1. Individual differences as antecedents of CSE

The estimation of self-efficacy is a composite of numerous factors classified into 12 categories: enactive mastery, task characteristics, perceived effort, situation support, degree/quality of feedback, emotional arousal, vicarious experience, verbal persuasions, assigned goals/anchors, degree of professional orientation, age, and attribution of cause (Marakas et al., 1998). Thus, CSE is determined by several factors McCrae (1996), some of which relate to a person's environment (e.g., situation support, verbal persuasions) and others of which are personally related to the individual (e.g., emotional arousal, age, degree of professional orientation).

CSE itself is considered to be a dynamic individual difference. This differs from a stable individual difference in that training or other environmental factors may diminish or increase its influence on behaviour over time (Ghiselli, Campbell, & Zedeck, 1981). The pattern of relationships among dynamic, IT-specific individual differences (e.g. CSE and computer anxiety), situation-specific traits (e.g., personal innovativeness in IT) and broad stable traits (e.g., trait anxiety and negative affectivity) was examined by Thatcher and Perrewe (2002). Their results indicate that situation-specific traits exert a more pervasive influence on IT situation-specific individual differences than broad stable traits. Of particular interest, personal innovativeness in IT was shown to have a significant direct effect on CSE (Pervin & John, 1997). However, this does not mean that broad stable traits are irrelevant to the understanding of CSE. Indeed, previous research results have related broad stable traits such as neuroticism (Watson & Clark, 1984) and innovativeness (Goldsmith & Hofaker, 1991) to self-efficacy. In order to gain a better understanding of the role of personality in IT, further research is needed to examine how different stable traits, both broad and situation-specific relate to constructs such as CSE that influence IT use. In light of the above, an examination of broad personality traits and gender and their potential relationship to CSE is presented in the following section.

### 2.2. Personality traits

Personality can be defined as "those characteristics of the person that account for consistent patterns of behaviour" (Pervin & John, 1997, p.58) or "an enduring pattern of reactions and behaviours across similar situations" (McCrae & Costa, 1999). Personality traits are said to develop through childhood and reach mature form in adulthood (Norman, 1963). Therefore, they are considered stable. Traits theorists argue that people possess broad predispositions, called traits, which cause them to behave in a particular way (Lin, Chiu, & Hsieh, 2001).

Early studies of personality as a predictor of organizational variables demonstrated low validity. They however came at a time when no well-accepted taxonomy or descriptive model for classifying personality traits existed (Barrick & Mount, 1991). Attempts at personality classification began in the early 1900's by theorists such as Allport and Odbert (1936). Later on, Eysenck's (1947), Eysenck's (1967) three-factor model and Cattel's (1957) 16-factor models dominated the field of personality structure. Around the same period, the Big-5 model emerged and evolved based on the original work done by Fiske (1949) and Norman (1963).[1] Yet, it was not until the 1990s, after several decades of replication (Goldberg, 1992; Norman, 1963), that researchers converged upon the Big-5 factors of personality, also called the Five-Factor Model of personality (FFM), as the premiere framework of personality (Costa & McCrae, 1992; Costa, McCrae, & Dye, 1991). Today, although there still remains an ongoing debate over the exact terminology of the five factors, they are most commonly called neuroticism, extraversion, openness, conscientiousness, and agreeableness (Costa & McCrae, 1992) and will be referred to as such in this paper.

[1] See Zuckerman, Kuhlman, Joireman, Teta, and Kraft, 1993 for a comparison between the Big-3 and the Big-5 models.