

# An Analysis of Trust, Distrust, and Their Antecedents: Development of a Comprehensive Model of Consumer Intentions in Technology-Driven Transactions

Steven John Simon, Carol J. Cagle

Stetson School of Business and Economics, Mercer University, Atlanta, GA, USA

**ABSTRACT:** *Data breaches -- security incidents -- have become an everyday occurrence with hundreds of millions of consumers having their lost personal identification information (PII), had their credit and debit card numbers stolen, and their credit compromised. Despite the risk, consumers continuously swipe their cards and share their personal information regularly. This study examines the impacts of trust and distrust on consumer intentions in this environment. More than 1,700 consumers involved in technology-driven transactions comprise the data sample. Trust, distrust, and their antecedents are investigated to determine (1) if trust and distrust are truly two distinct constructs, (2) if the two constructs have unique antecedents, and (3) their impacts on consumer intentions toward transactions. The study expands the literature treating trust and distrust as distinct yet inter-related constructs and by introducing new antecedents. Our findings suggest that trust and distrust are not the same construct and impact consumer intentions to transact.*

**KEYWORDS:** *Trust, Distrust, Disposition, Data Breaches, Consumer Intentions*

## 1. Introduction

In 2014, a total of 79,790 cyber security incidents were reported in 61 countries (Brumfield, 2015). In the United States 43% of companies *reported* a data breach. An estimated \$93 Billion was stolen from U.S. consumers between 2000 and 2014 (Ozawa, 2015). The widely publicized system breach at Home Depot exposed over 56 million customer records. Anthem's security lapse cost 80 million of its consumers and employees their personal information with similar losses at Ebay (145 million), JPMorgan (76 million), Court Ventures (200 million), Sony (77 million), AOL (92 million), and TJ Maxx (94 million). These attacks are not restricted to business as illustrated with the US government's Office of Personnel Management's (OPM) breach placing the security clearance and background information of over 22 million individuals at risk and the US military's loss of 70 million veteran's records. This phenomenon is not exclusive to any one country, continent, socio-economic class, or ethnic group. In South Korea, nearly 20 million people, almost 40% of the population had their personal data stolen and their credit

cards compromised (Thornhill, 2014). The magnitude of this crisis can be measured in media coverage. “Data breach” has become a term of everyday vernacular with *The New York Times* publishing more than 700 related articles in 2014, a 560% increase over 2013 (Brumfield, 2015). Despite the litany of successful cyber attacks and media coverage, individuals are continuously swiping their credit and debit cards, engaging in e-commerce transactions (many on unsecured connections), and providing a wealth of personal information to business, government, doctors, insurers, and almost anyone who asks for it. This extraordinary behavior in light of the obvious lack of security has prompted the authors to investigate technology-driven consumer behavior and transaction<sup>1</sup> intention as it relates to trust and distrust and their antecedents.

Interestingly, of the 70 million individuals impacted by the 2013 Target breach only 35% indicated that their trust and behavior towards Target had changed (Silver, 2014). Trust is a widely researched construct that has been linked to all economic transactions and interpersonal exchanges (Alga 2014; Gambetta, 1988; Gefen, 2004; Mayer et al., 1995). In a related technology-driven area, the role of trust in e-commerce is highly correlated with consumer intentions and purchase behavior (Kim et al., 2004, Pavlou & Gefen, 2005; Wu & Tsang 2008). Less understood and researched is distrust -- the unwillingness to be vulnerable to others (Benamati et al., 2010). Some researchers believe that distrust is a distinct construct from trust and not just ends of the same continuum (Lewicki et al., 1998).

This study seeks to answer several research questions while contributing to the body of knowledge. First, since the literature has focused almost exclusively on trust, this research develops a comprehensive model of trust and distrust, positing that trust and distrust are two distinct yet interrelated constructs that influence intentions. Few prior studies (Benamati et al., 2010; Moody et al., 2014) have attempted this with Benamati’s work focused on online banking, a more restrictive domain. Second, assuming that trust and distrust are distinct constructs, they should have antecedents that influence their development. Therefore, this study examines previously researched antecedents in the context of both trust and distrust. Third, we further develop a comprehensive model with factors validated through a large sample (n = 1,763) of real-world consumers. This work seeks insights into trust and distrust in our dynamic tech-driven, data theft environment while determining the impact of the model’s constructs on an individual’s intentions.

## 2. Trust

Trust can be thought of as the glue that holds society together. It is a defining

---

<sup>1</sup> For the purposes of this work, transactions refer to any monetary exchange or the providing of any personal identification information (PII) to include credit or debit card numbers, social security numbers, medical information, etc.

feature of most economic and social transactions in which uncertainty is present (Pavlou, 2003). Trust is commonly invoked by individuals, businesses and organizations, as well as governments. Trust is mentioned in mottos, slogans, pitches, and even appears on US currency. It is a pervasive concept that has been widely studied across disciplines and yet a common definition has eluded researchers and practitioners alike.

Gambetta (1988) stated that when a trust-related topic is discussed, trust is always considered a fundamental or crucial element -- one that we cannot do without in human interactions. Trust is generally crucial in business and social interactions that are characterized by dependence of one party on another. It is a common perception, that trust is one of the key and perhaps most important factors in completing a transaction and thus of economic trade (Alga, 2014). In these transactions, trust -- in part -- binds all parties together based on the expected utility or return from the interaction (Ganesan 1994; Mayer et al., 1995). Trust has been linked to consumer confidence with consumers willing to transact with organizations they trust more than those who they do not (Keen, 2000). Gefen (2004) suggests that trust caters to a basic need to predict, understand, and control the social environment while attempting to determine the behavior of others and foresee the outcomes of actions.

Trust is the foundation of commerce (Su & Han, 2003) and is important because it helps consumers overcome perceptions of risk (McKnight et al., 2002). When conducting commerce as in all social interactions, trust is a mechanism that is employed to reduce uncertainty (Su & Han, 2003) and complexity (Gefen et al., 2003; Luhmann, 1979). Trust in online merchants has been positively associated with their attitude towards the store and intent to conduct transactions (Jarvenpaa & Tractinsky, 1999; Kim et al., 2004; Macintosh & Lockshin, 1997). Ba and Pavlou (2002) argue that trust refers to the subjective assessment of one party that another party will perform a particular transaction according to his or her confident expectations, in an environment characterized by uncertainty. Lack of trust has a negative consequence for consumers both online (Wu & Tsang, 2008) and in the physical environments. Consumers whose trust is deficient will not engage in financial transactions (Hoffman et al., 1999). In e-commerce, a number of studies (Hoffman et al., 1999, Liu et al., 2005, Pavlou & Gefen, 2005) have shown that trust is a major barrier to acceptance and inhibits Internet transactions (Kim et al., 2004).

Trust has traditionally been difficult to define (Rousseau et al., 1998) and has been regarded as a *confusing pot-pourri* (Shapiro, 1987). McKnight et al. (2002) call for conceptual clarity and quote Keen et al. (1999), "... the basic conclusion in all these fields [is] trust is becoming more and more important, but we really cannot say what it exactly is" (pp. 4-5). The reason for this confusion (McKnight & Chervany, 2001) is that researchers have conceptualized trust within a narrow perspective in their specific field.

Economists view trust from the reputation of the parties and the impact on transactions (Cave, 2005). The key to successful economic transactions is avoiding opportunistic behavior (Williamson, 1985). Managerial and marketing researchers focus on strategies for consumers and trust building (Fogg, 2002) using trust as a mediator of the influence of a company's actions on consumer behavior (Johnson, 2007). Mayer et al. (1995) define trust as the "willingness of one party to be vulnerable to the actions of another based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party" (p. 712). Human computer interaction views the relationship between the user and system usability (Riegelsberger et al., 2005), while information systems researchers investigate system adoption, acceptance, and use<sup>2</sup>. Lee and Turban (2001) hold that trust is the willingness of a consumer to be vulnerable to the actions of an Internet merchant in an Internet shopping transaction, based on the expectation that the Internet merchant will behave in certain agreeable ways. Sociologists investigate trust from an interpersonal and group perspective (Salovey & Rothman, 2003) with Rotter (1971) defining trust as a generalized expectancy held by an individual that the word of another can be relied upon. Zucker (1986) suggests that trust is a set of expectations shared by all involved in an exchange, which encompass social rules.

