Chapter 7
User Trust and Human-Computer Trust Interaction

ABSTRACT

Trust plays an important role in human-computer interaction. It helps people overcome risk and uncertainty during the usage of a digital computing system. With the rapid growth of computer, communication, and networking technology, human-computer trust has been paid attention to, especially for human and mobile device interaction. This chapter investigates the factors that influence the trust in human-computer interaction (i.e., the construct of Human-Computer Trust Interaction [HCTI]). Based on a literature survey, a research model of human-computer trust interaction is explored. This model contains three root constructs: interaction intention, computer system trust, and communication trust. They are further delineated into 15 sub-constructs. Based on this model, the authors propose a number of instructions to improve user trust for human-computer interaction.

1. INTRODUCTION

Trust is firstly a social phenomenon. It is a multidimensional, multidisciplinary and multifaceted concept (Yan, 2007). Trust has been defined by researchers in many different ways, which often reflect the paradigms of particular academic disciplines. Common to these definitions are the notions of confidence, belief and expectation on the reliability, integrity, ability, etc. or characters of an entity (Yan, 2007). With the rapid growth of computer, communication and networking technology, human-computer trust has been paid attention to.

Trust is an integral component in many kinds of human interaction, allowing people to act under uncertainty and with the risk of negative consequences (Artz & Gil, 2007). Recently, researchers in Human-Computer Interaction (HCI) and human factors have studied trust in an on-line context.

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The realization that design can affect the trust of a user has had implications for user interface design, web sites and interactivity in general (Nielsen, 1999). Some researchers examined the cues that may affect trust. These cues range from design and interface elements, to perceived website credibility, to the extent to which the technology is perceived and responded to as a social actor (e.g., photographs and other indicators of social presence) (Corritore, Kracher & Wiedenbeck, 2003). Research focuses on the cues that convey trustworthiness to users. Interface design can give a cue of trust or signal trustworthiness (Corritore, Kracher & Wiedenbeck, 2003; Riegelsberger, Sasse & McCarthy, 2005a). On the other hand, Lee and Chung (2009) found that computer system quality and the quality of information provided by the computer influence trust and satisfaction of users.

Theory of Reasoned Action (TRA) posits that beliefs lead to attitudes, which lead to behavioral intentions, which lead to the behavior itself (Fishbein & Ajzen, 1975). Numerous researchers have conceptualized trust as a behavior, which has been validated in work collaboration and social communications (Deutsch, 1973; Fox, 1974; Anderson & Narus, 1990). Prior research has also confirmed a strong correlation between behavioral intentions and an actual behavior, especially for software system usage (Sheppard, Hartwick & Warshaw, 1988; Venkatesh & Davis, 2000; Venkatesh et al., 2003). Muir found a positive correlation between trust and use (Muir, 1994; Muir & Moray, 1996). The relationship between trust and interaction behavior is obvious since usage through human-computer interaction implies trust. Lee and Moray found that trust in a system partially explained system use, but other factors (such as the user's own ability to provide manual control) also influenced the system use (Lee & Moray, 1992). However, existing researches did not study or investigate a comprehensive construct of human-computer trust interaction. Thus, it lacks a generic guideline for building up trust interaction between human-beings and computers.

This chapter studies the factors that influence the trust in human-computer interaction, i.e., the construct of human-computer trust interaction (HCTI). HCTI plays an indispensible role in achieving usable trust management in digital computing, communication and networking environments. Based on a literature survey about system trust solutions, we explore a research model of HCTI and propose instructions to improve user trust for human-computer interaction. This chapter is based on the work presented by Yan, Kantola & Zhang (2011).

2. SYSTEM TRUST SOLUTIONS

In this section, we survey the work in the literature about system trust solutions. Trust in human-computer interaction can be enhanced by a number of technologies: a) user interface (UI) design for trust; b) trust information notification and visualization; c) trust management for computer systems and computer communications.

3.1 UI Design for Trust

Trust allows people to live in a risky and uncertain situation by providing the means to decrease complexity. It is the key to decision making and engaging in usage. It has been well realized that the design of computer user interface can affect the trust of a user (Nielsen, 1999).

Some researchers are examining the cues that may affect trust. These cues range from design and interface elements, to perceived website credibility, to the extent to which the technology is perceived and responded to as a social actor (Corritore, Kracher & Wiedenbeck, 2003). Wang and Emurian (2005) identified the types of trust cues that include interface design features, structure design (e.g., the look and feel of a web