



Perceived risk and trust associated with purchasing at electronic marketplaces

Tibert Verhagen¹,
Selmar Meents¹ and
Yao-Hua Tan¹

¹Department of Information Systems and Logistics, Faculty of Economics and Business Administration, Vrije Universiteit Amsterdam, Amsterdam, The Netherlands

Correspondence:

Tibert Verhagen, Department of Information Systems and Logistics, Faculty of Economics and Business Administration, Vrije Universiteit Amsterdam, De Boelelaan 1105, 1081 HV, Amsterdam, The Netherlands.
Tel: +31 0 20 4446050;
E-mail: tverhagen@feweb.vu.nl

Abstract

Understanding consumer behaviour is of vital importance to consumer-oriented e-business models today. In this paper, we study the relationships between consumer perceptions of risk and trust and the attitude towards purchasing at a consumer-to-consumer electronic marketplace (EM). Typical for EM settings is that consumer behaviour is subject to perceptions of the selling party as well as of the institutional structures of the intermediary that is operating the EM. Building upon the well-established literature of trust, we consider the concepts of intermediary trust and seller trust. We extend this categorisation by introducing the concepts of intermediary risk and seller risk. We developed measurement instruments for intermediary risk and seller risk. All measurement scales have acceptable alphas and are unidimensional. An empirical study is conducted to explore the relationships between the risk and trust types and consumer purchase attitude. The results reveal significant, direct effects of seller trust and seller risk. Second-order effects of intermediary trust and intermediary risk are investigated and reported. The paper concludes with general observations and recommendations for research and practice.

European Journal of Information Systems (2006) 15, 542–555.

doi:10.1057/palgrave.ejis.3000644

Keywords: electronic marketplace (EM); online purchasing; intermediary trust; intermediary risk; seller trust; seller risk

Introduction

The research objective of this paper is to explore the relationships between perceptions of risk and trust associated with purchasing from sellers at an *electronic marketplace* (EM) and consumer purchase attitude. Lowering the perceived risks associated with online transaction as well as maintaining transaction trust are vital keys to attracting consumers and retaining customers (Tan & Thoen, 2000, 2002). Owing to the lack of physical presence, visitors of EMs cannot experience the products by, for example, touching, feeling or smelling them. Furthermore, consumers are not able to visit the EM to reassure appropriate settlement should they be dissatisfied for any reason (e.g. payment problems, product failure). This implies that consumers depend on perceptions of the EM to assess the trustworthiness and perceived risks associated with the purchase before completing an online transaction.

As opposed to 'traditional' consumer–seller relationships, however, in a mediated environment consumers not only rely on perceptions of the seller when engaging in purchase behaviour but also on characteristics of the intermediary. In the trust literature regarding online purchasing (e.g. Pavlou & Gefen, 2004) this has been acknowledged by separating *intermediary trust* from *seller trust*. Intermediary trust refers to the trustworthiness of the intermediary operating the system. It reflects

perceptions of security due to the presence of guarantees, regulations or other structures that are introduced by these institutions. Seller trust concerns perceptions of trust in the counterpart of transaction. With respect to purchasing at EMs, the direct object of seller trust is the party selling the products. The relationships between intermediary trust and seller trust and purchase behaviour at EMs have received substantial attention and are starting to be explored empirically (e.g. Pavlou & Gefen, 2004). When focusing on the closely related concept of perceived risk, however, the differences between risks associated with the intermediary operating the system vs risks associated with the selling party have been relatively unexplored. Most research on electronic commerce has considered risk as one construct (e.g. Jarvenpaa *et al.*, 2000; Pavlou & Gefen, 2004), or has explicitly paid attention to perceived risk components (e.g. Featherman & Pavlou, 2003). We argue that, similar to the two trust types identified in the literature, purchasing at EMs is subject to two types of risk: *intermediary risk* and *seller risk*. Intermediary risk refers to the potential failure of institutional mechanisms employed by the intermediary. The target of intermediary risk is the intermediary operating the system. Seller risk reflects the uncertainties that arise since one is unsure about the offers of the counterpart of the transaction and its ability and willingness to perform. The target of seller risk is the selling party.

In this paper, we explore the relationships between intermediary trust, seller trust, intermediary risk and seller risk and consumer attitude towards purchasing at an EM. We consider the theoretical background of intermediary trust and seller trust and introduce the concepts of intermediary risk and seller risk. Next, we develop and validate measurement instruments for intermediary risk and seller risk and report on first empirical exploration. Finally, we conclude with overall observations and recommendations for further research.

Theoretical foundations: Perceived risk and trust associated with purchasing at EMs

The vast majority of empirical research in the field of trust, perceived risk and online purchasing behaviour has focused on purchasing from online stores. In general, the empirical results emphasise the importance of trust and risk in explaining and predicting online purchase behaviour (e.g. Jarvenpaa *et al.*, 2000; Van der Heijden *et al.*, 2003). Purchasing from online stores is dyadic in nature, which implies that two parties are involved in the transaction: the buyer and the seller. When studying purchase behaviour at an EM, however, three parties have to be taken into account: the buyer, the seller as well as the intermediary operating the system. In this context, consumer purchase behaviour is not only affected by risk and trust perceptions of the selling party, but it is also subject to perceptions of risk and trust associated with the intermediary. In this study, we focus on consumer purchase behaviour at EMs. An EM is defined here as a

website as well as the underlying procedures, routines and information systems that match buyers and sellers, facilitate the exchange of information, goods, services and payments associated with transactions and provide an institutional infrastructure (see Bakos, 1998). In particular, we focus on EMs facilitating consumer-to-consumer purchasing of products (C2C).

In the literature, the relationships between trust and intermediaries have been extensively discussed. Although many third-party intermediaries may be present in consumer-seller relationships, this research focuses on the formal authority that manages the exchange network (cf. Kambil & Van Heck, 1998; Zaheer *et al.*; Gallivan & Depledge, 2003; Pavlou & Gefen, 2004). While this particular intermediary performs many roles ranging from aggregating buyer demand and supplier products to facilitating the market by lowering costs and matching buyers and sellers, one of its most important roles is to protect buyers and sellers from opportunistic behaviour of other participants and generate trust in sellers by acting as a so-called agent of trust (Bailey & Bakos, 1997). Regarding this latter role, which is the focus of this study, the term intermediary trust is used.

Intermediary trust refers to the security one feels regarding the efforts of the intermediary to apply guarantees, regulations, safety nets or other structures effectively (Shapiro, 1987; Pavlou & Gefen, 2004). To generate trust in the online purchase situation, and in sellers at the EM in particular, intermediaries verify and monitor the parties engaged, employ enforcements in case of opportunistic behaviour and take care of privacy and security of both data and transaction. Widely applied instruments include monitoring, accreditation, safeguards (e.g. contracts), regulations and so-called structural assurances. The favourable conditions and structures offered by the intermediary allow consumers to believe that purchasing at the marketplace is safe.

Following the widely established literature on trust (see Geyskens *et al.*, 1998 and Rousseau *et al.*, 1998 for an overview), intermediary trust is regarded as unidimensional construct consisting of several intertwined beliefs. Although trust has been argued to consist of conceptually distinct dimensions such as honesty (also referred to as integrity or credibility) and ability (also referred to as competence) (e.g. Ganesan, 1994; Kumar *et al.*, 1995a, b; Mayer *et al.*, 1995; McKnight & Chervany, 2002), multiple authors argue that in general (Larzelere & Huston, 1980) and even more so in commercial settings they may be 'so intertwined that in practice they are operationally inseparable' (Doney & Cannon, 1997, p. 43). Therefore, in accordance with the majority of both empirical studies of trust in general commercial settings (e.g. Schurr & Ozanne, 1985; Dwyer & Oh, 1987; Crosby *et al.*, 1990; Doney & Cannon, 1997; Sirdeshmukh *et al.*, 2002) and studies of trust in online commercial settings (e.g. Jarvenpaa *et al.* 2000; Belanger *et al.*, 2002; McKnight *et al.*, 2002; Gefen *et al.*, 2003; Koufaris & Hampton-Sosa, 2004; Malhotra *et al.*, 2004), trust is viewed as

unidimensional construct consisting of a set of specific, intertwined beliefs. More specifically, we build upon the work of Pavlou & Gefen (2004) who, based on an extensive review of beliefs mentioned in trust literature, viewed trust in EM settings as a set of beliefs about the honesty, dependability and reliability of the trustee. Accordingly, intermediary trust is defined here as the belief that the intermediary ensures the honesty, dependability and reliability of sellers at the EM.