For purposes of this work, trust is not a behavior or a choice, but a psychological condition and can be defined as the willingness to be vulnerable under conditions of risk and interdependence (Bhattacharya, 2002). McKnight et al. (2002) proposed three means to measure trust -- willingness to provide personal information, willingness to engage in a purchase, and willingness to act on provided information. This study focuses on willingness to provide personal information and willingness to engage in a purchase in trusting intentions. Further McKnight et al. (1998) indicate that trusting beliefs directly influence trust intentions. This relationship between trust and intentions/behaviors has been pervasive across the literature and disciplines (Ho & Chau, 2013; Jarvenpaa & Tractinsky, 1999; Kim et al., 2004; Liu et al., 2005; Macintosh & Lockshin, 1997; Pavlou and Gefen, 2005; Wu & Tsang, 2008).

Prior research has also found that trust is a predictor of consumer behavior and directly influences trust intentions (Bhattacharjee, 2002; McKnight et al., 2002). The higher the trusting beliefs, the more likely they (consumers) are to interact (Luhmann, 1979). Recently, there have been efforts to integrate the concept of trust in technology with the technology acceptance model (Ghazizadeh et al., 2012; Pavlou, 2003) to predict a user's intent. In a study involving expectation disconfirmation theory, Lankton et al. (2014) demonstrate that technologytrusting expectations influence intentions. Trust

---

<sup>2</sup> Several prior studies have provided a meta-analysis of the trust literature (see Gefen et al., 2003; Johnson, 2007, Kim & Tadisina, 2007; Rousseau et al., 1998.).

researchers have found a strong relationship between trusting beliefs and intentions (Vance et al., 2008).

Therefore,

Hypothesis 1: Trust positively influences intentions.

### 3. Distrust

Prior research has mainly focused on trust and largely ignored distrust, partly because of the assumption that trust and distrust are two ends of one continuum (Benamati et al., 2010; Chau et al., 2013; Komiak & Benbasat, 2008; Ou & Sia, 2010; Schoorman et al., 2007; Seckler et al., 2015). Early studies (Rotter, 1971) viewed distrust as the opposite of high trust. This conceptualization of distrust as a single dipolar construct has been questioned (Lewicki et al., 1998). They state that distrust is a distinct construct from trust and that low trust is not equivalent to high distrust with the two constructs actually coexisting. To support this assumption, they extend Luhmann (1979) and suggest that trust and distrust have different consequences and develop a model which helps explain how both trust and distrust reflect the complexities and risks associated with interpersonal and business relationships. Trust focuses on more positive emotional reactions (*hope, faith, confidence, assurance*) toward others, while distrust is based in negative overtones (*fear, skepticism, cynicism, vigilance*) (Benamati et al., 2010; Lewicki et al., 1998).

Although both trust and distrust serve as mechanisms to reduce complexity and uncertainty (Kramer, 1999), distrust may exert a more critical role for consumers (Ou & Sia, 2010). In most people the desire to avoid a negative outcome is stronger than seeking a potentially more positive one (Moody et al., 2014), suggesting that distrust should provide stronger motivations and behaviors (Chau et al., 2013). Trust in the workplace has been found to foster improved working relationships and performance (Dirks & Ferrin, 2001) while distrust of institutionalized roles and structures lead to greater negative consequences (Sitkin & Roth, 1993).

Akin to trust, distrust simplifies an individual's decision-making process by determining which high risk or undesirable outcomes should be avoided. Trust reduces complexity by enabling individuals to take actions that expose them to risk while distrust reduces complexity, encouraging individuals to take protective actions to reduce risk (Benamati et al., 2010). In other words, trust and distrust balance each other leading a decision-maker to a state of equilibrium and potential action. Trust without distrust might lead to a consumer who fails to take full account of the risks associated with a decision. In the context of this work, a consumer that freely provides personal identification information (PII) on all occasions might find their identity compromised. This is not to

suggest that trust is good and distrust is bad, a simplistic view that has been pervasive in organizational and social research (Lewicki et al., 1998). Distrust can be thought to represent caution before or after taking an action. A famous example is Ronald Reagan's quote "Trust but Verify," during arms negotiations. While distrust is not explicitly mentioned it is implied and in this context not viewed as negative or bad but merely responsible and a means to reduce uncertainty which in turn led to an agreement. It has been further suggested (Benamati et al., 2010) that trust and distrust need not vary simultaneously. Lewicki et al. (1998) state that it is possible to like and dislike, to love and hate, and may be possible to trust and distrust. In this case, one might trust a company and its products but have minimal trust in their IT support systems as a result of a data breach or failure to protect personal information.

If distrust is a distinct construct from trust, then focusing exclusively on trust may explain only part or provide a bias estimation of behavior (Benamati et al., 2010; McKnight et al., 2004; Ou & Sia, 2010). This study therefore assumes that trust and distrust exist as separate yet related constructs allowing the authors to study the constructs independently and interdependently as they relate to intentions and behavior. This study follows prior definitions of distrust, the negative expectations regarding an action, "the positive expectation of injurious action" (Luhmann, 1979, p. 72), or "fear of, a propensity to attribute sinister intentions to, and a desire to buffer oneself from the effects of another's conduct" (Lewicki et al., 1998, p. 439).

In the context of consumer transactions distrust could lead to higher uncertainty on the part of the consumer and thus negatively impacting future transaction. The distrust is one of the most frequently cited reasons for consumers not using mobile banking (Lin, 2011). Although both trust and distrust serve as mechanisms to reduce complexity and uncertainty (Kramer, 1999), distrust may exert a more critical role for consumers (Ou & Sia, 2010). In most people the desire to avoid a negative outcome is stronger than seeking a potentially more positive one (Moody et al., 2014), suggesting that distrust should provide stronger motivations and behaviors (Chau et al., 2013).

Therefore:

Hypothesis 2: Distrust negatively influences intentions.

## **4. Antecedents to trust and distrust**

### **4.1 Disposition to trust or distrust**

"Disposition to trust is a general not situation specific, inclination to display faith in humanity and to adopt a trusting stance toward others" (Gefen, 2000, p. 728). Disposition



to trust does not imply that others are trustworthy, only that they are more willing to depend on others (McKnight & Chervany, 2001). Conlon and Mayer (1994) found the willingness to trust was significantly related to behavior and performance.

Disposition to trust has an impact on the formation of trust, especially when consumers have insufficient information or are in unfamiliar or abnormal situations (Gefen, 2004; Zhou & Tian, 2010). The concepts have been linked to faith in humanity and the assumptions of people and organizations in general. In contrast, disposition to distrust is also a persistent view that a person holds across situations, irrespective of the others involved (McKnight & Chervany, 2001; Moody et al., 2014; Zhaou & Tian, 2010). This concept implies a general unwillingness to depend on or become vulnerable to others (McKnight et al., 2004).

Both dispositional trust and distrust develop over a lifetime as a result of learned outcomes from varied experiences (McKnight et al., 2004; Merritt et al., 2013; Rotter, 1971). Furthermore, both constructs are thought to be relatively stable, although not static (Mayer et al., 1995; Merritt and Ilgen, 2008) and may change as individuals experience both positive and negative experiences. The degree or severity of an experience could yield a greater impact. Therefore, we expect that as with trust and distrust, disposition to trust and distrust may not vary simultaneously. A person with high disposition trust is more likely to trust others than a person with low dispositional trust, while an individual with high dispositional distrust is likely to be more distrustful.

Therefore:

Hypothesis 3: Disposition to trust positively influences trust.

Hypothesis 4: Disposition to distrust positively influences distrust.

#### **4.2 Reputation**

Company reputation reflects the amount of regard that stakeholders, particularly customers, assign to the company (Fombrun & Rindova, 2000). The literature recognizes that reputation plays a critical and primary role in building productive customer relations (Abimbola & Vallester, 2007; Garbarino & Johnson, 1999). Fombrun (2005) noted that customers judge companies constantly, adding that reputation is widely seen as a powerful intangible corporate asset, which the leaders of well-respected companies actively measure and work to enhance.

Prior research on cognitive trust suggests that a trustor may categorize an unfamiliar trustee as trustworthy or untrustworthy based on the reputation of the trustee. The reputation categorization process infers that a trustee with a good reputation is believed to be trustworthy (McKnight et al., 1998). When no direct experiential information is available, the trustee's reputation may affect people's beliefs (Powell, 1996). Thus, reputation is considered an important moderator of trust.

