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Kim, Dan J., "A Study of the Dynamic Nature of Trust from a Longitudinal Perspective" (2008). *SIGHCI 2008 Proceedings*. 10.
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A Study of the Dynamic Nature of Trust from a Longitudinal Perspective

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ABSTRACT

Trust is dynamic in nature. It is a process rather than an outcome; it develops over time. Trust is an essential ingredient for successful business transactions in electronic commerce. Yet, there is little empirical research on the dynamic nature of trust in information systems and electronic commerce areas using a longitudinal (pre- and post-phase) approach. This paper proposes a model of dynamic trust from a longitudinal perspective. Furthermore, it provides empirical evidence of the dynamic nature of trust in the context of e-Channel and e-Vendor. The results of the study show that a consumer's trust changes over time due to variations in the level of trust in the pre-purchase phase and satisfaction with a previous transaction in the post-purchase phase. The results also reveal that satisfaction and post-trust are strong determinants of a consumer's future intention to reuse the e-Channel and to repurchase through the e-Vendor.

Keywords

Dynamic Trust Model, Pre-Trust, Satisfaction, Post-Trust, E-Channel Trust, E-Vendor Trust

INTRODUCTION

Trust is considered by many (Morgan and Hunt, 1994, Dwyer et al., 1987, Ganesan, 1994) to be a crux of relationships; trust plays a vital role in almost any commerce transaction involving monetary exchanges (Jarvenpaa et al., 2000, Ba et al., 1999, Hoffman et al., 1999, Noteberg et al., 1999). The issue of trust is even more critical in electronic commerce (e-commerce) since the degree of uncertainty of an e-commerce transaction is higher than in a traditional commerce transaction – i.e., a consumer's e-commerce transaction decision is made based upon his or her confidence in selling parties' processes that are not transparent (Urban et al., 2000). This is in stark contrast to the traditional brick-and-mortar business environment, where trust is based on personal relationships and face-to-face interactions between consumers and retailers.

Although research on trust in e-commerce transactions has well elucidated the essential role of trust and its antecedents in building long-term relationships (Kim et al., 2008, Kim et al., 2005, Kim et al., 2004, Gefen et al., 2003, McKnight and Chervany, 2002, McKnight et al., 2002, Pavlou, 2003, Pavlou et al., 2007), one critical limitation of prior e-commerce trust studies is that the dynamic nature of trust (i.e., changing over multiple stages of interactions) is not considered from a longitudinal perspective. Recently, Gefen, Benbasat, and Pavlou (2008) present an agenda for the future research to extend the conceptual foundations of trust to improve the practice in online environments. They mention that trust is not only about one-time interactions. Since trust develops gradually over time, "future research could opt for longitudinal studies of trust in online environments to uncover the unexplored nature and effects of trust over time" (p. 277).

This is a crucial omission since consumers' post purchase process differs qualitatively from the pre purchase process; they already have prior experiences. A different theoretical insight is needed to understand the nature and effects of trust over time on long-term relationships in e-commerce transactions. Thus, there is clearly a need to study the dynamic nature of trust from a longitudinal (pre- and post-purchase) perspective. This paper attempts to fill this gap by studying the dynamic nature of trust in e-commerce transactions as a two-fold strategy (pre and post).

LITERATURE REVIEW

Meta-analytic studies on online trust are reviewed, since they cover literature from a comprehensive perspective and help to ensure that the next wave of primary research moves in the correct direction. There have been at least five meta-analytic studies to date that have reviewed and critically synthesized consumer trust and online consumer behavior in electronic commerce contexts. A meta-analysis study conducted by Chang, Cheung, and Lai (2005) reviews 45 empirical studies on the antecedents of online shopping and derived two reference models for online shopping adoption. According to the findings of their study on trust, most empirical studies have tested the direct effect of trust. Whether trust is mediated by other variables has not been explored.

