Chapter 10
An Empirical Study of Computer Self-Efficacy and the Technology Acceptance Model in the Military:
A Case of a U.S. Navy Combat Information System

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ABSTRACT

The U.S. Navy continues to be a major developer and procurer of information systems (ISs), yet very limited research has been done to determine the factors that influence technology acceptance by naval personnel. Literature suggests that efforts to embrace information technology in improving decision making and reducing workload depend heavily on the use of such systems. Moreover, previous research has shown the validity of the technology acceptance model (TAM) and computer self-efficacy (CSE) to model technology acceptance in numerous environments. However, very little research was done specifically addressing such technology acceptance with military combat ISs. Thus, this study examines the applicability of the extended TAM with a CSE construct model to the U.S. Navy's combat ISs. A survey sample of 237 sailors from five different U.S. Navy aircraft carriers was used to assess such an extended model on a U.S. Navy's combat IS. Results indicate that perceived ease of use, perceived usefulness, and CSE were valid antecedents of technology acceptance (as indicated by intention to use). Moreover, high Cronbach's alpha was observed on all measures, indicating reliability of the measures in the context of military organizations.

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INTRODUCTION

Understanding the factors that influence individual adoption and usage of information systems (ISs) continues to be a central interest for IS researchers (Thompson, Compeau, & Higgins, 2006, p. 25). Over the past two decades, a large body of research regarding technology acceptance of IS has been conducted (Chau, 1996; Chau & Hu, 2001; Davis, 1989; Hu, Chau, Sheng, & Tam, 1999; Legris, Ingham, & Collerette, 2003; Ma & Liu, 2004; Venkatesh, Morris, Davis, & Davis, 2003; King & He, 2006). One of the highly cited models is the technology acceptance model (TAM) introduced by Davis (1986). According to Compeau et al. (2006), it is the simplicity of TAM and its measures that made it fertile ground for the flourishing research stream that resulted.

Since the late 1980s, technology acceptance studies have been successfully replicated in many environments (Venkatesh et al., 2003). Such environments include a public hospital system (Chau & Hu, 2001), a construction-engineering environment (Lowry, 2002), technology adoption in Arab nations (Rose & Straub, 1998; Elbeltagi, McBride, & Hardaker, 2005), online gaming (Hsu & Lu, 2004), and a large corporation undergoing ERP implementation (Amoako-Gyampah & Salam, 2004). Moreover, many technology acceptance models and studies have been conducted in academic settings (Davis, 1989; McFarland & Hamilton, 2006; Taylor & Todd, 1995). Furthermore, others criticized most of the key TAM studies for the use of students as study participants and recommended that further validations are needed using other types of participants (Legris et al., 2003). However, researchers noted that it is important to study existing technology acceptance models in those IS contexts that "target highly specialized individual professionals" (Chau & Hu, 2001, p. 700).

Additionally, researchers have recommended replication of instruments and revalidation of technology acceptance models for unique environments (Amoako-Gyampah & Salam, 2004). Furthermore, others criticized previous TAM studies for the use of office-related applications as the IS and noted that research would benefit from the investigation of managerial or process-level applications, as well as other professional systems (Legris et al., 2003). Yet, despite the fertile work on technology acceptance in IS research, very little attention has been given to the investigation of technology acceptance in military environments (Briggs et al., 1999; Simon & Paper, 2007).

Hutchins (1996) details the dangers associated with tactical decision making in the military. Such unique context, especially during combat situations or when dealing with combat-related decisions where outcomes can have life-and-death as well as international relations consequences, may warrant the examination of existing technology acceptance models. In the past decade, the U.S. Navy has been spending a substantial amount of resources on the development of customized and unique Naval IS. In 2005, the U.S. Navy awarded more information technology contracts than any other federal agency, including all other branches of the military. The U.S. Navy awarded approximately $54 billion worth of prime technology contracts in 2005 through the Seaport program, which includes 500 vendor corporations ("Navy and Marines Lead Federal IT Spending," 2005). One of the key goals of such spending is to reduce shipboard manning by the use of IS. Achievement of this goal requires the development and integration of improved systems (Bisantz et al., 2003). Thus, considering the substantial funds being applied to IS projects by the U.S. Navy and the observed limitations of prior key TAM studies noted above, a model for technology acceptance and the factors that influence IS usage are warranted for the military.

This study explored the factors that influence sailors' intention to use the combat IS aboard U.S. Naval aircraft carriers. Specifically the model examined by this study is the revised TAM with computer self-efficacy (CSE) (Chau, 2001; Chau

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