Keh and Xie (2009) examined the relationship of corporate reputation to trust and purchase intent in Chinese companies. Their findings showed that reputation was very strongly related to trustworthiness and with a positive link to the customers' intent to purchase. The strength of the relationship suggests that it is a major component of overall corporate reputation. Consequently, higher levels of trust can exercise a significant and favorable impact on customer behavior. Reputation has been categorized as a factor through which individuals build cognitive trust (McKnight et al., 1998) and view an organization as trustworthy (Jarvenpaa et al., 2000; Kim, 2012). An established reputation has been linked to integrity and ability – an organization that is capable and insures its products and services (Liu et al., 2005; Mayer et al., 1995).

Therefore:

Hypothesis 5a: Reputation positively influences trust.

Hypothesis 5b: Reputation negatively influences distrust.

#### 4.3 Knowledge

Knowledge has been recognized as one of the most important cognitive factors influencing behavioral processes (Jeng & Fesenmaier, 2002; Vogt & Fesenmaier, 1998) and consumer behavior (Klink & Smith, 2001). Selnes and Howell (1999) found that decision-making behavior and information processing differ between customers with high and low levels of knowledge. Knowledge plays a central role in many theoretical models of attitude because it is hypothesized to influence behavior (Barber et al., 2009). Hadar et al. (2013) investigated the impact of subjective knowledge states on financial decision-making with findings showing that when customers felt less confident in their knowledge, they were less likely to make a risky investment. With high levels of knowledge, consumers are confident in their own ability to undertake information-searching tasks (Schmidt & Spreng, 1996) with results leading to higher levels of trust, which reinforce their purchase behavior (Alba & Hutchinson, 1987; Crowley & Mitchell 2003).

Knowledge is a multidimensional construct comprising three categories: (1) subjective knowledge -- familiarity, (2) objective knowledge -- expertise, and (3) product experience -- possession (Alba & Hutchinson, 1987; Bettman & Park 1980; Brucks, 1985; Johnson & Russo, 1984; Park & Moon, 2003; Ratchford, 2001; Sujaan, 1985). Hence, subjective knowledge equates to the familiarity with the laws and structural procedures in place to safeguard their information, objective knowledge is expertise but focused on the understanding of the nature of the technology related to information transmission and protection, while experience relates to the conduct of the transaction gained through use. This study incorporates knowledge that would protect an individual from the dangers present in technology-driven transactions.



Therefore:

Hypothesis 6a: Knowledge negatively influences trust.

Hypothesis 6b: Knowledge positively influences distrust.

#### **4.4 Technology trust**

It has been suggested (Benamati et al., 2010) that trust and distrust need not vary simultaneously. Lewicki et al. (1998) state that it is possible to like and dislike, to love and hate, and may be possible to trust and distrust. Therefore, one might trust a company and its products but distrust its IT support systems as a result of a data breach or failure to protect personal information. McKnight et al. (2011) explained that trust in technology relates to individuals depending on, or being willing to depend on the technology to accomplish a specific task because the technology has positive characteristics.

The relationship between trust in an organization's technology and the organization itself has been suggested by Evenstad (2016). An individual's trust in technology may also influence his/her trust in other elements of an organization such as institutional trust (Muir, 1994). Higher trust in technology leads to higher trust culture (in the organization) and greater adoption and use (Xu et al., 2014). In a medical setting, Montague et al. (2009) uncovered a link between trust in an organization's technology and social trust (trust in the organization itself). Distrust in technology prevents the user from utilizing systems to their full extent, and can lead to a decrease in productivity (Xu et al., 2014). The lack of trust is one of the most frequently cited reasons for consumers not using mobile banking (Lin, 2011; Masrek et al., 2014). Technology trust has been empirically supported as a moderator of trusting beliefs and intentions (Li et al., 2008; Vance et al., 2008).

Therefore:

Hypothesis 7a: Technology trust positively influences trust.

Hypothesis 7b: Technology trust negatively influences distrust.

## **5. Methodology**

### **5.1 Instrument**

The questionnaire was derived from previous literature (see Appendix) with a number of questions rewritten to make them more applicable to this study's intent. The initial instrument consisted of just under a hundred (7 point scale, Likert-type) items including demographic information. The instrument was initially pilot tested with a group of approximately 250 individuals drawn from a population representing the desired sample. As a result of the pilot test, the analysis of the data, and feedback from subjects, the instrument was reduced by greater than one half with redundant items eliminated and

the wording of several questions modified. The resulting instrument was then retested and after very minor changes, a final instrument was made available. The first page of the questionnaire explained to participants the intent and objectives of the study and provided them with some contextual background for the work, while asking them to answer the questions with regard to first hand interaction with a specific organization. It further explained that the research was for academic purposes only and that any information provided would be held in strictest confidence.

### **5.2 Participants**

The authors surveyed a large global sample (2,000+) of consumers to understand the impacts of data breaches. Participants were recruited into the study utilizing business and institutional contacts of the researchers and received no compensation. The only conditions for participation was that individuals must be over the age of 18, be personally responsible for a credit card or online pay account (e.g., PayPal or direct phone billing), and have either completed (1) an Internet transaction, (2) used a credit card or online pay account at any merchant -- on-line or otherwise, or (3) provided personal information to any organization (business or otherwise) in the preceding six months. Participants were screened to insure they met the previously stated requirements of the study. Participants were informed that when answering the study's questions they should consider their interaction with any organization through which they either conducted transactions or provided personal identification information regardless of if that organization had suffered a breach or not. Surveys were taken and collected via a controlled access website that randomized all sample questions. While not excluding students, this study focused on participants from the general population. The sample was not restricted to any group or country although the majority of responses (approximately 79%) came from the United States. For this sampling, 1,763 fully completed and useable surveys were obtained.

The sample was composed of 653 (37%) females and 1110 (63%) males with a mean age of 36.8 years (standard deviation 12.6). Participants had the following education make-up -- 1.2% no high school degree, 6.9% high school completion, 19.2% some college work, 12.5% associates degree, 39.2% bachelor degree, and 21% graduate degree. The questionnaire also collected income demographics with 43.9% having income of less than \$75,000 per year, 38.4% between \$75,000 & \$150,000, 9.7% between \$150,000 & \$200,000, and 8.1% in excess of \$200,000.

## **6. Research analysis**

Analysis and data validation were conducted in phases following recommended research guidelines (Cenfetelli & Bassellier, 2009; Hair et al., 2013; Moody et al., 2014).

First, data were examined to determine the extent of multicollinearity, reliability, or common-method bias. The data were found to be free of missing data for all observed items with the exception of control variables gender, age, highest level of education, ethnicity, and income.

The second phase of the analysis proceeded by establishing factorial validity using exploratory factor analysis (EFA). EFA was conducted using Unweighted Least Squares (ULS) with oblimin rotation used to extract the maximum shared variance, leaving unique and error variance in the model (Osborne & Banjanovi, 2016). ULS was considered to be more robust in the presence of violations of multivariate normality. The assumption that the manifest variables were correlated suggested that an oblimin rotation was appropriate. Initial analysis indicated an 8 factor model with 32 variables after examining the scree plot and data pattern matrices for the full sample.

The next phase of the analysis examined the model using path analysis. The path analysis was used to test the theoretical model to determine directional relationships and assess the overall viability of the model. After examining the final path analysis results, all paths were retained. Additionally, the Comparative Fit Index (CFI) (0.85), Standardized Root Mean Square Residual (SRMR) (0.06), Root Mean Square Error of Approximation (RMSEA) (0.167) and the full RMSEA 90% confidence interval were within acceptable limits,  $(0.153 \leq \text{RMSEA} \leq 0.181)$ .

Continuing with the analysis, the theoretical model was examined using Confirmatory Factor Analysis (CFA). Using the approach suggested by Anderson and Gerbing (1988), CFA was used to provide evidence that the indicator variables effectively measured the underlying constructs of the measurement model. Initial goodness-of-fit statistics were less than favorable. After examining results and Lagrange Multipliers (LM), two manifest variables were removed, retaining 30 variables. The CFI (0.94), GFI (0.89), RMSEA (0.064), and RMSEA 90% confidence interval  $(0.062 \leq \text{RMSEA} \leq 0.066)$ , results of the CFA indicated an acceptable fit.