Another meta-analysis conducted by Grabner-Krauter and Kaluscha (2003) provides an integrative review of the empirical literature on on-line trust in electronic commerce. One important argument addressed in their paper based on the findings of the analysis is that trusting intentions (e.g., willingness of to buy, intention to purchase) and their antecedents are examined more often, whereas trust-related behaviors (e.g., completion of purchase, actual use) are investigated in only a few studies (Kim and Prabhakar, 2004, Pavlou, 2003, Suh and Han, 2003). Since intentions do not automatically imply behaviors, trust-related actual behavior (i.e., completion of purchase) as a consequent of trust has to be measured (Grabner-Krauter and Kaluscha, 2003). Another noticeable finding of the analysis is that on-line trust is not static but a dynamic phenomenon. To take into account the dynamic nature of trust, longitudinal studies are required. However, the majority of the reviewed studies did not specify the phase of trust from a longitudinal perspective. A similar argument is made in another meta-analysis study conducted by Saeed, Hwang, and Yi (Saeed et al., 2003). In their study they point out that a major avenue for future research is to investigate, the relationships between website use, online purchase, and post-purchase satisfaction (Saeed et al., 2003).

A limitation of most prior e-commerce research found across several of the cited meta-analytic studies is that previous online consumer trust research in electronic commerce area has not examined the dynamic nature of consumer trust from a longitudinal viewpoint.

THEORY GROUNDING

According to consumer marketing literature (Blackwell et al., 2001, Kalakota and Whinston, 1997, Blackwell and Stephan, 2001), the consumer purchase process consists of three general phases: pre-purchase, purchase and post-purchase phases. These phases of consumer behavior occur in electronic commerce transactions as well as traditional transactions (Blackwell and Stephan, 2001). While the successful completion of the initial transaction is an important first step in e-commerce relationship, the long-term relationship depends not only on the factors that fostered the pre-purchase phase, but also on the outcomes of the pre-purchase decision (Oliver, 1993).

An important point from the *social exchange theory* perspective is that the trustor-trustee relationships terminate or continue based on two types of comparisons (Kelly and Thibaut, 1978, Thibaut and Kelley, 1959, Blau, 1964). The first type is the comparison of the relationships with other partners (i.e., the alternative relationship comparison). In other words, the trustor-trustee relationship may continue unless they find any better relationships with someone else. The second type is the comparison of the relationships with the current partner (i.e., the balance or give-and-take relationship comparison). In general, the trustors want to keep the balance between giving and taking from the relationship with the trustee. When they perceive a smaller take/give ratio based on the prior interaction and experience of the relationships, they may terminate the relationship with trustees and try to find a better relationship elsewhere.

As an indicator of how well the trustees (e.g., vendors) provide services, *satisfaction* is critical because if trustors (e.g., customers) are satisfied with trustees' performance, both parties will build a mutual understanding and the relationships will be more likely to continue. Therefore, in an e-commerce context, as the customer's satisfaction increases with respect to the vendor's performance, their trust increases and the intention to continue the relationships with the existing vendors will also increase.

Drawing from the social exchange theory perspective, *a conceptual dynamic trust model* is proposed (see Figure 1). The underlining mechanism of the model describes as follows: Let a purchase transaction happen at time t. The dynamic trust model rests on the logic that both post-trust and satisfaction significantly affect relationship retention (e.g., willingness to reuse, intention to repurchase) in time t+1. The degree of post-trust is adjusted at time t+1, based on the level of pre-trust at time t-1 along with the level of satisfaction with the previous transaction experience at time t. Satisfaction also plays a mediating role in pre-trust. The pre-trust at time t-1 plays the role of an anchor for the adjusted level of trust (i.e., post-trust) at time t+1. Without negative encounters (e.g., bad experience, negative word-of-mouth, etc.), the level of post-trust is enhanced from pre-trust because of the service consistence of a vendor.