Intermediary trust is to some extent related to the concepts of institutional trust (McKnight & Chervany, 2002), control trust (Tan & Thoen, 2000, 2002) and technology trust (Ratnasingam, 2005). These related trust concepts have been interpreted as the buyer's trust in the protective measures offered by intermediaries. However, the focus of intermediary trust does not lie on the protective measures, but rather the intermediary that provides them. This form of trust has also been called trust in the guardians of trust (Shapiro, 1987).

Whereas intermediary trust concerns the intermediary as mediating 'care-taker', seller trust reflects perceptions of trust in the counterpart of a transaction. The direct object of seller trust, in the literature also known as interpersonal trust (Zaheer *et al.*, 1998; McKnight & Chervany, 2002, p. 42), is the specific other party one trusts. Seller trust refers to the subjective belief with which consumers assess that sellers will perform potential transactions according to their confident expectations, irrespective of their ability to fully monitor them (Mayer *et al.*, 1995). This type of trust has been proposed and found to be of importance in both offline (e.g. Schurr & Ozanne, 1985; Crosby *et al.*, 1990; Doney & Cannon, 1997; Smith & Barclay, 1997) and online purchasing settings (e.g. Gefen *et al.*, 2003; Harris & Goode, 2004; Malhotra *et al.*, 2004; Hampton-Sosa & Koufaris, 2005; Liu *et al.*, 2005; Cho, 2006). Following the studies of Pavlou (2002) and Pavlou & Gefen (2004), the target of seller trust in this study are sellers at the EM in general (cf. Rotter, 1971). In line with the view of trust being a unidimensional construct of intertwined beliefs, we view seller trust as intertwined set of beliefs of the honesty, dependability and reliability of the trustee. Accordingly, and in line with the work of Pavlou & Gefen (2004), seller trust is defined here as the belief that the population of sellers at an EM is honest, dependable and reliable.

While the trust types described above have received substantial attention in the literature, the relationships between perceived risk and consumer purchasing at EMs have been relatively unexplored. Similar to the closely related concept of trust, however, we argue two types of risk can be identified: intermediary risk and seller risk.

Intermediary risk refers to risks that are caused by the failure of an intermediary to reduce opportunistic behaviour between trading parties. In many cases intermediaries use specific mechanisms to reduce opportunistic behaviour like, for example, contracts or certification. Consider, for example, a contract in which a due date for payment is stipulated, but there is no penalty for overdue

payment. Assuming that the seller intended to have this penalty, the lack of this penalty is an example of careless contracting and as such an intermediary risk. Another typical case of intermediary risk is weak monitoring. A good contract can be made ineffective by weak monitoring. An interesting case of weak monitoring is the weaknesses in the earlier versions of reputation systems, where it was possible that two people A and B could create extreme positive ratings for each other by selling the same good between each other several times with the sole purpose of being able to give high ratings to the other person. After they built up this positive reputation maliciously, they could subsequently abuse this reputation by selling bad goods to a third person C. Still, intermediary risks are not restricted to weak contracts or weak monitoring, but they can also relate to the lack of adequate security measures and technological mistakes (Grabner-Kräuter, 2002). Intermediary risk can never be completely excluded, since so many things can go wrong that it is impossible to foresee all possible future mishaps. Therefore, perfect conditions and structures that cover all risks are impossible. Hence, even though the intermediary's control has an important impact on the security and privacy of transactions, there is a possibility for sellers to compromise the transaction process (Pavlou, 2003). To some extent intermediary risk is related to environmental risk (Ring & van de Ven, 1994; Bensaou & Venkatraman, 1996), system-dependent uncertainty (Grabner-Kräuter, 2002) or exogenous risk (Hirshleifer & Riley, 1979). However, by intermediary risk we mean obvious omissions in institutional mechanisms offered by the intermediary operating the EM. Hence, even though the intermediary's control has an important impact on the security and privacy of transactions, there is a possibility for sellers to compromise the transaction process (Pavlou, 2003). We define intermediary risk as the subjective belief of a probability of suffering a loss due to the inability of the intermediary to provide sufficient protection against fraudulent and/or opportunistic sellers. In this study, we specifically focus on the intermediary risks that are caused by the intermediary between the buyer and seller, in particular the facilitator of the EM. Following the vast majority of works focusing on perceived risk and online consumer purchasing (e.g. Jarvenpaa *et al.*, 2000; McKnight *et al.*, 2002; Pavlou, 2002; Van der Heijden *et al.*, 2003; Pavlou & Gefen, 2004), intermediary risk is viewed as narrowly defined unidimensional construct. We acknowledge that in the risk literature, perceived risk has been conceptualised as two elements: uncertainty and consequences (Jacoby & Kaplan, 1972; Dowling & Staelin, 1994; Conchar *et al.*, 2004). Moreover, we recognise that in the risk literature the sources of perceived risk, also referred to as risk types, have received attention. Discussed sources of risk include financial risk, performance risk, physical risk, psychological risk, social risk and time risk (Jacoby & Kaplan, 1972). A widely established and validated framework of the dimensions and/or sources of perceived risk in online settings,

however, is still lacking. The few empirical works focusing on the dimensionality of perceived risk in an online setting (e.g. Featherman & Pavlou, 2003; Garbarino & Strahilevitz, 2004) arrive at different classifications or are limited in the sense that they have been applied to particular Internet applications and not to the risks associated with purchasing at a particular website. Moreover, defining intermediary risk as rather narrowly as homogeneous belief has the advantage that narrowly defined traits intend to be better predictors of a particular behaviour (Buss, 1989; Jones *et al.*, 2003).

In contrast to the intermediary being the implicit target of intermediary risk, seller risk concerns the relational risks resulting from the trading partner. Seller risk, also referred to as behavioural risk (Ring & van de Ven, 1994; Bensaou & Venkatraman, 1996) or endogenous risk (Hirshleifer & Riley, 1979), refers to the uncertainties that arise because online sellers can behave opportunistically by taking advantage of the distant and impersonal nature of online transactions and the intermediary's inability to carefully monitor all transactions (Pavlou, 2003, p. 77). Seller risk addresses the uncertainties that arise since one is unsure about the offers of the selling party (Hirshleifer & Riley, 1979) and the seller's ability and willingness to perform (Grabner-Kräuter, 2002). For example, sellers can include misleading product information, use false identities, ignore warranties or commit fraud. Following Pavlou & Gefen (2004), seller risk is narrowly defined as the buyers' subjective belief of a probability of suffering a loss when engaging in a transaction with members of the population of sellers at a particular EM. In line with the vast majority of works on perceived risk in online purchase settings (e.g. Jarvenpaa *et al.*, 2000; McKnight *et al.*, 2002; Pavlou, 2002; Van der

Heijden *et al.*, 2003; Pavlou & Gefen, 2004), seller risk is considered a unidimensional concept. To reduce seller risk, various kinds of information are offered, including information about regulations and procedures, the reputation of the seller (i.e. rating systems) and privacy statements. By offering such information and services, consumers are enabled to cope better with perceptions of risk (Murray, 1991).

Given the above, we arrive at the observation that consumer purchasing at EMs is subject to two types of trust (intermediary trust and seller trust) and two types of risk (intermediary risk and seller risk). An overview of these concepts, including their definitions and the literature on which these concepts are based, is provided in Table 1.

Whereas intermediary trust reflects feelings of trustworthiness due to favourable conditions and structures offered by the intermediary operating the system, seller trust refers to the trustworthiness of the sellers at an EM. Similarly, intermediary risk concerns the uncertainty about the intermediary's ability to exclude opportunistic behaviour, whereas seller risk reflects impressions of the risks associated with the sellers at an EM. The concepts differ according to the trust or perceived risk perspective they belong to, as well as the target they refer to. The similarities and differences between the four concepts are summarised in the table below.