The final step, assessing the structural model, indicated that the model identified five exogenous variables, Reputation, Knowledge, Technology Trust, Disposition to Trust and Disposition to Distrust and two endogenous variables that moderated levels of Trusting and Distrusting Beliefs affecting levels of Intent. All reported goodness-of-fit values were within acceptable ranges based on research (Hair et al., 2013). RMSEA (0.068), RMSEA 90% confidence interval  $(0.066 \leq \text{RMSEA} \leq 0.07)$ , and SRMR (0.058) support the conclusion that the model did a reasonable job of accounting for the covariance in the data. Additionally, 27% of the variance in Intentions is explained by Trusting and Distrusting Beliefs, 63% of the variance in Trusting Beliefs is explained by Disposition to Trust, Reputation, Knowledge, and Technology Trust, and 48% of the variance in

Distrusting Beliefs is explained by Disposition to Distrust, Reputation, Knowledge, and Technology Trust.

### **6.1 Measurement model analysis**

Common-method bias is a measurement error attributable to systematic error in the measurement method observed most often in research studies involving self-reported measures in measurement instruments. The Pearson correlation coefficient matrix for manifest variables was examined for mono-method bias and reliability (Podsakoff et al., 2003). All correlation coefficients were between -0.63 and 0.89 suggesting a lack of mono-method bias (See Table 1). Research suggests (Cenfetelli and Bassellier, 2009; Hair et al., 2013) that indicators with VIF values less than 10 are generally acceptable. The model's VIF values ranged from 1.919 to 6.720. Cronbach's Alphas ranged between 0.837 and 0.934 with only the indicators for Knowledge being below 0.9. The literature suggests that Cronbach's alphas greater than 0.70 are acceptable and values greater than 0.80 are ideal (Nunnally & Bernstein, 1994) (See Table 2). Statistical power is estimated at 0.99 for this model.

### **6.2 Convergent validity**

Research suggests that convergent validity is established using three measures (Hair et al., 2013). The first indicator of convergent validity is the size of the factor loadings. All standardized factor loadings ranged between 0.5943 and 0.9306. With the exception of one variable, all loading exceeded 0.61. The second indicator of convergent validity is the average variance extracted (AVE) for each item. AVE ranged between 0.504 and 0.766 (values exceeding 0.50 suggest adequate convergence). The third indicator of convergence uses reliability estimates where values greater than 0.6 are acceptable, i.e. internal consistency. Reliability estimates range between 0.604 and 0.915 and consistently represent the same latent construct. Therefore, there is empirical evidence to suggest that the model achieves convergent validity (See Table 2).

### **6.3 Discriminant validity**

Discriminant validity is achieved when the variables that should not be related are not. This is evidenced in exploratory factor analysis by variables *hanging* together without cross loading on other factors. The suggested approach for determining discriminant validity is to compare the AVE to the square of the correlation estimate for each latent construct (Hair et al., 2013). Empirically, AVE estimates suggest that the model violates this condition. However, the variables exhibit high loadings on each latent construct and exhibited no cross loading below the 0.55 level.

**Table 1** Pearson Correlation Coefficients for Manifest Variables

	I1	I2	I3	TR1	TR2	TR3	TR4	TR5	DB1	DB2	DB3	DB4	DB5	DT1	DT2	DT3
I1	1.00															
I2	0.88	1.00														
I3	0.79	0.80	1.00													
TR1	0.44	0.44	0.47	1.00												
TR2	0.41	0.43	0.42	0.81	1.00											
TR3	0.42	0.42	0.46	0.81	0.79	1.00										
TR4	0.38	0.38	0.44	0.70	0.67	0.74	1.00									
TR5	0.46	0.46	0.50	0.78	0.73	0.81	0.73	1.00								
DB1	-0.35	-0.37	-0.35	-0.53	-0.49	-0.54	-0.41	-0.55	1.00							
DB2	-0.33	-0.37	-0.33	-0.50	-0.47	-0.52	-0.43	-0.54	0.90	1.00						
DB3	-0.36	-0.37	-0.38	-0.54	-0.49	-0.57	-0.50	-0.63	0.83	0.85	1.00					
DB4	-0.34	-0.37	-0.37	-0.52	-0.46	-0.52	-0.49	-0.59	0.78	0.81	0.86	1.00				
DB5	-0.36	-0.39	-0.37	-0.57	-0.51	-0.58	-0.46	-0.63	0.82	0.82	0.84	0.83	1.00			
DT1	0.17	0.17	0.18	0.35	0.29	0.33	0.32	0.33	-0.18	-0.18	-0.16	-0.21	-0.21	1.00		
DT2	0.19	0.19	0.19	0.34	0.31	0.32	0.29	0.33	-0.09	-0.06	-0.10	-0.14	-0.14	0.68	1.00	
DT3	0.18	0.17	0.17	0.36	0.37	0.37	0.35	0.37	-0.22	-0.18	-0.16	-0.17	-0.22	0.66	0.61	1.00

Table 1 Pearson Correlation Coefficients for Manifest Variables (continued)

	DDT1	DDT2	DDT3	DDT4	DDT5	REP1	REP2	REP3	REP4	K1	K2	K3	K4	TT1	TT2	TT3
DDT1	1.00															
DDT2	0.72	1.00														
DDT3	0.53	0.69	1.00													
DDT4	0.61	0.69	0.69	1.00												
DDT5	0.58	0.60	0.55	0.72	1.00											
REP1	0.01	0.00	-0.01	0.00	0.00	1.00										
REP2	0.01	-0.03	-0.03	-0.02	-0.02	0.79	1.00									
REP3	0.02	0.01	-0.03	0.00	0.02	0.78	0.81	1.00								
REP4	0.02	0.01	-0.01	0.00	0.04	0.71	0.76	0.81	1.00							
K1	0.26	0.22	0.20	0.25	0.20	0.11	0.07	0.11	0.09	1.00						
K2	0.30	0.23	0.18	0.24	0.21	0.13	0.12	0.12	0.10	0.65	1.00					
K3	0.31	0.27	0.27	0.30	0.23	0.16	0.15	0.15	0.15	0.54	0.57	1.00				
K4	0.36	0.29	0.23	0.31	0.32	0.22	0.18	0.21	0.19	0.52	0.53	0.56	1.00			
TT1	-0.05	-0.05	-0.06	-0.05	-0.08	0.27	0.25	0.28	0.30	0.10	0.07	0.08	0.06	1.00		
TT2	-0.07	-0.09	-0.06	-0.04	-0.09	0.25	0.24	0.27	0.27	0.18	0.11	0.08	0.12	0.78	1.00	
TT3	-0.01	-0.03	-0.02	0.02	-0.04	0.30	0.29	0.30	0.32	0.21	0.14	0.10	0.16	0.71	0.80	1.00