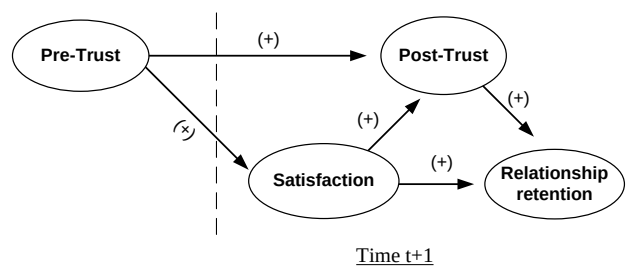

Figure 1. Dynamic Trust Model

E-CHANNEL TRUST VERSUS E-VENDOR TRUST: RESEARCH MODEL AND HYPOTHESES

In an e-commerce context, from a consumer's perspective there are at least two trustees: Internet as a shopping channel and an Internet selling party or Internet vendor as a business partner. Since an e-commerce transaction requires a consumer's sensitive personal and financial information (e.g., address, phone number, and credit card numbers), if the consumer does not have a certain level of trust in the selling party, he or she is also reluctant to make a transaction with the selling party. Further, e-commerce transactions involve trust not only between the consumer and the selling party, but also between the

consumer and the computer-mediated Internet channel through which the transactions are executed (Grabner-Krauter and Kaluscha, 2003). Thus, this study focuses on a consumer's trust in both trustees (i.e., e-channel and e-vendor) as trust-entities.

Trust and risk are closely related to each other. As an impersonal form of system trust (Grabner-Krauter and Kaluscha, 2003), the concept of *e-channel trust* is primarily related to a medium-specific transaction risk of using open technological infrastructures (i.e., the Internet) for monetary transactions (Chaudhury et al., 2001), while *e-vendor trust* as an interpersonal form of trust is associated with a partner-specific transaction risk that results from decisions of the partner, his ability, integrity, and willingness to perform. Grabner-Krauter and Kaluscha (2003) define system-dependent uncertainty (equivalent to system-specific transaction risk) as exogenous or environmental uncertainty that relates to "potential technological sources of errors and security gaps or to put it economically to technology-dependent risks that cannot to be avoided by an agreement or a contract with another actor who is involved in the transaction" (p. 785). Transaction-specific uncertainty (correspondent to partner-specific transaction risk) is defined as "endogenous or market uncertainty that results from decisions of economic actors and is caused by information asymmetry between sellers and buyers" (p. 786).

Satisfaction is an indicator of how well the vendors provide services. This is critical because if customers are satisfied with vendor performance, both parties will build mutual understanding and the relationships will be more likely to continue. Therefore, as the customer's satisfaction increases with respect to the vendors' performance, his or her trust increases and the intention to continue the relationships with the existing vendors will also increase. For the e-channel case, when the customers use the Internet for the first time as a new channel of shopping, it is natural for them to have a lower degree of trust since e-channel involves a higher degree of uncertainty and risk compared with the conventional shopping channel. However, once they have a positive experience (i.e., satisfied experience) that contributes to building a new level of trust in e-channel, they do not hesitate to reuse the e-channel. Thus satisfaction, as a summary of the trustor's previous experience, will, in turn, affect post-trust that is a prerequisite for future behaviors (i.e., reuse, repurchase, etc).

In e-commerce context, a consumer has pre-trust in e-channel (an e-vendor) before they place their first Internet order through the Internet using the e-vendor's Website. The next level of trust (i.e., post-trust) is revised based on their satisfaction level of the previous transaction experience. Consequently, when they need to make another transaction, post-trust will play the role that the pre-trust did. Over time, the consumer develops stable and mature trust in the trustees (i.e., e-channel and e-vendor) after they are consistently satisfied with the trustee's performance.

