

Consumer-Perceived Risk in E-Commerce Transactions

A. F. SALAM, H. R. RAO, AND C. C. PEGELS

A major promise of the Internet is its potential for online shopping and its benefits in the form of cost reduction, for consumers and businesses alike. For example, according to Penton Research (www.penton.com), using the Web site as a marketing tool provides a compelling means for cost reduction in terms of cost per contact statistics (Internet: \$0.98, direct mail: \$1.68, telemarketing: \$31.16, tradeshow: \$162). Yet the new medium is far from the true electronic marketplace of the future. This is due largely to the reluctance of consumers to engage in transactions over the Internet.

In their study, Hoffman, Novak and Peralta found that consumers, on the Web, may fear providing credit card information to any commercial Web provider and that consumers simply do not trust most Web providers enough to engage in exchange relationships involving money [4]. This perceived risk among consumers translates into their reluctance to use debit and/or credit card information over the Internet resulting in their disengagement from electronic transactions. Most sites on the Internet today do not focus on building and nurturing trust as part of an ongoing relationship with their customers [7, 9]. Millions of consumers browse thousands of Web vendor sites everyday with the intention of buying products and services. Yet, the majority of these consumers opt for buying the products or services from a brick-and-mortar facility rather than completing the purchase process online.

Reliable encryption and authentication methods are available. But we believe that secure technological infrastructure is only a necessary foundation and by itself not sufficient for creating the level of trust needed for spontaneous electronic transactions over the Internet. This is due to the fact that secure transaction methods using encryption and

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other technologies have been around for quite some time, but the perception of risk of transactions over the Internet is still significant [3]. Given the limitation of technology-based trust creation, what is probably required is the emergence of trusted intermediaries in the guarantor category. We argue that the role of familiar trustworthy institutions such as banks and other financial and social institutions (including those based on Web communities) as intermediaries in trust is more likely to reduce the perceived level of risk associated with e-commerce transactions over the Internet. A case in point is Amazon, which is an established, recognized, and legitimate business organization with a thriving electronic community-based social identity. In addition, Amazon is guaranteeing buyers a safe auction experience, based on the honor system (for purchases below \$250). This is similar to the electronic community-based, social-reputation system found at e-Bay where the system collects, distributes, and aggregates feedback about the past behavior of participants and actually helps people decide whom to trust, encourages trustworthy behavior, and deters those participants that may be dishonest [6].

Anecdotal literature also reports that many consumers do engage in transactions over the Web, even though such transactions may not be completely secure or the desired level of “institutional trust” may not be present. This occurs because not all consumers perceive equal levels of transaction risks over the Internet. Perceived level of risk, for some consumers, is perhaps lower due to economic incentives and value-added services that some of these consumers may find through lower priced goods, reduced search cost, better quality product, or reliable vendor, and so forth. In this vein, we propose the economic incentives may reduce the perceived level of risk experienced by consumers in electronic transactions over the Web.

Conceptual Framework

This article examines consumer-perceived risk of transactions over the Internet specifically focusing on the financial dimension. Any obstacle to Web transactions such as risk of financial asset transfer, either perceived or real, that chokes the spontaneous transfer of financial assets among consumers and online vendors requires critical examination. Such an examination may help in removing obstacles to transforming the Internet into a complete marketing, sales, and transaction medium. Social exchange literature and concepts of institutional trust and economic incentives, which add to consumer value, are used to develop a framework to identify critical aspects that need to be present or need to be developed in order to reduce perceived risk.

Social exchange framework. Exchange processes require the transfer of assets between parties involved in a transaction. This usually involves the transfer of financial assets, equivalent to the agreed upon price of the goods or services, from the consumers to vendors, prior to the actual transfer of goods or rendering of services by service providers. When there is no transfer of financial assets from consumers, very few transactions can be initiated or successfully completed. The social exchange literature provides a foundation to examine the emerging nature of transactions over the Internet. It allows us to integrate risk into the decision of the consumer as to whether or not to engage in the transaction. The incorporation of risk into the decision can be treated under a general heading that can be described by the word “trust” [2]. Trust is a critical element that needs to be in transactions in order to facilitate economic exchange.

