An Empirical Investigation of Trusting Bases in Initial Trust Formation with National Identity Systems

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ABSTRACT
Recent research indicates that trust is important in helping users overcome perceptions of risk and uncertainty as well as promoting the acceptance of a specific technology. While prior studies have investigated different underlying bases of trust, little research has empirically tested all bases in one comprehensive model and evaluated the relative effect of various bases on subsequent trusting intentions. This research empirically investigates these trusting bases within an extended initial trust model in the context of a national identity (NID) system. Research on understanding the role of initial trust will not only be of assistance to the successful implementation of an NID system, but also provide guidance for understanding the role of initial trust in the deployment of other types of information systems.

Keywords
Initial trust, NID systems, trusting bases, trusting beliefs, trusting intention

INTRODUCTION
A national identity (NID) system is a public information system used at the societal level. These systems have been successfully used in many countries as a means to facilitate public services and enhance national security. A NID system has also been advocated in the U.S. for several decades. Recent research indicates that trust plays an important role in helping users overcome perceptions of risk and uncertainty in the use of various types of information systems (Gefen, Karahanna and Straub, 2003; Li, Hess and Valacich, 2005; McKnight, Choudhury and Kacmar, 2002; Pavlou and Gefen, 2004); thus, understanding and mitigating trust concerns will promote the acceptance of a broad range of information systems, including a NID system.

Prior studies have investigated the influence of trust on perceptions and/or use of eCommerce (Gefen et al., 2003; McKnight et al., 2002), online marketplaces (Pavlou and Gefen, 2004), and NID systems (Li et al., 2005). These studies have primarily been based on the theory of reasoned action (TRA) (Ajzen and Fishbein, 1980) and described trust formation with multiple levels of constructs such as trusting beliefs and trusting intention (McKnight et al., 2002). In addition, trust related factors have been studied and provide underlying trust bases or determinants of those TRA trust constructs, including: knowledge base, personality base, cognitive base, calculative base, and institutional base. However, little research has been done to empirically investigate this comprehensive set of trust bases within the same context. The objective of this research is to provide a comprehensive view of trusting bases and to evaluate their relative effects on subsequent trusting intentions within the context of a NID system.

This research includes the various trusting bases in an integrated model and empirically tests this model within the context of initial trust in NID systems, addressing a significant gap in the trust literature. The study also provides practical implications for governments implementing an NID system. With an understanding of the foundational bases of initial trust in NID systems, governments can more readily predict and motivate citizens’ initial trust before such a system is implemented. These findings can also be generalized to organizations trying to assess the role of initial trust when implementing broader categories of information systems.
RESEARCH MODEL AND HYPOTHESES

The initial trust model developed and investigated in this study is shown in Figure 1. This model consists of three levels of constructs: trusting intention, trusting beliefs and trusting bases. Trusting intention is determined by two sets of trusting beliefs: behavioral beliefs and normative beliefs. Both trusting beliefs are then determined by various trusting bases, as described below.

![Figure 1: The Extended Initial Trust Model](image)

**Initial Trust**

Researchers have noted that trust is a dynamic rather than a static phenomenon and that trust in different stages is built on different factors and processes (McKnight, Cummings and Chervany, 1998). In this research, we study people’s initial trust towards an NID system before the system is implemented. Initial trust has been defined in prior research (McKnight et al., 1998) as trust in an unfamiliar object. When people have no prior interaction with the trusting object, they cannot develop trust based on experience or direct knowledge of the object. Instead, they will use other available information to make trust inferences (McKnight et al., 2002).

McKnight et al. (2002) used a parsimonious version of the TRA (Ajzen and Fishbein, 1980) to present initial trust formation, including trusting intention, trusting beliefs and trusting bases. Trusting beliefs refer to peoples’ perception of whether they should depend on the object. McKnight et al. posited that the perception of the trusting object’s attributes primarily determines trusting intention. This trusting belief is equivalent to the behavioral beliefs in the TRA. The TRA also includes social influence (normative beliefs) as another form of beliefs that influence intention. Kelman (1958) and Venkatesh and Davis (2000) posited that besides the direct impact on intention, social influence also indirectly influences intention by affecting the subjects’ own belief structure. Thus, normative beliefs, which represent social influence, are also important in predicting trusting intention.

In this research, we extend McKnight et al.’s (2002) initial trust model and propose that trusting intention is determined by both behavioral beliefs and normative beliefs. We also propose that normative beliefs have an indirect influence on trusting intention through an effect on behavioral beliefs.

\[ H1a: \text{Behavioral beliefs positively affect trusting intention.} \]
\[ H1b: \text{Normative beliefs positively affect trusting intention.} \]
\[ H2: \text{Normative beliefs positively affect behavioral beliefs.} \]

**Trusting Bases**

The TRA suggests that belief-level constructs, such as behavioral beliefs and normative beliefs, are built on external variables (Ajzen and Fishbein, 1980). We use trusting bases to describe all external variables that provide foundations to the trusting beliefs. Four trusting bases suggested in previous trust literature, personality base, cognitive base, calculative base and institutional base, are included in our research model. The knowledge base is also noted for its importance in trust development, but is excluded from this study because no direct knowledge is available in the context of initial trust in NID systems. While prior studies have investigated two or three of the trusting bases in various IS contexts (Gefen et al., 2003; 2005).
McKnight et al., 2002; Pavlou and Gefen, 2004; Sarker, Valacich and Sarker, 2003), these studies have not included all relevant bases and have not integrated these bases within a comprehensive, TRA-based model of trusting intentions.