The degree of post-trust is associated with the degree of pre-trust. If a consumer has not experienced negative encounters during e-commerce transaction, the level of post-trust is consistent or improved from that of pre-trust. However, there are conflicting hypotheses have been proposed for the relationship between pre-trust and post-trust for negative experiences. Some studies (e.g., (Anderson and Sullivan, 1993)) argue that consumers who have a high degree of pre-trust are likely to be unperturbed by a single small negative experience. So, the level of post-trust is not much changed. Some other studies (e.g., (Bitner et al., 1990)) argue that negative experiences for those who have a high degree of pre-trust produce a contrast effect so that the negative effect is enhanced. Thus, I hypothesize the triangular relationships as:

Hypothesis 1a/b*: A consumer's pre-trust in e-Channel (e-Vendor) positively affects a consumer's post e-Channel (e-Vendor) trust.*

Hypothesis 2a/b*: A consumer's pre-trust in e-Channel (e-Vendor) positively affects a consumer's satisfaction of the transaction via the e-Channel (with the e-Vendor).*

Hypothesis 3a/b: A *consumer's e-Channel (e-Vendor) satisfaction positively affects a consumer's post e-Channel (e-Vendor) trust.*

The role of trust in e-commerce has been elevated by many studies (Gefen, 2002, McKnight and Chervany, 2002, Jarvenpaa et al., 2000, Li et al., 2006) because of the high degree of risk present in most e-commerce transactions. In the context of e-commerce, since most electronic transactions are not-instantaneous (i.e., payment may occur in advance before delivery is completed) across large geographical distances, consumers are very concerned with that e-vendors won't adhere to their transactional obligations. Thus, a consumer's belief (i.e., trust) concerning an e-channel (e-vendor) is a direct determinant of willingness to make a transaction (Kim et al., 2008). Trust enables one to engage in an online transaction despite the presence of risk. By the same token, in the re-purchase phase, post-trust, (the adjusted pre-trust by satisfaction) directly influences a consumer's future favorable intent to repurchase through the e-channel from the e-vendor. Thus, drawing from the arguments above, we propose the following research hypotheses:

Hypothesis 4a/b: A *consumer's post e-Channel (e-Vendor) trust positively affects a consumer intention to reuse the e-Channel (to repurchase through the e-Vendor).*

Hypothesis 5a/b: A *consumer's e-Channel (e-Vendor) satisfaction positively affects a consumer's intention to reuse the e-Channel (to repurchase through the e-Vendor).*

RESEARCH DESIGN AND DATA COLLECTION

This study used Web-based surveys in a longitudinal design. The instrument development was carried out following the three stages suggested by Moore and Benbasat (1991): i) item creation, ii) scale development, and iii) instrument testing. The data was collected in two phases which created a temporal separation by introducing a time lag between the measurements of independent and dependent variables (i.e., separation of measurements). The respondents were assured that there was no right or wrong answer, meaning that they should answer questions as honestly as possible. These procedures reduced their evaluation apprehension.

For the main field study, two rounds of surveys were distributed to a group of students enrolled in lower level[1] undergraduate courses at a large public university in the Northeastern United States. The participation was voluntary, and it took 15-20 minutes for students to complete each phase. Those who did not wish to take the survey were given the option of doing some other work of equal value. To increase the seriousness of participation to the participants, they were given 2% of extra course credits for each stage, and all participants were entered into random drawings for a chance to win four $100 cash-prizes.

To test the research hypotheses of the study concerning two objects of trust by two phases: pre-purchase and post-purchase stages, this research requires a relatively complex data collection (i.e., data about e-Channel and e-Vendor from the same respondents at two separate time periods). Especially for collecting multi-stage data about consumers' pre-trust in e-Channel and e-Vendor, self-reported data are necessary in studies of this kind. By using students, we were better able to avoid attrition between data collection points, and thereby avoid a critical threat to validity. Therefore, student subjects for this study provide another major advantage. The surveys received a total of 767 responses for the first phase and 730 responses for the second phase. Due to the fact that students participated in the study voluntarily for extra credit, it would be possible for them to provide mock responses. After eliminating duplicate, invalid and/or incomplete responses, a total of 658 usable responses were collected.