Research methodology

To explore the impact of intermediary trust, seller trust, intermediary risk and seller risk on consumer purchasing, we conducted an empirical study. We addressed how and to what extent perceptions of the trust and risk types affect consumers' attitude to purchase at an EM. This

Table 1 Trust and risk concepts used in this study

Concept	Definition in the study	Literature
Intermediary trust	The belief that the intermediary ensures the honesty, dependability and reliability of sellers at the EM	Pavlou & Gefen (2004); Shapiro (1987)
Seller trust	The belief that the population of sellers at an EM is honest, dependable and reliable	Cho (2006); Crosby <i>et al.</i> (1990); Doney & Cannon (1997); Gefen <i>et al.</i> (2003); Hampton-Sosa & Koufaris (2005); Harris & Goode (2004); Liu <i>et al.</i> (2005); Malhotra <i>et al.</i> (2004); Pavlou (2002); Pavlou & Gefen (2004); Schurr & Ozanne (1985); Smith & Barclay (1997)
Intermediary risk	The belief of a probability of suffering a loss due to the inability of the intermediary to provide sufficient protection against fraudulent and/or opportunistic sellers	Bensaou & Venkatraman (1996); Grabner-Kräuter (2002); Hirshleifer & Riley (1979) (Ring & van de Ven (1994)
Seller risk	The belief of a probability of suffering a loss when engaging in a transaction with members of the population of sellers at a particular EM	Bensaou & Venkatraman (1996); Grabner-Kräuter (2002); Hirshleifer & Riley (1979); Jarvenpaa <i>et al.</i> (2000); Pavlou (2002); Pavlou (2003); Pavlou & Gefen (2004); Ring & van de Ven (1994); Van der Heijden <i>et al.</i> (2003)

section introduces the research model and deliberates on measurement instruments and research method.

Conceptual model

The model to be tested is depicted in Figure 1. The model reflects the relationships between the trust and perceived risk constructs discussed in the previous section, and the attitude towards purchasing from sellers at an EM. This structure conforms to the *Theory of Reasoned Action* (TRA) of Ajzen & Fishbein (1980) that has extensively been applied in online consumer behaviour research (e.g. Crisp *et al.*, 1997; Moon & Kim, 2001; Shim *et al.*, 2001; Shih, 2004). According to the TRA, the attitude towards behaviour is a direct determinant of the behavioural intention to perform the behaviour. The intention itself is the sole determinant of the overt behaviour. The TRA states that variables that are not part of the theory, also referred to as external variables, do not add to the predictions of intentions over and above the attitude. This is known as the claim to sufficiency (Fishbein & Ajzen, 1975; Ajzen & Fishbein, 1980). Research findings in the field of online purchasing support the claim to sufficiency and demonstrate that the relationship between the attitude and the behavioural intention can be labelled as 'very strong' (e.g. O'cass & Fenech, 2003); Van der Heijden *et al.*, 2003). These findings are similar to those of meta-studies conducted in traditional shopping settings (e.g. Ryan & Bonfield, 1975) as well as in non-shopping settings (e.g. Sheppard *et al.*, 1988), supporting the notion that external variables are directly related to the attitude and that the impact of external variables is to a very large extent carried over to the behavioural intention via the attitude.

In this study, we focus on the relationships between the external variables and the attitude. The external variables included are intermediary trust, seller trust, intermediary

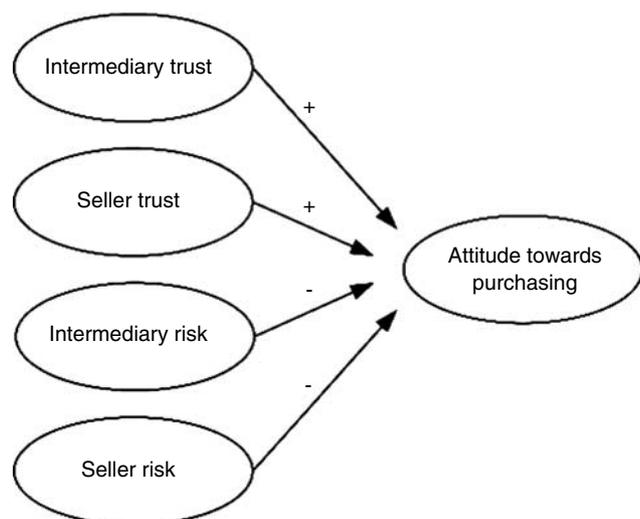


Figure 1 Conceptual model (adapted from Ajzen & Fishbein, 1980; Tan & Thoen, 2000; Pavlou, 2002).

risk and seller risk. Since perceptions of trust are likely to have a positive effect on consumers' attitude towards online purchasing (Jarvenpaa *et al.*, 2000; Pavlou, 2003), we expect the effects of intermediary trust and seller trust to be positive. Following research focussing on the relationships between perceived risk and online consumer purchasing (e.g. Jarvenpaa *et al.* 2000; Van der Heijden *et al.*, 2003), the effects of intermediary risk and seller risk on the attitude is expected to be negative. This results in the following combination.

Measurement instruments

In order to increase reliability, we operationalised each construct with multiple items. The operationalisation for the attitude towards purchasing at an EM was taken from Van der Heijden *et al.* (2003) who slightly modified the scale from Jarvenpaa *et al.* (2000). We did make some minor modifications, including the wording of the items to make them applicable to an EM context. The measure for the seller trust construct was taken from Pavlou & Gefen (2004) who, based on items put forward by Doney & Cannon (1997), Jarvenpaa *et al.* (2000), Pavlou (2002), Gefen *et al.* (2003) and Ohanian (1991), operationalised seller trust as intertwined set of beliefs about the honesty, dependability, reliability and overall trustworthiness of the population of sellers. The measure for intermediary trust was based on the seller trust instrument of Pavlou & Gefen (2004). We adapted the original items to reflect the intermediary's institutional role to act as agent of trust by ensuring the honesty, dependability and reliability of the population of sellers. In line with Doney & Cannon (1997) and Pavlou & Gefen (2004), we added one global measurement item of trust reflecting the overall impression of the trustworthiness of the intermediary.

A measurement instrument for intermediary risk was, to the best of our knowledge, lacking. Concerning the measurement of seller risk, only the instrument as applied by Pavlou & Gefen (2004) seemed appropriate to measure risk perceptions of a population of sellers in EM settings. A closer examination of the face validity of the construct (see Netemeyer *et al.*, 2003), however, clearly revealed discrepancy between the definition of the construct and representation of measurement items. Although seller risk was defined rather similarly to our interpretation of seller risk, the items addressed more general notions of risk associated with taking part in an auction at an EM. As such the measurement scale lacked the level of target specificity required to address perceived risk associated with the population of sellers. We then decided to develop new measurement instruments for both intermediary risk and seller risk. Following calls from Straub (1989) and Boudreau *et al.* (2001) to increase the reliability and validation of the instruments used in IS research, we built upon the measurement development process as put forward by Churchill (1979). First, a literature study was conducted to gather a sample of potentially valid items concerning the two constructs. These items were derived from the risk literature (e.g.,

Stone & Grønhaug, 1993; Agarwal & Teas, 2001; Pavlou 2003; Pavlou & Gefen, 2004) and were part of several risk measurement instruments. We then undertook a series of focus group sessions with a sample of 10 people. Two of the participants were electronic commerce practitioners working for a well-known Dutch EM. The remaining eight participants included IS faculty (six) and marketing faculty (two) in an academic institution. In the focus groups, the participants were asked to comment on the applicability of the items for each of the constructs, and to propose new items. This resulted in a draft questionnaire containing 10 items for intermediary risk and 10 items for seller risk. Next, all items were translated into Dutch, resulting in a final questionnaire.

Finally, to purify the intermediary risk and seller risk measures and to address reliability and validity, we conducted a pilot test with a convenience sample of 167 undergraduate students taking a mandatory core information systems course in the economics curriculum. Each student was notified in the class of an assignment to study the website of the Dutch version of the EM eBay (www.eBay.nl) and the URL to a web-based questionnaire. Next to the to-be-purified intermediary risk and seller risk measures, the measures for intermediary trust and seller trust were included in the online questionnaire. This enabled us to test for convergent and discriminant validity, and to study reliability for all independent constructs under study.

The assignment focused on the purchase of a laptop, a purchase often perceived as risky due to the complexity and expensiveness of the product (Stone & Grønhaug, 1993). It is conceivable that the purchase of a laptop at an EM is subject to perceptions of risk, as well as to the closely related concept of trust. Using the data from the convenience sample, we studied the validity and reliability of the four measurement instruments. For the intermediary risk and seller risk constructs, some items were dropped to keep the scales unidimensional and to improve the reliability. The remaining risk measurement instruments contained four items for seller risk and five items for intermediary risk. The pretest demonstrated convergent and discriminant validity for all four constructs and revealed that all measurement instruments exceeded the reliability thresholds for more established research (Cronbach's alpha >0.70; Hair *et al.*, 1998). A detailed overview of the measurement instruments is included in *Appendix A*.