**Table 2** Factor Loadings, Average Variance Extracted (AVE), and Cronbach Alphas

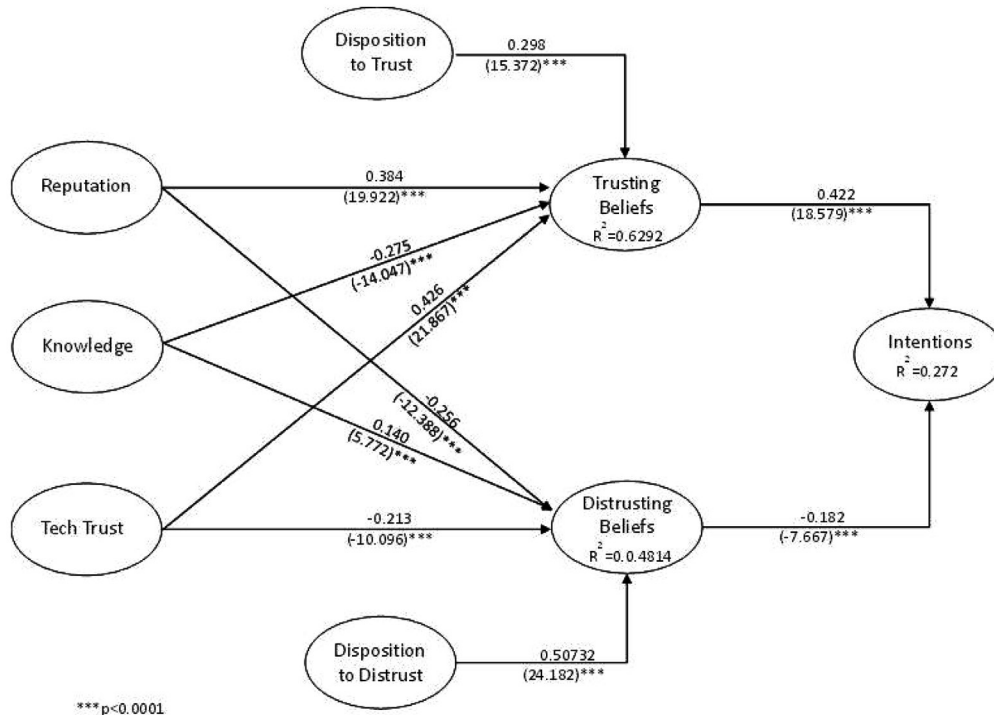
Constructs and Indicators	Standardized Loading $L_i$	Indicator Reliability $L_i^2$	Error Variance $1 - L_i^2$	Composite Reliability	Variance Extracted (AVE)	Squared Multiple Correlations of the Variables with Each Factor	Cronbach Coefficient Alpha
Intentions (F1)					0.7655	0.9463	0.9331
V1	0.9069	0.8225	0.1775	0.9069			
V2	0.9306	0.8660	0.1340	0.8476			
V3	0.7798	0.6081	0.3919	0.6692			
Trust_Beliefs (F2)					0.5201	0.9302	0.9003
V4	0.6347	0.4029	0.5971	0.7474			
V5	0.7833	0.6136	0.3864	0.7056			
V6	0.6918	0.4786	0.5214	0.6939			
Distrust_Beliefs (F3)					0.5748	0.8928	0.9622
V7	0.7650	0.5853	0.4147	0.8263			
V8	0.8220	0.6757	0.3243	0.8166			
V9	0.7616	0.5800	0.4200	0.7771			
V10	0.7338	0.5385	0.4615	0.6811			
V11	0.7033	0.4947	0.5053	0.7427			
Disp_Trust (F4)					0.6166	0.9455	0.8472
V12	0.8307	0.6901	0.3099	0.8278			
V13	0.7970	0.6352	0.3648	0.7336			
V14	0.7242	0.5244	0.4756	0.6076			
Disp_Distrust (F5)					0.5036	0.9279	0.8988
V15	0.5942	0.3531	0.6469	0.7283			
V16	0.7814	0.6106	0.3894	0.7901			
V17	0.6792	0.4613	0.5387	0.7627			
V18	0.7748	0.6002	0.3998	0.7062			
V19	0.7019	0.4926	0.5074	0.7157			
Reputation (F6)					0.6703	0.8462	0.9337
V20	0.7896	0.6235	0.3765	0.8744			
V21	0.8577	0.7356	0.2644	0.8672			
V22	0.8593	0.7383	0.2617	0.7954			
V23	0.7641	0.5838	0.4162	0.7459			
Knowledge (F7)					0.5231	0.8565	0.8374
V24	0.7782	0.6056	0.3944	0.8001			
V25	0.7997	0.6395	0.3605	0.7444			
V26	0.6874	0.4725	0.5275	0.5944			
V27	0.6124	0.3750	0.6250	0.6348			
Tech_Trust (F8)					0.6977	0.8901	0.9071
V28	0.7483	0.5600	0.4400	0.8728			
V29	0.9357	0.8755	0.1245	0.8673			
V30	0.8109	0.6576	0.3424	0.6576			

## 6.4 Structural model analysis

The theoretical model identifies three first order constructs, Reputation (F6), Knowledge (F7), and Tech Trust (F8) as well as two second order constructs, Disposition to Trust (F4) and Disposition to Distrust (F5). Three other constructs were identified, Trusting Beliefs (F2), Distrusting Beliefs (F3), and Intentions (F1). Intentions, Trusting Beliefs and Distrusting Beliefs are second order variables. Goodness-of-fit indices for the SEM are within acceptable limits. All paths linking the latent constructs were determined to be in the appropriate direction and significant at  $p < 0.0001$ . The standardized path coefficients from Trusting Beliefs (F2) to Intentions (F1) is 0.423,  $t = 18.58$ ,  $p < 0.0001$  from Distrusting Beliefs (F3) to Intentions (F1) is -0.182,  $t = -7.667$ ,  $p \leq 0.0001$ .

## 7. Results

The theoretical model (see Figure 1) exhibits the constructs and their respective relationship magnitude and direction. The higher trusting beliefs, the more likely consumers' intentions will be manifested by their intentions. Prior research suggests that



**Figure 1** Comprehensive Model

Note. \*\*\*  $p < 0.0001$

there is a strong relationship between consumers' trusting beliefs and their intentions. The theoretical model portraying the relationship between trusting beliefs and intentions confirms this relationship. The research shows that there is a strong, positive (0.422,  $p < 0.0001$ ) relationship between trusting beliefs and intentions. Therefore, Hypothesis 1 is supported. The relationship between distrusting beliefs and intentions is negatively related (-0.180,  $p < 0.000$ ). This supports prior research findings that distrusting beliefs are a conceptually separate construct from trusting beliefs. Therefore, Hypothesis 2 is supported.

Hypotheses 3 and 4 for disposition to trust and disposition to distrust were both supported (0.290,  $p < 0.0001$  and 0.510,  $p < 0.0001$ ). As antecedents, disposition to distrust appears to have a stronger relationship to distrusting beliefs than disposition to trust with trusting beliefs. This finding is not surprising given that trusting beliefs and distrusting beliefs are conceptually different concepts. Reputation indicated a strong positive relationship (0.0.390,  $p < 0.0001$ ) with trusting beliefs and and negative relationship with distrusting beliefs (0.140,  $p < 0.0001$ ). Prior research indicates that reputation often plays a role in people's beliefs. Therefore, the theoretical model supports both hypotheses 5a and 5b.

Prior research suggests that knowledge is an important antecedent in many theoretical models of attitude due to its direct and indirect effects on behavior. Knowledge has a negative relationship (-0.280,  $p < 0.0001$ ) with trusting beliefs and a somewhat weaker, positive relationship (0.140,  $p < 0.0001$ ) with distrusting beliefs. Knowledge that would protect an individual from technology-driven transactions would strengthen this argument. The model supports hypotheses 6a and 6b. Technology trust exhibits a strong, positive relationship with trusting beliefs (0.430,  $p < 0.0001$ ) and a negative relationship with distrusting beliefs (-0.220,  $p < 0.0001$ ) suggesting that as a consumer becomes more dependent on technology to complete specific tasks or transactions, the stronger the trusting beliefs. On the other hand, a lack of trust in an organization's technology suggests that distrusting beliefs or avoidance of such technology. Hypotheses 7a and 7b are supported in the model.

## **8. Discussion and conclusion**

This research provides interesting insights into an academic discussion -- the relationship of trust and distrust -- as well as understanding of consumer behavior in data theft environments, a new phenomenon. This study and was undertaken in part because both researchers had their information compromised during data breaches. Trust and

distrust were historically believed to be opposite ends of the same continuum. The belief that they are distinct constructs with unique antecedents was introduced by Lewiciki et al. (1998) and is still widely argued. The researchers recognize that one study neither confirms nor rejects theory but while using a large sample of real-world participants, as opposed to students, the empirical findings support the concept that trust and distrust are distinct constructs and those constructs directly impact the intentions of consumers.

While shedding light on a new phenomenon, the study created as many questions as it provided answers. Since this study was a snapshot in time a follow-up study of a longitudinal nature of trust/distrust would be very interesting to understand the lasting impacts of data breaches on trust/distrust as well as the impact on consumer intentions. Additionally, this study did not explore the degree of impact, only if the participants had been directly exposed to a data breach. Clearly the magnitude of the incident should create varied reactions by consumers, leading to stronger changes in intentions. A future study of the degree of loss and its impact would provide an interesting extension. Further, while not emphasized in this study, our sample was drawn from a global population (although predominately USA). We did not differentiate on national or cultural origin but it would be interesting to understand any cultural implications that future studies might derive.

The subject material of this research is of interest to both academics and practitioners. Future studies from an academic standpoint should extend this work while attempting to understand the relationships amongst trust and distrust and their antecedents. Those relationships would further clarify the nature of trust and distrust. For practitioners, future studies of the relationships -- amongst trust, distrust, their antecedents, and intentions -- and their strengths could assist in the understanding of how changes in one factor impact a consumer's behaviors and intentions. This in turn could provide organizations remedies that go beyond 'locking down' a system. For instance, strong relationships were discovered between reputation and trust and distrust. Assuming that these relationships are generalizable, organizations could enhance their reputation which in turn could provide benefits if they suffer as data breach. The same can be inferred for knowledge and technology trust.