[1] Since one part of this research model focuses on initial e-Channel trust, we collected data from lower level undergraduate students to increase the possibility of collecting data from first time e-Channel users.

After the respondents reported the URL of their very recent B2C transaction site at the first phase survey, they were asked to answer these two questions: "Was the electronic commerce transaction the very first of its kind in your life?" and "Was the transaction the very first with this e-vendor?" Since this study focuses on initial trust and post trust in e-Channel/e-Vendor, we classified the data based on these questions. As expected, only a small number (73) of respondents reported that the transaction was the very first in their life. Two-hundred forty-nine respondents reported that their transaction was the very first transaction with the e-vendor. The remaining respondents were the ones who had previous transaction experience with the e-vendor. In short, 73 and 249 samples were used for data analyses and e-Chanel and e-Vendor trust model testing, respectively.

DATA ANALYSES AND RESULTS

The proposed hypotheses of the research model were tested using Partial Least Squares (PLS)-Graph e.0.1060, which is a structural modeling technique that is well suited for testing both the measurement model and highly complex predictive structural models at the same time (Chin, 1998b, Chin, 1998a).

Measurement Model Testing

To ensure the appropriateness of the measurement model, it was tested for the reliability of internal consistency, and convergent and discriminant validity (Bollen, 1989, Chin and Gopal, 1995).

Structural Model Testing

The assessment of the structural models includes estimating path coefficients and R-square. Both R-square and the path coefficients show how well the model is performing (i.e., model fit) (Hulland, 1999). The model fit is analyzed as a measure of the validity of the model, and statistical tests, (t-tests) of path coefficients are used to draw conclusions regarding the research hypotheses. The results of the model assessment are presented in Figure 2.

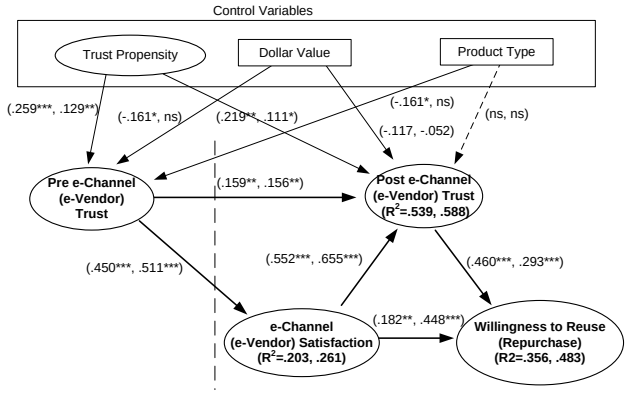

Figure 3.Structural Model Results

As shown in the results of the e-Channel trust model, a consumer pre e-Channel trust shows a strong positive effect on a consumer's post e-Channel trust (Beta = .159, $p < 0.01$). As expected, the pre e-Channel trust strongly affects a consumer's e-Channel satisfaction (Beta = .450, $p < .001$) and, in turn, e-Channel satisfaction strongly affects post e-Channel trust (Beta = .552, $p < .001$). Finally, a consumer's e-Channel reuse intention is significantly affected by e-Channel satisfaction (Beta = .182, $p < .01$) and post e-Channel trust (Beta = .460, $p < .001$).

Now turning to how the model fits, the R-square for post e-Channel trust, e-Channel satisfaction, and e-Channel reuse intention are .539, .203, and .356, respectively. The relatively high R-squares show that the model fits well with the data and provides a strong explanation of the variance in these variables. For example, the R-square of e-Channel reuse intention is .356, indicating that the model explains 36% of the variability in a consumer's e-Channel reuse intention.

For the e-Vendor trust model, a Consumer's pre e-Vendor trust has strong positive effect on both post e-Vendor trust and e-Vendor satisfaction. A consumer's post e-Vendor trust is strongly affected by e-Vendor satisfaction in the post-purchase phase. All hypothesized paths in the model are significant at the 0.01 level. A consumer's repurchase intention is strongly affected by e-Vendor satisfaction and post e-Vendor trust. The beta coefficients with the results of hypotheses are summarized in Table 3. The R-squares of post e-Vendor trust, e-Vendor satisfaction, and repurchase intention are .588, .261, and .483, respectively.