Sample

The sample consisted of registered users of eBay.nl, the Dutch version of eBay.com. An e-mail was sent to 3000 users who voluntarily signed up for an e-mail list. The e-mail consisted of an invitation to participate voluntarily in the study and a link to a web-based survey. The survey addressed the trust and risk perceptions of the respondents when purchasing via the eBay.nl website. Like for the pilot test, the assignment focused on the purchase of a laptop. As incentive, respondents were

asked to fill in their e-mail address to engage in the raffle of a book token. Four hundred and fifty users responded and completed the online questionnaire, resulting in a response rate of 15%. The survey was conducted from 13th to 18th (inclusive) of July 2004.

Results

Sample demographics

Eventually, 450 respondents participated in our study. Of the respondents, 67.6% were men, 32.4% women. The majority of the respondents were between 27 and 52 years old ($n=309$, 68.7%). A clear peak was noticed for the group of 32–37 years old ($n=135$, 22.2%). The vast majority of the sample consisted of experienced Internet users, most of them having experience with online purchasing as well. Of the respondents, 92.98% reported to have purchased via eBay.nl four times or more and can be considered experienced eBay.nl shoppers. The vast majority of the respondents (80.2%) reported to visit the eBay.nl website a couple of times per week. This implies that the study is biased towards middle-aged, mostly male, extensive users and experienced buyers.

Validity and reliability

Principal component factor analysis with varimax rotation was applied to explore the validity of the constructs. The sample met the thresholds for sampling adequacy (overall MSA 0.85, Bartlett's test of sphericity = 10,484, $P<0.001$). The five factors explained 85.36% of the variance and suggested convergent and discriminant validity since all factor loadings loaded higher on their own factor than on the others (*see Appendix B*). Following Gerbing & Anderson (1988), we assessed reliability after the acceptable establishment of discriminant validity. Table 2 displays the Cronbach's alphas for the constructs, all exceeding the 0.60 threshold for exploratory research (Nunnally, 1967) as well as the 0.70 standard for more established research (Hair *et al.*, 1998). To test the predictive validity of the constructs and the conceptual model against the data, we regressed intermediary trust, seller trust, intermediary risk and seller risk on the attitude towards purchasing (see Tables 2 and 3).

Two out of four components contributed to the attitude towards purchasing. These are, in order of relative importance, seller trust and seller risk. The overall impact of seller trust and seller risk on the attitude can be labelled as 'strong'. The two intermediary components, intermediary trust and intermediary risk, did not contribute directly to the attitude. However, there are reasons

Table 2 Trust and risk types associated with purchasing at EMs

	<i>Trust</i>	<i>Perceived risk</i>
Intermediary Sellers	Intermediary trust Seller trust	Intermediary risk Seller risk

Table 3 Multiple regression results and reliability of measurement scales ($n = 450$)

Regression model	R ²	Adjusted R ²	Beta	Number of items	Cronbach's alpha
Attitude	0.33	0.32		3	0.95
Intermediary trust			0.03	4	0.96
Seller trust			0.39***	4	0.98
Intermediary risk			0.03	5	0.90
Seller risk			-0.28***	4	0.94

*** $P < 0.001$.

Note: see Appendix A for an overview of the items.

to assume that both constructs have indirect relationships with the attitude. Actually, Zucker (1986) already observed in her seminal paper on institutional trust that there is such a relation. For example, she argues that the trust in doctors as a group of trustees is brought about by their affiliation with professional medical institutions. According to Zucker, the trust in medical institutions has an impact on the trust in doctors as a group of trustees. This trust in doctors as a group of trustees is very similar to our notion of seller trust, because we also consider this as trust in a specific group of trustees. Hence, the relation we postulate is that intermediary trust is an antecedent of seller trust. This relationship is very similar to the relationship that Zucker observed between the trust in the professional association and the trust in a group of professionals. Further support for the proposed relationship between intermediary trust and seller trust is provided by literature addressing the concept of *trust transference*. Following the works of Strub & Priest (1976), Milliman & Fugate (1988) and Doney & Cannon (1997), trust in a party can be derived from another third party functioning as proof source. As such, trust can be transferred from the proof source to the group of persons to be trusted (Doney & Cannon, 1997). Building upon trust transference theory, it is well conceivable that perceptions of the institutional role of the intermediary acting as agent of trust function as proof source for trust in the population of sellers. Similarly, this transference logic applies to the closely related concept of risk (Pavlou & Gefen, 2004). Perceptions of the inability of the intermediary to fulfil its institutional role by providing protection against fraudulent and/or opportunistic sellers are likely to affect perceptions of the likelihood that sellers will behave opportunistically. Seller risk arises because of the chance that online sellers can behave opportunistically by taking advantage of the intermediary's inability to carefully monitor all transactions (Pavlou, 2003, p. 77). The chance that technological and regulatory measures applied by the intermediary fail to provide proper protection, functions as important source of seller risk (Pavlou, 2003). As such, perceptions of the intermediary's potential failure as caretaker are transferred to perceptions of the likelihood that sellers will take advantage of the situation by behaving opportunistically. Building upon this process of risk transference, intermediary risk is postulated to be a determinant of seller risk.

Test of alternative model

To explore the theoretical assumptions that intermediary trust affects seller trust and that intermediary risk precedes seller risk, structural equation modelling (SEM) was applied. We adopted the two-step approach as put forward by Anderson & Gerbing (1988), which has been applied in IS settings more recently by Gefen (2002) and Pavlou & Gefen (2004). The two-step approach implies 'a separate estimation and respecification of the measurement model prior to the simultaneous estimation of the measurement and structural submodels' (Anderson & Gerbing, 1988, p. 417). The major strengths of this approach compared to a one-step approach, where the measurement and structural models are estimated simultaneously, are that the analysis is exclusively confirmatory; that the theoretical model is tested independently (Anderson & Gerbing, 1988) and that the inclusion of measurement items is much less dependent on characteristics of the data that has been used for estimation and respecification (Gefen, 2002). For our analysis, we used Amos 5.0 with maximum likelihood estimation (Arbuckle & Wothke, 1999; Arbuckle, 2003).

As first step, we estimated the measurement model and assessed model fit for the eBay.nl sample ($n = 450$). The fit values demonstrated unacceptable overall fit. To locate the source of misspecification, we focused on the patterning of the residuals, since these are the first indication to look for model improvements (Gerbing & Anderson, 1984, 1988; Anderson & Gerbing, 1988; Hair *et al.*, 1998). The items Intmedtrust3, Selltrust3, Intmedrisk2 and Sellrisk2 shared a high residual variance with other items both within and across constructs. Since items sharing residual variance with other items are subject to deletion (Anderson & Gerbing, 1988; Netemeyer *et al.*, 1996), and the items reflected redundancy in wording with other items within the scale, the items were dropped (cf. Netemeyer *et al.*, 1996; Gefen, 2002). Deletion of items that share high residual variance is necessary in CFA, since this method addresses the extent to which items share residual variance and the unidimensionality of the constructs (Gefen, 2002). We dropped the four items and reestimated the model. Except for the χ^2 statistic (290.26, $P < 0.001$), the CFA demonstrated good fit indexes (GFI 0.93; AGFI 0.90; NFI 0.96; TLI 0.97; RMSEA 0.066). It is common that not all fit indexes are acceptable in CFA (Pavlou & Gefen, 2004). Moreover, the χ^2 statistic is known for its sensitivity to

larger samples, implying that other fit measures have to be taken into account (Hair *et al.*, 1998).

Next, we tested for convergent and discriminant validity (cf. Pavlou & Gefen, 2004). The results confirmed convergent validity since all items loaded significantly ($P < 0.001$) on the underlying latent constructs (Anderson & Gerbing, 1988). Following the procedure described by Anderson & Gerbing (1988), we tested for discriminant validity by conducting χ^2 difference tests between all possible pairs of constructs (see also Jöreskog, 1971). By constraining the estimated correlation parameter between a pair of constructs to 1.0, and assessing statistical differences between the constrained and unconstrained models, discriminant validity was tested (Anderson & Gerbing, 1988, p. 416). Significantly lower χ^2 values for the unconstrained model indicated discriminant validity (Bagozzi & Philips, 1982). The χ^2 difference tests confirmed significantly lower χ^2 values ($P < 0.001$) for the unconstrained models for all comparisons we tested for, implying the achievement of discriminant validity (Bagozzi & Philips, 1982). We reassessed the reliability of the measures. All Cronbach's alpha's were more than acceptable (intermediary trust: 0.94; seller trust: 0.97; intermediary risk: 0.88; seller risk: 0.91).