All investigations and reports suggest that data breaches and loss of data will continue to increase and that the magnitude of the losses will expand correspondingly. This exploratory study examined the impact of data breaches/hacks on trust/distrust, their antecedents, and intentions. This research demonstrates that, within this context, trust and distrust are distinct constructs with distinct antecedents.

## References

- Abimbola, T. and Vallaster, C. (2007), 'Brand, organization identity and reputation: SMEs as expressive organizations', *Qualitative Market Research: An International Journal*, Vol. 10, No. 4, pp. 416- 430.
- Alba, J.W. and Hutchinson, J.W. (1987), 'Dimensions of consumer expertise', *Journal of Consumer Research*, Vol. 13, No. 4, pp. 411-454.
- Anderson, J.C. and Gerbing, D.W. (1988), 'Structural equation modeling in practice: a review and recommended two-step approach', *Psychology Bulletin*, Vol. 103, No. 3, pp. 411-423.
- Ba, S. and Pavlou, P.A. (2002), 'Evidence of the effect of trust building technology in electronic markets: price premiums and buyer behavior', *MIS Quarterly*, Vol. 26, No. 3, pp. 243-268.
- Barber, N., Taylor, C. and Strick, S. (2009), 'Wine consumers' environmental knowledge and attitudes: influence on willingness to purchase', *International Journal of Wine Research*, Vol. 2009, No. 1, pp. 59-72.
- Benamati, J., Serva, M.A. and Fuller, M.A. (2010), 'The productive tension of trust and distrust: the coexistence and relative role of trust and distrust in online banking', *Journal of Organizational Computing and Electronic Commerce*, Vol. 20, No. 4, pp. 328-346.
- Bettman, J.R. and Park, C.W. (1980), 'Effects of prior knowledge and experience and phase of the choice process on consumer decision processes: a protocol analysis', *Journal of Consumer Research*, Vol. 7, No. 3, pp. 234-248.
- Bhattacharjee, A. (2002), 'Individual trust in online firms: scale development and initial test', *Journal of Management Information Systems*, Vol. 19, No. 1, pp. 211-241.
- Brucks, M. (1985), 'The effects of product class knowledge on information search behavior', *Journal of Consumer Research*, Vol. 12, No. 1, pp. 1-16.
- Brumfield, J. (2015), 'Verizon 2015 data breach investigations report', available at: <http://www.verizon.com/about/news/2015-data-breach-report-info> (accessed on Feb 23, 2016).
- Cave, J. (2005), 'The economics of cyber trust between cyber partners', in Mansell, R. and Collins, B.S. (Eds.), *Trust and Crime in Information Societies*, Edward Elgar, Cheltenham, UK, pp. 380-427.
- Cenfetelli, R.T. and Bassellier, G. (2009), 'Interpretation of formative measurement in information systems research', *MIS Quarterly*, Vol. 33, No. 4, pp. 689-707.
- Chau, P.Y.K., Ho, S.Y., Ho, K.K. and Yao, Y. (2013), 'Examining the effects of malfunctioning personalized services on online users', *Decision Support Systems*, Vol. 56, pp. 180-191.

- Colesca, S.E. (2009), 'Understanding trust in e-government', *Economics of Engineering Decisions*, Vol. 3, pp. 7-15.
- Conlon, E.J. and Mayer, R.C. (1994), 'The effect of trust on principal-agent dyads: an empirical investigation of stewardship and agency', *Academy of Management Meeting*, Dallas, TX.
- Cowley, E. and Mitchell, A.A. (2003), 'The moderating effect of product knowledge on the learning and organization of product information', *Journal of Consumer Research*, Vol. 30, No. 3, pp. 443-454.
- Dirks, K.T. and Ferrin, D.L. (2001), 'The role of trust in organizational settings', *Organizational Science*, Vol. 12, No. 4, pp. 450-467.
- Doney, P.M. and Cannon, J.P. (1997), 'An examination of the nature of trust in buyer-seller relationships', *Journal of Marketing*, Vol. 61, No. 2, pp. 35-51.
- Evenstad, L. (July 12-18, 2016), 'The importance of trust and ethics in a digital world', *Computer weekly*, pp. 23-28.
- Fogg, B. (2002), *Persuasive Technology: Using Computers to Change What We Think and Do*, Morgan Kaufmann, Boston, MA.
- Fombrun, C. and Rindova, V.P. (2000), 'The road to transparency: reputation management at royal Dutch/Shell', in Schultz, M., Hatch, M.J. and Larsen, M.H. (Eds.), *The Expressive Organization: Linking Identity, Reputation, and the Corporate Brand*, Oxford University Press, Oxford, UK, pp. 233-258.
- Fombrun, C. (2005), 'The leadership challenge of building resilient corporate reputations', in Doh, J.P. and Stumpf, S.A. (Eds.), *Handbook on Responsible Leadership and Governance in Global Business*, Edward Elgar, Northampton, MA, pp. 54-70.
- Gambetta, D.G. (1988), 'Can we trust trust?', in Gambetta, D. (Ed.), *Trust: Making and Breaking Cooperative Relations*, Blackwell, New York, NY, pp. 213-237.
- Ganesan, S. (1994), 'Determinants of long-term orientation in buyer-seller relationships', *Journal of Marketing*, Vol. 58, No. 2, pp. 1-19.
- Garbarino, E. and Johnson, M.S. (1999), 'The different roles of satisfaction, trust and commitment in customer relationships', *Journal of Marketing*, Vol. 63, No. 2, pp. 70-87.
- Gefen, D. (2000), 'E-commerce: the role of familiarity and trust', *Omega*, Vol. 28, No. 6, pp. 725-737.
- Gefen, D., Karahanna, E., and Straub, D.W. (2003), 'Trust and TAM in online shopping: an integrated model', *MIS Quarterly*, Vol. 27, No. 1, pp. 51-90.



- Gefen, D. (2004), 'What makes an ERP implementation relationship worthwhile: linking trust mechanisms and ERP usefulness', *Journal of Management Information Systems*, Vol. 21, No. 1, pp. 263-288.
- Ghazizadeh, M., Lee, J.D. and Boyle, L.N. (2012), 'Extending the technology acceptance model to assess automation', *Cognition, Technology & Work*, Vol. 14, No. 1, pp. 39-49.
- Grazioli, S and Jarvenpaa, S. (2000), 'Perils of internet fraud: an empirical investigation of deception and trust with experienced internet users', *IEEE Transactions on Systems, Man & Cybernetics, Part A : Systems and Humans*, Vol. 30, No. 4, pp. 395-412.
- Hadar, L., Sood, S. and Fox, C. (2013), 'Subjective knowledge in consumer financial decisions', *Journal of Marketing Research*, Vol. 50, No. 3, pp. 303-316.
- Hair, J.F., Black, W.C. Babin B.J. and Anderson R.E. (2013), *Multivariate Data Analysis*, Pearson Education, Harlow, UK.
- Ho, S.Y. and Chau, P.Y. (2013), 'The effects of location personalization on integrity trust and integrity distrust in mobile merchants', *International Journal of Electronic Commerce*, Vol. 17, No. 4, pp. 39-71.
- Hoffman, D.L., Novak, T.P. and Peralta, M. (1999), 'Building consumer trust online', *Communications of the ACM*, Vol. 42, No. 4, pp. 80-85.
- Jarvenpaa, S.L. and Tractinsky, N. (1999), 'Consumer trust in an internet store: a cross-cultural validation', *Journal of Computer-Mediated Communication*, Vol. 5, No. 2, pp. 0.
- Jarvenpaa, S.L., Tractinsky, N. and Vitale, M. (2000), 'Consumer trust in an internet store', *Information Technology and Management*, Vol. 1, No. 1, pp. 45-71.
- Jeng, J. and Fesenmaier, D.R. (2002), 'Conceptualizing the travel decision-making hierarchy: a review of recent developments', *Tourism Analysis*, Vol. 7, No. 1, pp. 15-32.
- Johnson, D.S. (2007), 'Achieving customer value from electronic channels through identity commitment, and trust in technology', *Journal of Interactive Marketing*, Vol. 21, No. 4, pp. 2-22.
- Johnson, E.J. and Russo, J.E. (1984), 'Product familiarity and learning new information', *Journal of Consumer Research*, Vol. 11, No. 1, pp. 542-550.
- Keen, P, G. W., Balance, C., Chan, S. and Schrupp, S. (1999), *Electronic Commerce Relationships: Trust by Design*, Prentice-Hall, Englewood Cliffs, NJ.
- Keen, P.G. (2000), 'Ensuring e-trust', *Computerworld*, Vol. 34, No.11, pp. 46.