The personality base, or disposition to trust, refers to people’s general tendency to be willing to depend on others across a broad spectrum of situations and persons/objects (Erikson, 1968). This trusting base influences how much trust one has for others prior to any interaction or direct information being available (Mayer, Davis and Schoorman, 1995). McKnight et al. (1998) differentiated two types of personality base. One is faith in humanity, which refers to people’s beliefs about human nature in terms of benevolence, competence, and integrity (McKnight et al., 1998). The other personality base is trusting stance, which refers to people’s belief that better outcomes will result from dealing with trustees as though they are well meaning and reliable, regardless of the trustees’ real attributes (Riker, 1971). An individual with strong trusting stance tends to initially trust everything until something happens to prove him/her wrong (McKnight et al., 2002). In this research, we propose that these two types of personality base provide foundations to both sets of trusting beliefs.

\[ H3a: \text{Faith in humanity positively affects behavioral beliefs and normative beliefs.} \]
\[ H3b: \text{Trusting stance positively affects behavioral beliefs and normative beliefs.} \]

The cognitive base refers to various cognitive cues and impressions on which people form their trust (Brewer, 1981). When people lack direct information and experience with the trusting object, their cognition will be developed on other available information (McKnight et al., 1998). Prior research has posited that when people have no direct knowledge about a trusting object, they will categorize it into a trustworthy or untrustworthy group based on other available information, such as reputation and stereotype (McKnight et al., 1998; Sarker et al., 2003). Those objects with good reputations and positive stereotypes are more likely to be categorized as trustworthy (McKnight et al., 1998). In this research, we propose that the cognitive trusting base provides foundations to both sets of trusting beliefs.

\[ H4: \text{Cognitive base positively affects behavioral beliefs and normative beliefs.} \]

The calculative trusting base refers to a rational trust decision based on the calculations of costs and benefits of the trusting object violating the trusting behavior (Williamson, 1993). When there is no direct interaction, people will build trust on rational assessments of whether the trusting object gains from violating the trusting behaviors. If there is no net gain for the trusting object by violating trust, people will grant trust towards the object (Lewicki and Bunker, 1995). In this research, we propose that calculative base provides foundations to both sets of trusting beliefs.

\[ H5: \text{Calculative base positively affects behavioral beliefs and normative beliefs.} \]

The institutional base refers to the impersonal structures that are inherent in a specific circumstance and facilitate trust building in this circumstance (Shapiro, 1987). When necessary institutional structures are in place and the social environment is in proper order, people are more likely to grant trust to others (McKnight et al., 1998). Two types of institutional trusting base are discussed in prior trust research (Gefen et al., 2003; McKnight et al., 2002). One is situational normality, which means that the situation is normal and everything is in its proper order (Lewis and Weigert, 1985). People are more likely to trust in such a normal and properly ordered setting (McKnight et al., 1998). The other is structural assurance, which means that safeguards such as promises, contracts, regulations, and guarantees are in place (Shapiro, 1987). These safeguards enable people to feel assured to trust the object. In this research, we propose that both types of institutional trusting base provide foundations to the two sets of trusting beliefs.

\[ H6a: \text{Situational normality positively affects behavioral beliefs and normative beliefs.} \]
\[ H6b: \text{Structural assurance positively affects behavioral beliefs and normative beliefs.} \]

Based on the trust literature (Gefen et al., 2003; McKnight et al., 1998; Pavlou and Gefen, 2004), we proposed that all trusting bases have positive direct effects on both sets of trusting beliefs. However, previous research has also noted that the effects of some bases may be overshadowed or diminished when studied in the presence of other bases (Johnson-George and Swap, 1982; McKnight et al., 1998).

**METHODOLOGY**

A 3-step experiment with two surveys was developed to test the extended initial trust model using undergraduate students. Subjects were first asked to complete a pre-survey, which included demographic information and scales measuring Faith in Humanity, Trusting Stance, Situational Normality and Structural Assurance. These bases were assessed in a pre-survey as these bases should be independent of the specific trust context. The subjects were then given an introductory NID lecture including topics such as system objectives, technical components, functions, and existing NID systems. The subjects were then given an assignment to search online for NID information. These interventions were designed to provide subjects with certain bases to build up their trust. Lastly a post-survey including all remaining scales was conducted.
Measures

The measurement scales in the survey were adapted from previous studies or developed according to the guidelines provided in previous research. The scales of trusting intention, behavioral beliefs, personality base, and institutional base were adapted from McKnight et al. (2002). The scales for cognitive and calculative base were adapted from Sarker et al. (2003) and Gefen et al. (2003). The scale for normative beliefs was developed according to the TRA guidelines (Ajzen and Fishbein, 1980).

Data Collection and Analysis

A pilot study with 390 data points was conducted to refine the scales and study design. The full data collection has been completed and includes 443 data points. Confirmatory factor analysis with AMOS for structural equation modeling was used to validate the measurement model and indicates good model fit with GFI, CFI, NFI over 0.90, AGFI (0.87) being close to GFI, and RMSEA of 0.04. Preliminary results indicate that two bases, cognitive and calculative, affect trusting beliefs and subsequent trusting intentions. Complete results will be presented at the conference.

CONTRIBUTIONS

This study provides an empirical investigation of the trusting bases and how they affect initial trust in NID systems. Our initial trust model extends McKnight et al’s (2002) model by including normative beliefs and cognitive and calculative bases. These extensions make the model more consistent with the TRA framework (Ajzen and Fishbein, 1980) and should explain more variance in trusting beliefs and trusting intention. Limitations of the study include the use of student subjects. The detailed implications of the empirical results will be presented at the conference.

REFERENCES