Finally, the second step of the two-step approach was taken. Following Anderson & Gerbing (1988) and Chin and Todd (1995), we cross-validated the model by a simultaneous estimation of the measurement and structural models on another independent sample. The sample consisted of 266 visitors of a relatively well-known Dutch EM that facilitates online consumer-to-consumer exchanges solely in the Netherlands. The visitors were invited via a banner on the website to participate voluntarily in the research. The data were collected from the 8th to 31st (inclusive) of August 2005.

As product a digital camera was selected. A digital camera is sufficiently complex in terms of its attributes set (cf. Jahng *et al.*, 2002) and therefore likely to be subject to perceptions of trust and risk. Eventually, 266 respondents participated in our study. Of the respondents, 62% were men and 38% women. The majority of the respondents were between 21 and 50 years old

($n = 185$, 70.6%). A peak was noticed for the group of 21–30 years old ($n = 73$, 27.9%). The vast majority of the sample consisted of experienced Internet users, most of them having experience with online purchasing as well. Of the respondents, 47.1% had prior experience with purchasing via the Dutch EM. The vast majority of the respondents (72.6%) reported to visit the website of the Dutch EM a couple of times per week. This implies that, in line with the eBay.nl study, our findings are biased towards middle-aged, mostly male, extensive users and experiences buyers.

The goodness of fit indices suggested, except for the χ^2 (202.01; $P < 0.001$), good fit with the data (GFI 0.92; AGFI 0.88; NFI 0.96; TLI 0.97; CFI 0.98; RMSEA 0.063). The estimated path coefficients are depicted in Figure 2.

The data revealed a significant beta of 0.54 of intermediary trust on seller trust ($R^2 = 0.29$). We also detected a significant impact of intermediary risk on seller risk (beta 0.17, $R^2 = 0.03$). Together, seller trust (beta 0.42) and seller risk (beta -0.20) accounted for 21% of the attitude variance. A reestimation of the reliability of the scales demonstrated more than acceptable Cronbach's alpha's (intermediary trust: 0.94; seller trust: 0.96; intermediary risk: 0.93; seller risk: 0.94; attitude 0.94).

Discussion

This research has focused on the relationships between perceptions of trust and risk in intermediaries and sellers at an EM and consumers' purchase attitude. We have examined the literature on intermediary trust and seller trust and introduced the concepts of intermediary risk and seller risk. Building upon literature study, focus group interviews and a pilot survey, we have developed measurement instruments for intermediary risk and seller risk. Two real shopper samples were used to address the validity of the measurement instruments. We linked the trust and risk types to the attitude towards purchasing at a particular EM. The results show statistical significance for seller trust and seller risk. Building upon trust and risk transference logic, we tested and confirmed second-order effects for intermediary trust and intermediary risk. In general, the impact of seller trust and seller risk on the

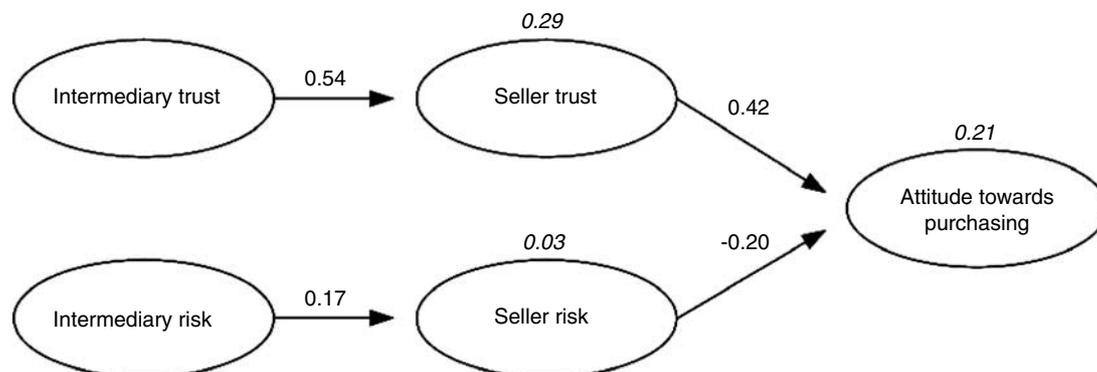


Figure 2 SEM results. All standardised path coefficients are significant at $P < 0.001$. Italic parameters above the constructs refer to the amount of variance explained.

attitude can be considered as rather strong. Together, seller trust and seller risk accounted for 21% of the variance of the attitude towards purchasing at an EM. This finding is rather similar to other empirical studies addressing the impact of seller-related trust and risk in online consumer purchasing (e.g. Jarvenpaa *et al.*, 2000). Since empirical studies in both on- and offline settings have demonstrated that shopping environments explain about 30–40% of the variance of consumers' attitude towards purchasing (Van der Heijden & Verhagen, 2004), our findings are quite encouraging. It is conceivable that seller trust and seller risk explain most of the attitude variance potentially accounted for by characteristics of the shopping system. We believe that part of the remaining attitude variance is likely to be explained by other online shopping system characteristics like, for example, ease-of-use, usability and enjoyment.

Concerning the individual role of seller trust and seller risk as attitude determinants, our results demonstrate that the impact of seller trust can be labelled as 'very strong' (beta 0.42), whereas the impact of seller risk can be labelled as 'rather strong' (beta -0.20). These findings are in line with the findings of the online shopping research of Jarvenpaa *et al.* (2000), where both trust and risk seemed to have clear impacts on consumer purchase attitudes. Compared to the findings of the online shopping study of Van der Heijden *et al.* (2003), however, a difference was noticed since their empirical study revealed that only perceived risk significantly contributed to the attitude towards purchasing, while the direct impact of trust on purchase attitudes was non-significant. A plausible explanation for this rather contrasting finding is that the vast majority of the student sample used by Van der Heijden *et al.* did not have any experience with online purchasing. Consequently, a relationship with the websites under investigation was lacking. According to prior research, trust is most likely to be a determinant of transaction-oriented behaviour when a relationship has been established (Dwyer *et al.*, 1987; Doney & Cannon, 1997; Geyskens *et al.*, 1998). This may explain why Van der Heijden *et al.* found no significant relationship between trust and consumer purchase attitude in their study. Building upon this argumentation, it is conceivable that the nature of our sample, mainly consisting of very experienced users and buyers at the EMs under investigation, explains the very strong impact of seller trust. Obviously, more empirical research is needed to address and validate the relative impact of seller trust and seller risk in online shopping settings in general, and in EM settings in particular.

With respect to the transferred impact of intermediary trust and intermediary risk, the results are encouraging though ambiguous. Intermediary trust can be considered a rather strong determinant of seller trust, accounting for 29% of the seller trust variance. Comparable findings have been revealed in research in B2B settings, in which perceptions of institutional structures explained a substantial part of trust in sellers (e.g. Pavlou, 2002).

Regarding the impact of intermediary risk, however, the results are less conclusive. Intermediary risk only explained 3% of the variance in seller risk. We advocate more research to explore the relationships between intermediary risk and seller risk in detail.

Conclusions and recommendations

At least two conclusions can be drawn from our research. First, perceptions of trust and risk account for a 21% proportion of the attitude towards purchasing at an EM. This finding contributes to the research on trust and perceived risk in electronic commerce. Second, seller trust and seller risk have significant direct effects on the attitude towards purchasing, whereas intermediary trust and intermediary risk can be labelled as second-order determinants. These findings have implications for both practice and research.