- Khe, H.T. and Xie, Y. (2009), 'Corporate reputation and customer behavioral intentions. the roles of trust, identification and commitment', *Industrial Marketing Management*, Vol. 38, No. 7, pp. 732-742.
- Kim, E. and Tadisna, S. (2007), 'A model of customers' trust in e-businesses: micro-level inter-party trust formation', *Journal of Computer Information Systems*, Vol. 48, No. 1, pp. 88-104.
- Kim, H.W., Xu, Y. and Koh, J. (2004), 'A comparison of online trust building factors between potential customers and repeat customers', *Journal of the Association for Information Systems*, Vol. 5, No. 10, pp. 392-420.
- Kim, J.B. (2012), "An empirical study on consumer first purchase intention in online shopping: integrating initial trust and TAM", *Electronic Consumer Research*, Vol. 12, No. 2, pp. 125-150.
- Klink, R. R. and Smith, D.C. (2001), 'Threats to the external validity of brand extension research', *Journal of Marketing Research*, Vol. 38, No. 3, pp. 326-335.
- Komiak, S.Y. and Benbassat, I. (2008), 'A two-process view of trust and distrust building in recommendation agents: a process-tracing study', *Journal of the Association for Information Systems*, Vol. 9, No. 12, pp. 727-747.
- Kramer, R.M. (1999), 'Trust and distrust in organizations: emerging perspectives, enduring questions', *Annual Review of Psychology*, Vol. 50, No. 1, pp. 569-598.
- Lankton, N., McKnight, D.H. and Thatcher, J.B. (2014), 'Incorporating trust-in-technology into expectation disconfirmation theory', *Journal of Strategic Information Systems*, Vol. 23, No. 2, pp. 128-145.
- Lewicki, R.J. and Bunker, B.B. (1996), 'Developing and maintain trust in work relationships', in Kramer, R.M. and Tyler, T.M. (Eds.), *Trust in Organizations: Frontiers of Theory and Research*, Sage, Thousand Oaks, CA, pp. 114-139.
- Lewicki, R.J., McAllister, D.J. and Bies, R.J. (1998), 'Trust and distrust: new relationships and realities', *The Academy of Management Review*, Vol. 23, No. 3, pp. 438-458.
- Li, X., Hess, T. and Valacich, J.S. (2008), 'Why do we trust new technology? a study of initial trust formation with organizational information systems', *Journal of Strategic Information Systems*, Vol. 17, No. 1, pp. 39-71.
- Lin, H.F. (2011), 'An empirical investigation of mobile banking adoption: the effect of innovation attributes and knowledge-based trust', *International Journal of Information Management*, Vol. 31, No. 3, pp. 252-260.

- Liu, C.T., Marchewka, J. and Yu, C. (2005), 'Beyond concern: a privacy trust-behavioral intention model of electronic commerce', *Information and Management*, Vol. 42, No. 2, pp. 289-304.
- Luhmann, N. (1979), *Trust and Power: Two Works*, Wiley, Chichester, UK.
- Macintosh, G. and Lockshin, L.S. (1997), 'Retail relationships and store loyalty: a multi-level perspective', *International Journal of Research in Marketing*, Vol. 14, No. 5, pp. 478-497.
- Masrek, M.N., Salwani, I., Daud, N.M. and Omar, N. (2014), 'Technology trust and mobile banking satisfaction: a case of Malaysian consumers', *Procedia -- Social and Behavioral Sciences*, Vol. 129, pp. 53-58.
- Mayer, R.C., Davis, J.H. and Schoorman, F.D. (1995), 'An integrative model of organizational trust', *The Academy of Management Review*, Vol. 20, No. 3, pp. 709-734.
- McKnight, D.H., Carter, M., Thatcher, J.B. and Clay, P.L. (2011), 'Trust in a specific technology: an investigation of its components and measures', *ACM Transactions on Management Information Systems*, Vol. 2, No. 2, doi: 10.1145/1985347.1985353.
- McKnight, D.H., Cummings, L.L. and Chervany, N.L. (1998), 'Initial trust formation in new organizational relationships', *Academy of Management Review*, Vol. 23, No. 3, pp. 437-490.
- McKnight, D.H. and Chervany, N.L. (2001), 'What trust means in e-commerce customer relationships: an interdisciplinary conceptual typology', *International Journal of Electronic Commerce*, Vol. 6, No. 2, pp. 35-59.
- McKnight, D.H., Choudhury, V. and Kacmar, C. (2002), 'Developing and validating trust measures for e-commerce: an integrative typology', *Information Systems Research*, Vol. 13, No. 3, pp. 334-359.
- McKnight, D.H., Kacmar, C. and Choudhury, V. (2004), 'Dispositional trust and distrust distinctions in predicting high- and low-risk internet expert advice site expectations', *E-Service Journal*, Vol. 3, No. 2, pp. 35-58.
- Merritt, S.M. and Ilgen, D.R. (2008), 'Not all trust is created equal: dispositional and history-based trust in human-automation interactions', *Human Factors: The Journal of the Human Factors and Ergonomics Society*, Vol. 50, No. 2, pp. 194-210.
- Merritt, S.M., Heimbaught, H., LaChapell, J. and Lee, D. (2013), 'I trust it, but I don't know why: effects of implicit attitudes toward automation on trust in an automated system', *Human Factors: The Journal of the Human Factors and Ergonomics Society*, Vol. 55, No. 3, pp. 520-534.

- Montague, E.N., Kleiner, B.M. and Winchester, W.W. (2009), 'Empirically understanding trust in medical technology', *International Journal of Industrial Ergonomics*, Vol. 39, No. 4, pp. 628-634.
- Moody, G.D., Galletta, D.F. and Lowry, P.B. (2014), 'When trust and distrust collide online: the engenderment and role of consumer ambivalence in online consumer behavior', *Electronic Commerce Research and Applications*, Vol. 13, No. 4, pp. 266-282.
- Muir, B.M. (1994), 'Trust in automation: part I. theoretical issues in the study of trust and human intervention in automated systems', *Ergonomics*, Vol. 37, No. 11, pp. 1905-1922.
- Nunnally, J.C. and Bernstein, I.H. (1994), *Psychometric Theory*, McGraw-Hill, New York, NY.
- Osborne, J.W. and Banjanovic, E.S. (2016), *Exploratory Factor Analysis with SAS*, SAS Institute, Cary, NC.
- Ou, C.X. and Sia, C.L. (2010), 'Consumer trust and distrust: an issue of website design', *International Journal of Human-Computer Studies*, Vol. 68, No. 12, pp. 913-934.
- Ozawa, N. (2015), '\$16 billion stolen from 12.7 million identity fraud victims in 2014', available at: <https://www.javelinstrategy.com/press-release/16-billion-stolen-127-million-identity-fraud-victims-2014-according-javelin-strategy> (accessed on July 22, 2015).
- Park, C.W. and Moon, B.J. (2003), 'The relationship between product involvement and product knowledge: moderating roles of product type and product knowledge type', *Psychology and Marketing*, Vol. 20, No. 11, pp. 977-997.
- Pavlou, P.A. (2003), 'Consumer acceptance of electronic commerce: integrating trust and risk with the technology acceptance model', *International Journal of Electronic Commerce*, Vol. 7, No. 3, pp. 101-134.
- Pavlou, P.A. and Gefen, D. (2005), 'Psychological contract violation in online marketplaces: antecedents, consequences, and moderating role', *Information Systems Research*, Vol. 16, No. 4, pp. 372-399.
- Podsakoff, P.M., MacKenzie, S.B., Jeong-Yeon, L. and Podsakoff, N.P. (2003), 'Common method biases in behavioral research: a critical review of the literature and recommended remedies', *Journal of Applied Psychology*, Vol. 88, No. 5, pp. 879-903.
- Powell, W.W. (1996), 'Trust-based forms of governance', in Kramer, R.M. and Tyler, T.R. (Eds.), *Trust in Organizations: Frontiers of Theory and Research*, Sage, Thousand Oaks, CA, pp. 1-67.
- Ratchford, B.T. (2001), 'The economics of consumer knowledge. *The Journal of Consumer Research*, Vol. 27, No. 4, pp. 397-411.