Trust and exchange process, institutional structure, and economic incentives.

Time asymmetries in delivery introduce risk (perceived or real) into transactions for the parties who must invest resources before receiving a return [2]. Sometimes the risk may be reduced by use of contracts that can be enforced by law, but for many reasons, contracts cannot always serve this purpose. For instance, it may not be practical for many online transactions where the value of the product is not high enough to justify the cost of drawing up contracts. Trust plays a key role in many such transactions that occur over the Internet [5].

Trust and exchange process. Placement of trust involves putting resources in the hands of parties who will use them to their own benefit, to the trustee's benefit, or both [8]. If the trustee (the party being trusted) is trustworthy, the person who places trust is better off than if trust were not placed, whereas if the trustee is not trustworthy, the trustor (the party placing the trust) is worse off than if trust were not placed [2]. Coleman argues that it is in the trustors' interest to create social structures or institutions in which it is to the potential trustees' interest to be trustworthy, rather than untrustworthy [2]. Some of this interest is embedded in the market mechanism while others are interweaved in the social fabric. This is precisely the type of mechanism used by reputation-based systems at e-Bay, Amazon.com, and other similar Web communities facilitating transactions over the Web. Therefore, social and economic institutions increasingly assume the role of fostering and nurturing trust in exchange processes.

Institutional structures as intermediaries in trust. It is useful to distinguish three different kinds of intermediaries in trust. These intermediaries can be described as advisors, guarantors, or entrepreneurs. In the context of e-commerce and especially from the consumers' perspective, the intermediary as guarantor is the most important one. Financial institutions, such as banks and credit card companies, have largely played the role of guarantors in economic exchange. These institutions create and foster an "institutional trust" among consumers and businesses alike. This institutional trust is one of the fundamental requirements for e-commerce to flourish, by reducing the consumer-perceived risk of transactions over the Internet. Even when the guarantor experiences a loss of resources if the final trustee violates trust (such as a vendor who refuses to give refunds for defective products), the guarantor takes initiatives so that their own trustworthiness in the eyes of the trustor is not diminished.

Economic incentive and added consumer value. Despite the risks involved with transactions over the Internet, we observe that Internet users do engage in economic transactions and do provide financial information (credit card information, and so forth) over the Web. We theorize these users perceive the risk associated with e-commerce transactions over the Web. However, their perceived level of risk may decrease with the existence of economic incentives that add value to their business such as lower priced goods, reduced search cost, better quality product, and so forth.

The situation changes from perceived loss to gain as the price differential between products advertised in traditional outlets increases in favor of products available over the Internet. As consumers find low priced goods of comparable quality on the Internet, the difference in the price of the product from a traditional shopping outlet is perceived as gain. As this perceived gain increases coupled with factors such as convenience and low search cost (afforded by the Web), the perceived gain may be significant enough to reduce the perceived risk of the transaction over the Internet.

Hence, we propose that incentives that increase the potential for gain and add value to the consumer tend to reduce the perceived level of risk so that consumers are more prone to engaging in transactions.

Consumer-perceived risk of transaction over the Internet. Here, we specifically focus on the perceived financial risk of transactions over the Internet. This risk deals with using a payment alternative that will lead to financial loss. Financial loss means that the consumer cannot get a refund when needed or is not able to reverse the transaction or to stop payment after discovering the mistake. It also includes fraudulent and sometimes unauthorized use of credit cards leading to financial loss. These are some of the most prevalent types of risks that may be associated with marketing and sales transactions over the Internet.

If for some reason the perceived risk (potential loss of resources) in a transaction is too high, consumers are likely to delay the transaction until some form of institutional mechanism is in place to reduce the associated risks. Alternately, they will use different avenues that provide the desired level of protection (using telephone or fax to complete e-commerce transactions). Nonetheless, the consumer's perception of risk associated with the transaction will tend to predominate in his/her decision to engage in a transaction. We propose the following framework (See Figure 1) to study the role of institutional trust and economic incentive in consumer-perceived risk in the context of e-commerce. We are proposing two hypotheses as part of the framework: one, that consumer-perceived risk is reduced with the increase in institutional trust (H1) and two, that consumer-perceived risk is reduced with the increase in economic incentives (H2).

