



Understanding online purchase intentions: contributions from technology and trust perspectives

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Abstract

This paper explores factors that influence consumer's intentions to purchase online at an electronic commerce website. Specifically, we investigate online purchase intention using two different perspectives: a technology-oriented perspective and a trust-oriented perspective. We summarise and review the antecedents of online purchase intention that have been developed within these two perspectives. An empirical study in which the contributions of both perspectives are investigated is reported. We study the perceptions of 228 potential online shoppers regarding trust and technology and their attitudes and intentions to shop online at particular websites. In terms of relative contributions, we found that the trust-antecedent 'perceived risk' and the technology-antecedent 'perceived ease-of-use' directly influenced the attitude towards purchasing online.

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Introduction

The research objective of this paper is to explore the factors that influence online purchase intentions in consumer markets. Firms operating in this segment sell their goods and services to consumers via a website. These online stores are important and sometimes highly visible representatives of the 'new economy', yet despite this, they do not enjoy much sound conceptual and empirical research (Hoffman & Novak, 1996; Alba *et al.*, 1997). An increased understanding of online consumer behaviour can benefit them in their efforts to market and sell products online.

We investigate consumers' intentions to purchase products at online stores using two different perspectives: a technology-oriented perspective and a trust-oriented perspective. Technology and trust issues are highly relevant to online consumer behaviour, yet their inclusion in traditional consumer behaviour frameworks is limited. We discuss the contributions of each perspective to our understanding of online purchase intentions. We also present an empirical study that examines the contribution of each perspective by surveying 228 potential online shoppers.

The paper is organised as follows. First, we deal with the theoretical background, paying attention to technology and trust-oriented perspectives of online consumer behaviour. The subsequent section deals with the empirical study. Next, we present a summary of the findings. We conclude with a discussion and further directions for research.

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Theory

To a very large extent, online consumer behaviour can be studied using frameworks from 'offline' or traditional consumer behaviour. A number of general frameworks in consumer behaviour are available that capture the decision-making processes of consumers (Engel *et al.*, 1995; Schiffman & Kanuk, 2000). These frameworks distinguish a number of stages, typically including at least the following: need recognition, prepurchase search, evaluation of alternatives, the actual purchase, and postpurchase evaluation. These stages are relatively abstract and do not consider the *medium* through which the consumer buys. Hence, the stages can be applied to online consumer behaviour (O'Keefe & McEachern, 1998).

Looking more closely at the difference between online and 'off-line' consumer behaviour, we can identify at least two types of issues that differentiate online consumers from off-line consumers. First, online consumers have to interact with *technology* to purchase the goods and services they need. The physical shop environment is replaced by an electronic shopping environment or, in other words, by an information system (IS). This gives rise to technical issues that have traditionally been the domain of IS and human computer interaction (HCI) researchers (O'Keefe *et al.*, 2000).

Second, a greater degree of *trust* is required in an online shopping environment than in a physical shop. It is by now a folk theorem that trust is an important issue for those who engage in electronic commerce (Keen *et al.*, 1999). Trust mitigates the feelings of uncertainty that arise when the shop is unknown, the shop owners are unknown, the quality of the product is unknown, and the settlement performance is unknown (Tan & Thoen, 2001). These conditions are likely to arise in an electronic commerce environment.

Given these differences, research in online consumer behaviour can benefit from models that have been developed to study technology and trust issues in particular. We will examine the contributions of each of these models in more detail in the following sections.

Contributions from technology-oriented models

The technology perspective focuses on the consumer's assessment of the technology required to conduct a transaction online. In the context of this paper, technology refers to the website that an online store employs to market and sell its products. Researchers have long been studying how consumers search for information about products and how useful technology can be to acquire this information (Stigler, 1961; Thorelli & Engledow, 1980; Keller & Staelin, 1987; Widing & Talarzyk, 1993; Moorthy *et al.*, 1997). Information-seeking behaviour by consumers is characterised by a trade-off between the cost of searching and evaluating more alternative products and the benefit of a better decision when more alternatives are taken into account (Hauser & Wernerfelt, 1990). Technology has the potential to both decrease the

cost of searching and evaluating alternatives and increase the quality of the decision (Haubl & Trifts, 2000).

The advent of the internet and the proliferation of online stores have given rise to a number of studies that look at the consumer's intention to purchase online. There is some evidence that online consumers not only care for the instrumental value of the technology, but also the more immersive, hedonic value (Childers *et al.*, 2001; Heijden, forthcoming). These and other studies (Chau *et al.*, 2000) build their models upon a well-known theory in IS research: the technology acceptance model (TAM).

The TAM was first developed by Davis to explain user acceptance of technology in the workplace (Davis, 1989; Davis *et al.*, 1989). TAM adopts a causal chain of beliefs, attitudes, intention, and overt behaviour that social psychologists Fishbein and Ajzen (Fishbein & Ajzen, 1975; Ajzen, 1991) have put forward, and that has become known as the Theory of Reasoned Action (TRA). Based on certain beliefs, a person forms an attitude about a certain object, on the basis of which he/she forms an intention to behave with respect to that object. The intention to behave is the prime determinant of the actual behaviour.