- Riegelsberger, J., Sasse, M.A. and McCarthy, J.D. (2005), 'The mechanics of trust: a framework for research and design', *International Journal of Human-Computer Studies*, Vol. 62, No. 3, pp. 381-422.
- Rotter, J.B. (1971), 'Generalized expectancies for interpersonal trust', *American Psychologist*, Vol. 26, No.5, pp. 443-452.
- Rousseau, D.M., Sitkin, S.B., Burt, R.S. and Camerer, C. (1998), 'Not so different after all: a cross-discipline view of trust', *Academy of Management Review*, Vol. 23, No. 3, pp. 393-404.
- Schmidt, J.B. and Spreng, R.A. (1966), 'A proposed model of external consumer information search', *Journal of the Academy of Marketing Science*, Vol. 24, No. 3, pp. 246-256.
- Schoorman, F.D., Mayer, R.C. and Davis, J.H. (2007), 'An integrative model of organizational trust: past, present, and future', *Academy of Management Review*, Vol. 32, No. 2, pp. 344-354.
- Seckler, M., Heinz, S., Forde, S., Tuch, A.N. and Opwis, K. (2015), 'Trust and distrust on the web: User experiences and web site characteristics', *Computers in Human Behavior*, Vol. 45, pp. 39-50.
- Selnes, F. and Howell, R. (1999), 'The effect of product expertise on decision making and search for written and sensory information', *Advances in Consumer Research*, Vol. 26, No. 1, pp. 80-89.
- Silver, H. (2014) 'The impact of target's data breach on consumer trust', available at: <http://connexity.com/blog/2014/05/the-impact-of-targets-data-breach-on-consumer-trust/> (accessed on July 22, 2015).
- Shapiro, S.P. (1987), 'The social control of interpersonal trust', *American Journal of Sociology*, Vol. 93, No. 3, pp. 623-658.
- Sitkin, S.B. and Roth, N. (1993), 'Explaining the limited effectiveness of legalistic "Remedies" for trust/distrust', *Organizational Science*, Vol. 4, No. 3, pp. 367-392.
- Suh, B. and Han, I. (2003), 'The impact of consumer trust and perception of security control on the acceptance of electronic commerce', *International Journal of Electronic Commerce*, Vol. 7, No. 3, pp. 135-161.
- Sujan, M. (1985), 'Consumer knowledge: effects on evaluation strategies mediating consumer judgments', *Journal of Consumer Research*, Vol. 12, No. 1, pp. 31-46.
- Thornhill, T. (2014), 'Nearly half of South Koreans have their bank details stolen (including the President) as anti-fraud worker arrested', *Daily Mail*, available at <http://www.dailymail>.

co.uk/news/article-2543167/Data-100MILLION-South-Korean-credit-cards-stolen-scam-affecting-40-population-including-President-Park-Geun-hye.html (accessed July 22, 2015).

- Vance, A., Elie-Dit-Cosaque, C. and Straub, D.W. (2008), 'Examining trust in information technology artifacts: the effects of system quality and culture', *Journal of Management Information Systems*, Vol. 24, No. 4, pp. 73-100.
- Vogt, C.A., and Fesenmaier, D.R. (1998), 'Expanding the functional information search model', *Annals of Tourism Research*, Vol. 25, No. 3, pp. 551-578.
- Williamson, O.E. (1985) *The Economic Institutions of Capitalism*. Free Press, New York, NY.
- Wu, J.J. and Tsang, A.S. (2008), 'Factors affecting members' trust belief and behavior intention in virtual communities', *Behaviour & Information Technology*, Vol. 27, No. 2, pp. 115-125.
- Xu, J., Kim, L., Dietermann, A. and Montague, E. (2014), 'How different types of users develop trust in technology: a qualitative analysis of the antecedents of active and passive user trust in a shared technology', *Applied Ergonomics*, Vol. 45, No. 6, pp. 1495-1503.
- Zhou, M. and Tian, D. (2010), 'An integrated model of influential antecedents of online shopping initial trust: empirical evidence in a low-trust environment', *Journal of International Consumer Marketing*, Vol. 22, No. 2, pp. 147-167.
- Zucker, L.G. (1986), 'Production of trust: institutional sources of economics structure, 1840-1920', *Research in Organizational Behavior*, Vol. 8, pp. 53-111.



## About the authors

**Steven John Simon** holds a PhD in Information Technology and International Business from the University of South Carolina and is currently an Associate Professor of Information Technology at Mercer University in Atlanta Georgia. He is a retired US Navy Captain having served 26 years. His assignments included Deputy CIO for the Office of Naval Research and US Sixth Fleet, CIO/J-6 for USSTRATCOM's WMD Center, Director of the Cyber Security Center at USNA, and Commanding Officer for both the Department of the Navy's Communication Security (COMSEC) System and Naval Information Operations Center – Georgia. He has published over 75 scholarly papers in journals including *ISR*, *EJIS*, *CACM*, and was editor-in-chief for *JIST*.

Corresponding Associate Professor, Stetson School of Business and Economics, Mercer University Dr., Atlanta, GA, 30341. Tel: +01-678-547-6118. E-mail address: Simon\_sj@mercer.edu

**Carol J. Cagle** holds a Ph.D. in Business Administration and Management Science from the University of Texas at Arlington, M.S. in Management of Technology from Georgia Institute of Technology, and M.S. and B.S. in Computer Science from George Washington University and Naval Postgraduate School, respectively. Dr. Cagle teaches graduate and undergraduate operations and supply chain management and business analytics courses. Her current research interests include operations strategy and business analytics. Dr. Cagle has extensive experience with Fortune 500 companies managing technological developments. She is an active member of the Institute of Electronic and Electrical Engineers (IEEE), the Association of Computing Machinery (ACM), the American Society for Quality (ASQ), The Institute for Operations Research and Management Sciences (INFORMS), and the Council of Supply Chain Management Professionals (CSCMP). E-mail address: Cagle\_cj@mercer.edu

## Appendix

### *Retained Survey Instrument Items*

(source in italics)

Have you, a family member, or close friend had your personal information compromised (information/files stolen or financial data, e.g. credit card or bank numbers) as a result of data theft or a hack with a retailer or organization you provided information?

#### **Knowledge** (Kim et al., 2004)

- K1 I understand the safeguards in place to protect my personal information.
- K2 I understand about encryption that can protect my information when stored and during transmission.

K3 I understand that there are laws in place to limit my liability if my personal information is compromised.

K4 I know that organizations are responsible for protecting my personal information.

**Disposition to Trust** (Benamati et al., 2010; Ho & Chau, 2013; McKnight et al., 2002)

DT1 I usually trust people until they give me a reason not to trust them.

DT2 I generally give people the benefit of the doubt when I first meet them.

DT3 My typical approach is to trust new acquaintances until they prove I should not trust them.

**Disposition to Distrust** (Ho & Chau, 2013)

DDT1 Most people are usually out for their own good.

DDT2 Most people pretend to care more about one another than they really do.

DDT3 Most people inwardly dislike putting themselves out to help other people.

DDT4 Most people would tell a lie if they could gain by it.

DDT5 Most people would cheat on their income tax if they thought they could get away with it.

**Technology Trust** (Cloesca, 2009)

TT1 I believe the technologies supporting ... are reliable.

TT2 I believe the technologies supporting ... are secure.

TT3 Overall, I have confidence in the technology used by....

**Reputation**

REP1 People say this organization has a good reputation. (Doney & Cannon, 1997)

REP2 In public opinion, this organization is favorably regarded. (Kim et al., 2004)

REP3 People say this organization has a good image. (Grazioli & Jarvenpaa, 2000)

REP4 This organization is well respected by people. (McKnight et al., 2002)

**Trust (in Organization)**

TR1 This organization is trustworthy. (Grazioli & Jarvenpaa, 2000)

TR3 This organization keeps customers' best interests in mind. (Grazioli & Jarvenpaa, 2000)

TR4 This organization would do the job right even if not monitored. (Suh & Han, 2003)

**Distrust (in Organization)** (Ou & Sia, 2010)

DB1 This organization looks suspicious.

DB2 This organization seems distrustful.

DB3 I feel skeptical (i.e., have doubts) about this organization.

DB4 I must be very watchful and wary when dealing with this organization.

DB5 I am fearful of dealing with this organization.

**Intentions** (Pavlou, 2003; Suh & Han, 2003)

I1 I intend to continue doing business with ... in the future.

I2 I expect I will continue working with ... in the future.

I3 I will strongly recommend others to use....