In practice, we believe one should realise that consumer purchase behaviour is the outcome of a mixture of decision-making processes, each of them being affected by a large number of factors. Most of these factors (e.g. income, culture, family, referral groups, social influence, experience) are beyond the scope of the intermediary facilitating online transactions. The only 'instrument' intermediaries of an EM have is the online exchange environment itself. Our findings imply that intermediaries are likely to profit most directly from applying instruments that contribute to seller trust and decrease seller risk. Examples of such instruments include guarantees, monitoring, conditions and feedback mechanisms (see Pavlou, 2002). From a communication point of view, intermediaries might also use their position as independent mediator to distribute transaction-related information that affects perceptions of seller trust and seller risk. In particular, we refer to the communication of quantitative information such as detailed information about the numbers and percentages of exchanges that were completed successfully without signs of any fraudulent behaviour. To process such quantitative information, potential buyers will have to rely more on their cognitive resources and will therefore focus less on the message itself and more on the source credibility and expertise to arrive at judgments (Petty *et al.*, 1983; Artz & Tybout, 1999). As such, intermediaries can take advantage of their role as independent mediator and credible information provider, and persuade more consumers to trust sellers at the EM and engage in transactions. Since our results provide support for the process of trust and risk transference, intermediaries would also profit from applying information to affect perceptions of intermediary trust and intermediary risk. In particular, following Palmer *et al.* (2000), intermediaries might pay attention to the provision of information on their capabilities. These capabilities refer to the skills and competencies of the intermediary to ensure the trustworthiness of sellers and prevent sellers from engaging in fraudulent behaviour. By convincing buyers of their care taking competencies, intermediary trust and intermediary risk are

likely to be affected and transferred to perceptions of trust and risk in the population of sellers. We believe that research on the different types of instruments and information that intermediaries can apply to affect perceptions of trust and risk is likely to result into useful insights for practice. We have planned further research in this field in the near future.

For research, our findings show that explaining and predicting online purchase behaviour in EM settings demands taking the different actors into account. Our research results strongly support that purchasing at an EM is subject to perceptions of two different actors: the intermediary operating the system and the population of sellers. Next to the trust and risk constructs we focused on, other characteristics of the online exchange environment are likely to explain part of the remaining attitude variance (cf. Bart *et al.*, 2005). An interesting challenge would be to explore whether these characteristics can be attributed to these two actors as well and, even more interesting, what the relationships between these characteristics and consumer purchasing would be. It is well conceivable that consumer perceptions of widely explored system characteristics, like for example system usefulness, are derived from actions of the intermediary, as well as different actions of sellers. Similarly, perceived reputation might be attributed to the intermediary and its facilitated system but also to the population of sellers. We expect that a study focusing on the impact of these perceptions, differentiated according to the actor that they refer to, will add to our understanding of online purchasing.

We believe that our research has made a number of contributions to the existing body of research.

First, we introduced the concepts of intermediary risk and seller risk. We believe that these concepts will add to the discussion of how and to what extent perceptions of EMs affect consumer purchase behaviour.

Second, we developed reliable and valid new measurement instruments for the concepts of intermediary risk and seller risk. We encourage researchers to apply these instruments in their own research.

Third, we empirically explored the relationships between intermediary trust, seller trust, intermediary risk, seller risk and the attitude towards purchasing at an EM. Our research results support the distinction between trust and risk perceptions of the intermediary operating the system and the population sellers. Furthermore, we have shown that seller trust and seller risk have a direct impact on the attitude towards purchasing, while intermediary trust and intermediary risk are likely to function as second-order determinants.

Our research has been subject to some limitations. An important limitation of our work concerns the bias of our samples. The samples mainly consisted of extensive users and experienced buyers. Consequently, the results of the study are biased towards *repeated* purchases. This might have implications for our findings. For example, the fact that the vast majority of the samples consisted of experienced users of the EMs under study could have had an upward-biasing effect on the impact of the intermediary trust and seller trust variables. In established relationships, behaviour is to a large extent subject to perceptions of trust (Grabner-Kräuter & Kalusha, 2003; Ratnasingam, 2005). Having established relationships with the EM and, possibly, also with part of the population of sellers, trust is likely to have been an important issue to the respondents. Similarly, it is believable that the familiarity with the EMs under study has affected the results of our study. Both EMs are well-known institutions in the Netherlands, and intend to function as trustworthy 'care taker' by applying instruments such as monitoring, regulations, safeguards and assurances. Consequently, established expectations concerning the role of the intermediary in monitoring and verifying sellers could have had an upward biasing effect on the relationship between intermediary trust and seller trust. Possibly, the impact of intermediary trust on seller trust is weaker when buyers engage in purchase situations at EMs that they are less familiar with and/or at EMs that pay less attention to the monitoring of sellers and protection of buyers. In such situations trustworthy relationships are less established and feelings of uncertainty are more prevalent. It is believable that in online purchase situations that are perceived as more risky, the impact of seller risk on purchase attitudes and the impact of intermediary risk on seller risk is likely to be stronger than in our research. Future research will have to address the validity of these assumptions. Of particular interest might be a study testing our research model at less-regulated EMs, with other samples.

Another limitation concerns the validity of the research. We introduced the concepts of intermediary risk and seller risk. Next, we empirically explored the impact of both EM characteristics and the closely related concepts of intermediary trust and seller trust on consumer purchase attitudes. Based on the outcomes, we explored the indirect relationships of intermediary trust and intermediary risk. These findings, and the nature of the relationships in particular, have to be interpreted with care since more theoretical rationale and empirical exploration are needed. We plan to investigate this in future research.

About the authors

Tibert Verhagen is an assistant professor E-business at the Department of Economics and Business Administration of

the Vrije Universiteit Amsterdam. His Ph.D. specialisation is on online purchase behaviour. Next to several con-

ference proceedings, his work has been published in journals such as *Information & Management* and the *European Journal of Information Systems*.

Selmar Meents is a Ph.D. candidate at the Vrije Universiteit Amsterdam, Department of Economics and Business Administration. He received his M.A. in business administration from this academic institution. His research interests include trust and risk in offline and online settings, electronic marketplaces and buyer–seller relationships.

Yao-Hua Tan is professor of Electronic Business at the Department of Economics and Business Administration of the Vrije Universiteit Amsterdam. His research interest is design of business and control procedures for network organisations. He has published in journals such as *International Journal of Electronic Commerce* and *Decision Support Systems*.