Managerial Implications

The technological infrastructure is already in place to facilitate completion of transactions over the Internet. However, it is important that consumers accept and use the Internet as a medium for asset transfer in exchange processes. Hence, the reduction of consumer-perceived risk of transactions over the Internet is crucial to transforming the Internet into a complete sales and transaction medium.

The results of the structural equation analyses (for an overview of the analysis, please refer to the end of the article—Table 1 shows constructs and items used) using

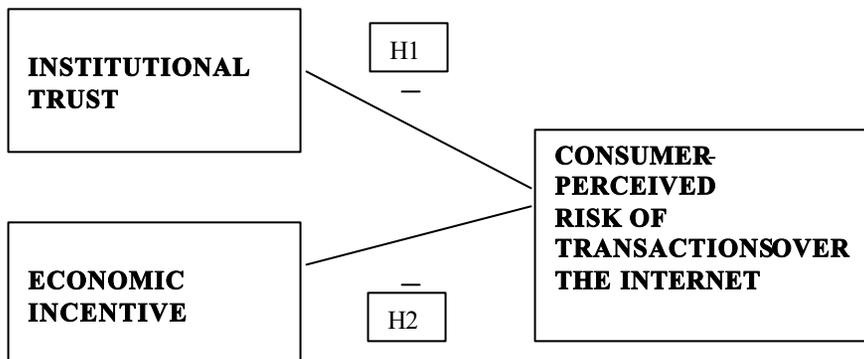


Figure 1. Institutional trust, economic incentive, and consumer-perceived risk of transactions in the context of e-commerce over the Internet.

<p>Construct: Consumer-Perceived Risk</p> <p>Providing Credit Card Information Over the Web RISKITEM1= is just plain foolish RISKITEM2= is the single most important reason I don't buy through the Web more often RISKITEM3 = is riskier than providing it over the phone to an offline vendor RISKITEM4= is riskier than providing it to some unknown store when traveling away from home RISKITEM5= is riskier than faxing it to an offline vendor</p> <p>Construct: Economic Incentive</p> <p>Providing credit card information through the Web</p> <p>EINC1= would not matter much if the prices were considerably lower EINC2=would not matter much if the products/services were of a higher quality</p> <p>Construct: Institutional Trust</p> <p>Institutional trust has been operationalized as the necessity to open financial accounts with trusted third parties (financial or social institutions as intermediaries in trust) to facilitate transactions over the Internet.</p> <p>ITRUST = Institutional Trust ITRUST1 = A Bank (e.g., Bank of America, Citibank, etc.) ITRUST2 = A mall operator who was previously unknown to you ITRUST3 = A mall operator well known to you (e.g., internetMCI) ITRUST4 = A major credit card company (MasterCard, Visa, American Express) ITRUST5 = A check clearing company (e.g. Telecheck) ITRUST6 = Other well known third parties (e.g., Microsoft, Intuit, etc.) ITRUST7 = Digitally based banks/currency providers (e.g., First Virtual, DigiCash, CyberCash, etc.)</p>

Table 1. Model constructs and items.

Web survey data, support our hypotheses (as presented in the Figure 1). We have found support for the hypothesis that consumer-perceived risk is reduced with the increase in institutional trust. This implies that one way to reduce consumer-perceived risk is to develop, foster, and increase institutional trust with the involvement of financial and social institutions in the capacity of guarantors in the exchange process.