DISCUSSION AND CONCLUSION

This study has several key findings. First, the triangular relationships among pre trust, satisfaction, and post-trust in e-Channel and e-Vendor models were confirmed. Another important finding in this study is that a consumer's e-Channel (e-Vendor) satisfaction and post-e-Channel (e-Vendor) trust are strong determinants of a consumer's e-Channel reuse intention (repurchase intention) in post-purchase phase. The causal relationship between pre-trust and satisfaction can be justified by Festinger's cognitive consistency theory (Festinger, 1957).

Implications of the study

This present study proposes a dynamic trust model, which suggests that trust at time t-1 (i.e., pre-trust) influences trust at time t+1 (i.e., post-trust). The model has broken down the pre-trust → post trust link into two paths. One is the *direct route* from pre-trust to post trust. The other is the *transient route* containing satisfaction as a mediator between pre-trust and post trust. This study also provides empirical evidence of the dynamic nature of trust in an e-commerce context though the e-Channel and e-Vendor trust model. The influence of pre-trust on post-adjusted trust was found to be equal across the two trustees (i.e., e-Channel and e-Vendor).

This study also provides a theory which bridges two important constructs (i.e., consumer trust and satisfaction) based on the dynamic trust model over two phases (i.e., pre-purchase and post-purchase). To the best of our knowledge, this is one of the first studies that focus on the dynamic nature of trust from a longitudinal viewpoint in the context of both the e-channel and the e-vendor. The findings of the research also have important practical implications. Trust coupled with satisfaction is among the biggest factors that determine a long-term relationship, which is imperative to the success of a business. Importantly, post trust, the adjusted trust, plays exactly the same role as the pre-trust does in the earlier time frame. Thus, from a practical perspective, Internet business managers should consider trust not just as an output of one time process but as an iterative and evolving process itself.

Limitations of the study and suggestions for future research

In this study we focused on direct and indirect effects of pre-trust and satisfaction on post-trust. However, the argument of dynamic trust could also work if satisfaction is explicitly modeled as a moderator – post-trust is less than pre-trust if satisfaction is low, but greater than pre-trust if satisfaction is high. Thus, an interesting future study will compare alternative models of dynamic trust (i.e., direct, mediated, and moderated effect models).

In addition, there is an interesting intuitive relationship that exists between an e-Channel and e-Vendor trust. Unless the potential consumers of e-commerce have a certain level of pre trust in e-Channel, they are not willing to use this new shopping channel. However, once consumers have a positive experience with electronic commerce transactions, the e-Channel trust is not a serious barrier anymore. After this stage, e-Vendor trust plays a major role in electronic commerce transactions (e-transactions). Thus, a certain level of e-Channel trust is more important for the first time consumers and for the consumers who have had negative experiences. It seems that the pre e-Channel trust is a necessary but not a sufficient condition to adopt the e-Channel for the pre stage of e-Channel adoption, while e-Vendor trust is another condition to make a transaction with an e-Vendor. During a consumer's pre purchase stage via the e-Channel, a consumer's trust in a certain e-Vendor plays a major role which then affects a consumer's purchase decision from that e-Vendor. However, the consumer's e-Vendor trust may or may not be a necessary condition because some consumers make e-transactions even if they perceive a low level of e-Vendor trust. In this case, consumers' decisions are mainly affected by other factors such as perceived benefit, low cost, quality of service,

etcetera. Drawing from the discussion above we propose the following proposition for a future follow-up study.

Proposition: ***e-Channel trust is a necessary condition to adopt the e-channel as a new shopping medium but e-Vendor trust is not a necessary condition for some groups of consumers.***

REFERENCES

Due to the space limitations, references are not included, but are available from the author upon request.