References

- AGARWAL S and TEAS RK (2001) Perceived value: mediating role of perceived risk. *Journal of Marketing Theory and Practice* **9**(4), 1–14.
- AJZEN I and FISHBEIN M (1980) *Understanding Attitudes and Predicting Social Behaviour*. Prentice Hall, Inc., Englewood Cliffs, New Jersey.
- ANDERSON JC and GERBING DW (1988) Structural equation modelling in practice: a review and recommended two-step approach. *Psychological Bulletin* **103**(3), 411–423.
- ARBUCKLE JL (2003) *Amos 5.0 Update to the Amos User's Guide*. SmallWaters Corporation, Chicago.
- ARBUCKLE JL and WOTHKE W (1999) *Amos 4.0 User's Guide*. SmallWaters Corporation, Chicago.
- ARTZ N and TYBOUT AM (1999) The moderating impact of quantitative information on the relationship between source credibility and persuasion: a persuasion knowledge model interpretation. *Marketing Letters* **10**(1), 51–62.
- BAGOZZI RP and PHILIPS LW (1982) Representing and testing organizational theories: a holistic construal. *Administrative Science Quarterly* **27**(3), 459–489.
- BAILEY J and BAKOS JY (1997) An exploratory study of the emerging role of electronic intermediaries. *International Journal of Electronic Commerce* **1**(3), 7–20.
- BAKOS JY (1998) Towards friction-free markets: the emerging role of electronic marketplaces on the Internet. *Communications of the ACM* **41**(8), 35–42.
- BART Y, SHANKAR V, SULTAN F and URBAN GL (2005) Are the drivers and role of online trust the same for all web sites and consumers? A large-scale exploratory empirical study. *Journal of Marketing* **69**(4), 133–152.
- BELANGER F, HILLER JS and SMITH WJ (2002) Trustworthiness in electronic commerce: the role of privacy, security, and site attributes. *Journal of Strategic Information Systems* **11**(3/4), 245–270.
- BENSAOU M and VENKATRAMAN N (1996) Inter-organizational relationships and information technology: a conceptual synthesis and a research framework. *European Journal of Information Systems* **5**(2), 84–91.
- BOUDREAU MC, GEFEN D and STRAUB DW (2001) Validation in information systems research: a state-of-the-art assessment. *MIS Quarterly* **25**(1), 1–16.
- BUSS AH (1989) Personality as traits. *American Psychologist* **44**(11), 1378–1388.
- CHIN WW and TODD PA (1995) On the use, usefulness, and ease of use of structural equation modeling in MIS research: A note of caution. *MIS Quarterly* **19**(2), 237–246.
- CHO J (2006) The mechanism of trust and distrust formation and their relational outcomes. *Journal of Retailing* **82**(1), 25–35.
- CHURCHILL Jr. GA (1979) A paradigm for developing better measures of marketing constructs. *Journal of Marketing Research* **16**(1), 64–73.
- CONCHAR MP, ZINKHAN GM, PETERS C and OLAVARRIETA S (2004) An integrated framework for the conceptualization of consumers' perceived-risk processing. *Academy of Marketing Science* **32**(4), 418–436.
- CRISP CB, JARVENPAA SL and TODD PA (1997) *Individual differences and internet shopping attitudes and intentions*. Graduate School of Business Working Paper, University of Texas.
- CROSBY LA, EVANS KR and COWLES D (1990) Relationship quality in services selling: an interpersonal influence perspective. *Journal of Marketing* **54**(3), 68–81.
- DONEY PM and CANNON JP (1997) An examination of the nature of trust in buyer–seller relationships. *Journal of Marketing* **61**(1), 35–51.
- DOWLING GR and STAELIN R (1994) A model of perceived risk and intended risk-handling activity. *Journal of Consumer Research* **21**(1), 119–134.
- DWYER FR and OH S (1987) Output sector munificence effects on the internal political economy of marketing channels. *Journal of Marketing Research* **24**(4), 347–358.
- DWYER FR, SCHURR PH and OH S (1987) Developing buyer–seller relationships. *Journal of Marketing* **51**(2), 11–27.
- FEATHERMAN MS and PAVLOU PA (2003) Predicting e-services adoption: a perceived risk facets perspective. *International Journal of Human-Computer Studies* **59**, 451–474.
- FISHBEIN M and AJZEN I (1975) *Belief, Attitude, Intention and Behaviour: An Introduction to Theory and Research*. Addison-Wesley Publishing Company, Reading, Massachusetts.
- GALLIVAN M and DEPLEDGE G (2003) Trust, control and the role of interorganizational systems in electronic partnerships. *Information Systems Journal* **13**(2), 159–190.
- GANESAN S (1994) Determinants of long-term orientation in buyer–seller relationships. *Journal of Marketing* **58**(2), 1–19.
- GARBARINO E and STRAHILEVITZ M (2004) Gender differences in the perceived risk of buying online and the effects of receiving a site recommendation. *Journal of Business Research* **57**(7), 768–775.
- GEFEN D (2002) Reflections on the dimension of trust and trustworthiness among online consumers. *The Data Base for Advances in Information Systems* **33**(3), 38–53.
- GEFEN D, KARAHANNA E and STRAUB DW (2003) Trust and TAM in online shopping: an integrated model. *MIS Quarterly* **27**(1), 51–90.
- GERBING DW and ANDERSON JC (1984) On the meaning of within-factor correlated measurement errors. *Journal of Consumer Research* **11**(1), 572–580.
- GERBING DW and ANDERSON JC (1988) An updated paradigm for scale development incorporating unidimensionality and its assessment. *Journal of Marketing Research* **25**(2), 186–192.
- GEYSKENS I, STEENKAMP J-BEM and KUMAR N (1998) Generalizations about trust in marketing channel relationships using meta-analysis. *International Journal of Research in Marketing* **15**(3), 223–248.
- GRABNER-KRÄUTER S (2002) The role of consumers' trust in online-shopping. *Journal of Business Ethics* **39**(1), 43–50.
- GRABNER-KRÄUTER S. and KALUSHA EA (2003) Empirical research in on-line trust: a review and critical assessment. *International Journal of Human-Computer Studies* **58**(6), 783–812.
- HAIR Jr. JF, ANDERSON RE, TATHAM RL and BLACK WC (1998) *Multivariate Data Analysis*. Prentice-Hall, Upper Saddle River, NJ.
- HAMPTON-SOSA W and KOUFARIS M (2005) The effect of web site perceptions on initial trust in the owner company. *International Journal of Electronic Commerce* **10**(1), 55–81.
- HARRIS LC and GOODE MMH (2004) The four levels of loyalty and the pivotal role of trust: a study of online service dynamics. *Journal of Retailing* **80**(2), 139–158.
- HIRSHLEIFER J and RILEY JG (1979) The analytics of uncertainty and information: an expository survey. *Journal of Economic Literature* **17**(4), 375–1421.