Further analysis of the data indicates that socially recognized and entrenched institutions such as banks and credit card companies are perceived to be better candidates for fostering institutional trust compared to little known or non-institutionalized organizations such as unknown mall (Internet) operators or even known mall operators (see Table 2). At present, an example of a known mall operator would be Yahoo with its Yahoo! Shopping Internet mall. A t-test analysis that all institutions (banks, credit card companies, known mall operators, unknown mall operators, check clearing companies, and so forth) are perceived to be equally trustworthy was rejected. The direction of trust (as measured by the likelihood of opening accounts) favored traditional institutions such as banks and credit card companies over known mall operators (Internet), unknown mall operators (Internet), check clearing companies, known third parties or even digital banks. This finding has significant implications for established banks and credit card companies in terms of seizing on the opportunity by performing the role of intermediaries in trust. Incidentally, some banks such as the Citibank, First USA Bank, and UMB Bank have taken initiatives in this direction. For example, Citibank (on its Web site as of Feb 15, 2002) states "Your Citibank account is password-protected and secured by state-of-the-art encryption. We even go a step further by providing a free fraud protection serv-

Types of Institutions	t-values
Bank	Significantly Positive (t= 30.276 df=3943)
Unknown Mall	Significantly Negative (t=- 87.418 df=3933)
Known Mall	Significantly Negative (t= - 9.850 df=3917)
Credit Card Companies	Significantly Positive (t= 41.674 df=3911)
Check Clearing Companies	Significantly Negative (t=- 21.309 df=3885)
Known Third Parties	Significantly Negative (t=-15.181 df=3905)
Digital Banks	Significantly Negative (t=-10.843 df=3908)

Table 2. Consumer's perception of institutions on the Internet based on t-test (N=3987).

ice called SafeWeb. In the unlikely event that unauthorized online transactions occur in your Citibank deposit account, you're covered for the full amount of the loss, which you'd otherwise be responsible for under federal banking regulations.”

Given the difficulty and infeasibility for every single company on the Internet to provide a guarantee for each transaction, this void in terms of intermediary in trust represents a significant opportunity for established financial institutions.

We also found support for the second hypothesis that consumer-perceived risk is reduced with the increase in economic incentives. This means that consumer-perceived risk may be reduced by offering products or services at a price that is below that offered in the traditional market, thereby inducing consumers to transact. This also implies that online merchants need to be cost competitive and recognize that consumers vary in their perception of risk of transactions over the Internet.

Further research needs to be carried out in order to understand the exact nature of these institutions as intermediaries-in-trust in the exchange processes. Based on the suggestion of the anonymous reviewers, in future research we plan to investigate which people weigh risk more and which people weigh economic value more. The research also needs to focus on whether small purchases over the Internet need to be treated differently than large purchases and, if so, what kind of structure needs to be present or needs to be developed to facilitate such transactions.

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How the Framework was Tested

The sample consists of 3,987 unique respondents to the Georgia Tech Graphics, Visualization, and Usability (GVU) Center's Web survey. The average age of the respondents was 36.7 years. The income of the respondents ranged from under \$10,000 to over \$100,000. The education level ranged from "some college" to masters and doctorate. The income and education ranges can be considered typical of Web users.

The reliability of the scales for each measure was tested using Cronbach's alpha and found to exceed the minimum desirable alpha of 0.8 in every case. The scale dimensionality for each of the constructs was tested using factor analysis. Structural equation modeling (SEM) using EQS [1] was then used to test the research model. The model provided a good explanation of the variation in data. The normed fit index, the comparative fit index, robust comparative fit index, GFI, and others were all above the acceptable limit of 0.9. The parameter estimates support our speculations. Increase in institutional trust significantly decreased consumer-perceived risk of transactions over the Web. The path coefficient between institutional trust and consumer-perceived risk is -0.25 ($t = -13.862$). Increase in economic incentive also significantly reduces consumer-perceived risk. The path coefficient between economic incentive and consumer-perceived risk is -0.26 ($t = -15.454$).

Both propositions were supported in terms of statistical significance as well as in direction. Additionally, we tested the framework with a separate sample ($N=5048$) and found similar support in terms of model fit criteria and path loadings. This alternate sample exhibited similar t-test statistics on demographic variables such as age, education, income, and so on. This additional test provided further support to our framework. The data in both sets were from the GVU survey conducted in 1997.

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