- JACOBY J and KAPLAN LB (1972) The components of perceived risk. In *Proceedings of the Third Annual Conference on the Association for Consumer Research* (VENKETASAN M, Ed), pp 382–393, College Park, MD, Chicago.
- JAHNG JJ, JAIN H and RAMAMURTHY K (2002) Personality traits and effectiveness of presentation of product information in e-business systems. *European Journal of Information Systems* **11**(3), 181–195.
- JARVENPAA SL, TRACTINSKY N and VITALE M (2000) Consumer trust in an Internet store. *Information Technology and Management* **1**(1), 45–71.
- JONES MA, REYNOLDS KE, WEUNG S and BEATTY SE (2003) The product-specific nature of impulse buying tendency. *Journal of Business Research* **56**(7), 505–511.
- JÖRESKOG KG (1971) Statistical analysis of sets of congeneric tests. *Psychometrika* **36**(2), 109–133.
- KAMBIL A and VAN HECK E (1998) Reengineering the Dutch flower auctions – a framework for analyzing exchange organizations. *Information Systems Research* **9**(1), 1–19.
- KOUFARIS M and HAMPTON-SOSA W (2004) The development of initial trust in an online company by new customers. *Information & Management* **41**(3), 377–397.
- KUMAR N, SCHEER LK and STEENKAMP J-BEM (1995a) The effects of supplier fairness on vulnerable resellers. *Journal of Marketing Research* **32**(1), 54–65.
- KUMAR N, SCHEER LK and STEENKAMP J-BEM (1995b) The effects of perceived interdependence on dealer attitudes. *Journal of Marketing Research* **32**(3), 348–356.
- LARZELERE RE and HUSTON TL (1980) The dyadic trust scale: toward understanding interpersonal trust in close relationships. *Journal of Marriage and the Family* **42**(3), 595–604.
- LIU C, MARCHEWKAB JT, LUC J and YU C-S (2005) Beyond concern – a privacy-trust-behavioral intention model of electronic commerce. *Information & Management* **42**(2), 289–304.
- MALHOTRA NK, KIM SS and AGARWAL J (2004) Internet users' information privacy concerns (IUIPC): the construct, the scale, and a causal model. *Information Systems Research* **15**(4), 336–355.
- MAYER RC, DAVIS JH and SCHOORMAN FD (1995) An integrative model of organizational trust. *Academy of Management Review* **20**(3), 709–734.
- MCKNIGHT DH and CHERVANY NL (2002) What trust means in e-commerce customer relationships: an interdisciplinary conceptual typology. *International Journal of Electronic Commerce and Business Media* **6**(2), 35–59.
- MCKNIGHT DH, CHOUDHURY V and KACMAR C (2002) The impact of initial consumer trust on intentions to transact with a web site: a trust building model. *Journal of Strategic Information Systems* **11**(3/4), 297–323.
- MILLIMAN RE and FUGATE DL (1988) Using trust-transference as a persuasion technique: an empirical field investigation. *The Journal of Personal Selling and Sales Management* **8**(2), 1–7.
- MOON J-W and KIM Y-G (2001) Extending the TAM for a world-wide-web context. *Information and Management* **38**(4), 217–230.
- MURRAY KB (1991) A test of services marketing theory: consumer information acquisition activities. *Journal of Marketing* **55**(1), 10–25.
- NETEMEYER RG, BEARDEN WO and SHARMA S (2003) *Scaling Procedures: Issues and Applications*. Sage Publications, Thousand Oaks, California.
- NETEMEYER RG, BOLES JS and MCMURRIAN R (1996) Development and validation of work–family conflict and family–work conflict scales. *Journal of Applied Psychology* **81**(4), 400–410.
- NUNNALLY JC (1967) *Psychometric Theory*. McGraw-Hill, New York.
- O'CASS A and FENECH T (2003) Web retailing adoption: exploring the nature of internet users web retailing behaviour. *Journal of Retailing and Consumer Services* **10**(2), 81–94.
- OHANIAN R (1991) The impact of celebrity spokespersons 'perceived image on consumers' intention to purchase. *Journal of Advertising Research* **31**(1), 45–64.
- PALMER JW, BAILEY JP and FARAJ S (2000) The role of intermediaries in the development of trust on the WWW: use and prominence of trusted third parties and privacy statements. *Journal of Computer Mediated Communication* **5**(3), available online at <http://jcmc.indiana.edu/vol5/issue3/palmer.html>.
- PAVLOU PA (2002) Institution-based trust in interorganizational exchange relationships: the role of online B2B marketplaces on trust formation. *Journal of Strategic Information Systems* **11**(3/4), 215–243.
- PAVLOU PA (2003) Consumer acceptance of electronic commerce: integrating trust and risk with the technology acceptance model. *International Journal of Electronic Commerce* **7**(3), 69–103.
- PAVLOU PA and GEFEN D (2004) Building effective online marketplaces with institution-based trust. *Information Systems Research* **15**(1), 37–59.
- PETTY RE, CACIOPPO JT and SCHUMANN D (1983) Central and peripheral routes to advertising effectiveness: the moderating role of involvement. *Journal of Consumer Research* **10**(2), 135–146.
- RATNASINGAM P (2005) Trust in inter-organizational exchanges: a case study in business to business electronic commerce. *Decision Support Systems* **39**(3), 525–544.
- RING PS and VAN DE VEN AH (1994) Developmental processes of cooperative inter-organizational relationships. *Academy of Management Review* **19**(1), 90–118.
- ROTTER JB (1971) Generalized expectancies for interpersonal trust. *American Psychologist* **26**(5), 443–450.
- ROUSSEAU DM, SITKIN SB, BURT RS and CAMERER C (1998) Not so different after all: a cross-discipline view of trust. *Academy of Management Review* **23**(3), 393–404.
- RYAN MJ and BONFIELD EH (1975) The Fishbein extended model and consumer behaviour. *Journal of Consumer Research* **2**(2), 118–136.
- SCHURR PH and OZANNE JL (1985) Influences on exchange processes: buyers' preconceptions of a seller's trustworthiness and bargaining toughness. *Journal of Consumer Research* **11**(4), 939–953.
- SHAPIRO SP (1987) The social control of impersonal trust. *American Journal of Social Psychology* **93**(3), 623–658.
- SHEPPARD BH, HARTWICK J and WARSHAW PR (1988) The theory of reasoned action: a meta-analysis of past research with recommendations for modifications and future research. *Journal of Consumer Research* **15**(3), 325–343.
- SHIH H-P (2004) An empirical study on predicting user acceptance of e-shopping on the Web. *Information & Management* **41**(3), 351–368.
- SHIM S, EASTLICK MA, LOTZ SL and WARRINGTON P (2001) An online prepurchase intentions model: the role of intention to search. *Journal of Retailing* **77**(3), 397–416.
- SIRDESHMUKH D, SINGH J and SABOL B (2002) Consumer trust, value, and loyalty in relational exchanges. *Journal of Marketing* **66**(1), 15–37.
- SMITH JB and BARCLAY DW (1997) The Effects of organizational differences and trust on the effectiveness of selling partner relationships. *Journal of Marketing* **61**(1), 3–21.
- STONE RN and GRØNHAUG K (1993) Perceived risk: further considerations for the marketing discipline. *European Journal of Marketing* **27**(3), 39–50.
- STRAUB DW (1989) Validating instruments in MIS research. *MIS Quarterly* **13**(2), 147–169.
- STRUB PJ and PRIEST TB (1976) Two patterns of establishing trust: the marijuana user. *Sociological Focus* **9**(4), 399–411.
- TAN Y-H and THOEN W (2000) Towards a generic model of trust for electronic commerce. *International Journal of Electronic Commerce* **5**(2), 61–74.
- TAN Y-H and THOEN W (2002) Formal aspects of a generic model of trust for electronic commerce. *Decision Support Systems* **33**(3), 233–246.
- VAN DER HEIJDEN H and VERHAGEN T (2004) Online store image: conceptual foundations and empirical measurement. *Information and Management* **41**(5), 609–617.
- VAN DER HEIJDEN H, VERHAGEN T and CREEMERS M (2003) Understanding online purchase intentions: contributions from technology and trust perspectives. *European Journal of Information Systems* **12**(1), 41–48.
- ZAHNER A, MCEVILY B and PERRONE V (1998) Does trust matter? Exploring the effects of interorganizational and interpersonal trust on performance. *Organization Science* **9**(2), 141–159.
- ZUCKER L (1986) Production of trust: institutional sources of economic structure. *Research in Organization Behaviour* **8**(1), 53–111.

Appendix A

Measurement instruments

<i>Item</i>	<i>Caption</i>
<i>Intermediary trust</i>	
Intmedtrust1	< name intermediary > ensures sellers are dependable
Intmedtrust2	< name intermediary > ensures sellers are reliable
Intmedtrust3	< name intermediary > ensures sellers are honest
Intmedtrust4	< name intermediary > ensures sellers are trustworthy
<i>Seller trust</i>	
Selltrust1	Sellers of < product > in this online market are in general dependable
Selltrust2	Sellers of < product > in this online market are in general reliable
Selltrust3	Sellers of < product > in this online market are in general honest
Selltrust4	Sellers of < product > in this online market are in general trustworthy
<i>Intermediary risk</i>	
Intmedrisk1	If I were to purchase a < product > through this online marketplace, I become concerned about whether < name intermediary > will take care of transaction security
Intmedrisk2	If I were to purchase a < product > through this online marketplace, I become concerned about whether < name intermediary > will preclude theft of money
Intmedrisk3	If I were to purchase a < product > through this online marketplace, I become concerned about whether < name intermediary > will protect me against fraudulent sellers
Intmedrisk4	If I were to purchase a < product > through this online marketplace, I become concerned about whether < name intermediary > will prevent fraudulent seller from doing business via the EM
Intmedrisk5	If I were to purchase a < product > through this online marketplace, I become concerned about whether < name intermediary > will trace sellers in case of disputes
<i>Seller risk</i>	
Sellrisk1	As I consider to purchase a < product > through this online marketplace, I become concerned about whether sellers will commit fraud
Sellrisk2	As I consider to purchase a < product > through this online marketplace, I become concerned about whether sellers will swindle
Sellrisk3	As I consider to purchase a < product > through this online marketplace, I become concerned about whether sellers offer products that will not perform as expected
Sellrisk4	As I consider to purchase a < product > through this online marketplace, I become concerned about whether sellers will behave opportunistic
<i>Attitude</i>	
Att1	I am positive towards buying a < product > on the < name > website.
Att2	The thought of buying a < product > at the website of < name > is appealing to me.
Att3	I think it is a good idea to buy a < product > at the website of < name >.

Appendix B

Principal components factor analysis ($n = 450$)

	<i>Seller trust</i>	<i>Intermediary trust</i>	<i>Intermediary risk</i>	<i>Seller risk</i>	<i>Attitude</i>
Intmedtrust1	0.167	0.910	0.049	-0.046	0.059
Intmedtrust2	0.156	0.935	0.057	-0.058	0.058
Intmedtrust3	0.211	0.898	0.012	-0.136	0.128
Intmedtrust4	0.194	0.915	0.033	-0.117	0.085
Selltrust1	0.899	0.190	0.117	-0.158	0.202
Selltrust2	0.913	0.215	0.113	-0.144	0.204
Selltrust3	0.895	0.216	0.101	-0.172	0.221

Appendix B. Continued

	<i>Seller trust</i>	<i>Intermediary trust</i>	<i>Intermediary risk</i>	<i>Seller risk</i>	<i>Attitude</i>
Selltrust4	0.902	0.221	0.086	-0.180	0.211
Intmedrisk1	0.041	0.088	0.789	0.005	-0.007
Intmedrisk2	0.045	0.082	0.825	0.068	0.048
Intmedrisk3	0.125	-0.014	0.871	0.117	0.060
Intmedrisk4	0.059	0.004	0.874	0.105	0.013
Intmedrisk5	0.075	-0.017	0.824	0.096	-0.026
Sellrisk1	-0.167	-0.090	0.111	0.866	-0.161
Sellrisk2	-0.185	-0.107	0.100	0.908	-0.139
Sellrisk3	-0.074	-0.112	0.103	0.872	-0.156
Sellrisk4	-0.156	-0.043	0.103	0.891	-0.169
Att1	0.300	0.131	0.001	-0.251	0.843
Att2	0.221	0.089	0.027	-0.168	0.926
Att3	0.231	0.101	0.053	-0.223	0.906