Davis adapted the TRA by developing two key beliefs that specifically account for technology usage. The first of these beliefs is *perceived usefulness*, defined by Davis as 'the degree to which a person believes that using a particular system would enhance his or her job performance.' The second is *perceived ease-of-use*, defined as 'the degree to which a person believes that using a particular system would be free of effort'. Moreover, TAM theorises that all other external variables, such as system-specific characteristics, are fully mediated by these two key beliefs. The model has recently been updated (Venkatesh & Davis, 2000) with a number of antecedents of usefulness and ease-of-use, including subjective norms, experience, and output quality. There is ample evidence that not only usefulness (i.e., external motivation) but also enjoyment (i.e., internal motivation) is a direct determinant of user acceptance of technology (Davis *et al.*, 1992; Venkatesh, 1999). This is in line with a recent evaluation of the TRA, in recognition of the evidence that attitudes are not only based on cognition, but also on affection (Ajzen, 2001). Viewed in this light, perceived usefulness and ease-of-use represent the cognitive component of the user evaluation, while perceived enjoyment represents the affective component.

Researchers have empirically validated the original TAM in a variety of settings. Of particular interest here are recent studies on technology acceptance in internet usage and website usage. These studies by and large confirm the relevance and appropriateness of ease-of-use and usefulness in an online context, and find substantial evidence for the intrinsic enjoyment that many consumers have when surfing the web (Teo *et al.*, 1999; Lederer *et al.*, 2000; Moon & Kim, 2001). Support has also been found for ease-of-use being an antecedent of

usefulness and perhaps not directly contributing to attitude formation (Gefen & Straub, 2000).

Summarising, the contribution of TAM and other similar models is that they explain why online transactions are conducted from a technological point of view. In doing so, they highlight the importance of website usefulness and the usability of the website. Also, these models direct our attention to the hedonic features of the technology and demonstrate how these features can affect consumer's intention to purchase online.

Contributions from trust-oriented models

The trust-oriented perspective quickly gained momentum after the introduction of wide-scale electronic commerce in the beginning of the 1990s (Keen *et al.*, 1999). Trust is a multidimensional concept that can be studied from the viewpoint of many disciplines, including social psychology, sociology, economics, and marketing (Doney & Cannon, 1997). While there are many definitions of trust, the one that we will adopt in this paper is 'the willingness of a consumer to be vulnerable to the actions of an online store based on the expectation that the online store will perform a particular action important to the consumer, irrespective of the ability to monitor or control the online store cf. the more general definition from Mayer *et al.* (1995).

While researchers have been concerned with interpersonal trust and inter-organisational trust, they have paid less attention to trust between people and organisations (Lee & Turban, 2001). Recent conceptual and empirical research has started to look into this type of trust in more detail, in particular in the context of business to consumer electronic commerce. Researchers have developed instruments to measure trust in internet shopping (Cheung & Lee, 2000; Jarvenpaa *et al.*, 2000), and these measures are beginning to be used in the testing of empirical frameworks.

To what extent does trust in the company influence the intention to buy at a specific website? The existing empirical evidence suggests that trust in the company negatively influences the *perceived risk* that is associated with buying something on the internet (Featherman, 2001; Pavlou, 2001). Perceived risk can be regarded as a consumer's subjective function of the magnitude of adverse consequences and the probabilities that these consequences may occur if the product is acquired (Dowling & Staelin, 1994). The more a person trusts the internet company, the less the person will perceive risks associated with online buying. Perceived risk, in turn, negatively influences the attitude towards internet shopping. Trust in the online store may also directly influence this attitude (Jarvenpaa *et al.*, 2000).

People develop trust in the webstore through a number of factors. One is the perceived *size* of the company, another is their *reputation* (Jarvenpaa *et al.*, 2000). The larger the perceived size and the perceived reputation, the greater the trust in the company. Reputation is closely related to familiarity with the store, which researchers

have also identified as an antecedent of trust. Familiarity deals with an understanding of *current* actions of the store, while trust deals with beliefs about the *future* actions of other people (Gefen, 2000).

It should be noted that trust in the company does not have to be a necessary condition to purchase online. It has been argued that lack of trust in the organisation can be offset by trust in the control system (Tan & Thoen, 2001). Such a control system would include the procedures and protocols that monitor and control the successful performance of a transaction, and could include the option to insure oneself against damage. We may not trust the internet company, but we may trust the control system that monitors its performance (Tan & Thoen, 2002).

In sum, the trust-oriented perspective highlights the importance of trust in determining online purchase intentions, and its antecedents include a number of trust drivers. In doing so, it emphasises constructs such as perceived risk, trust in the online store, perceived size, and perceived reputation.

Method

To explore the contributions and the relative importance of each perspective, we conducted an empirical study. The following sections describe the model, the measurement instrument, and the sample.

Conceptual model

The model that we attempted to test is depicted in Figure 1. The backbone of this model is the relation between attitude towards online purchasing and intention to purchase online. This conforms the general relation between attitudes and intentions that the theory of reasoned action predicts, and is consistent with prior online purchase models (Jarvenpaa *et al.*, 2000; Pavlou, 2001).

The attitude construct has four antecedents in total: two from the technology perspective and two from the trust perspective. The technological antecedents are the perceived usefulness and perceived ease-of-use. Both constructs originate from TAM. The trust antecedents are trust in the online store and perceived risk; these constructs appear in the Jarvenpaa *et al.* study. Signs and directions of the relations between the constructs are displayed in Figure 1 and have been discussed in the Theory section.

Measurement instrument

In order to increase reliability and ease of comparison with previous work in this area, we operationalised each construct with multiple items. The operationalisations for the trust constructs were taken from Jarvenpaa *et al.* (2000). The operationalisations for the usefulness constructs were taken from Chau *et al.* (2000), based on Davis (1989). We made modifications, most of which were adaptations to increase the applicability of the items to the local context. A substantial adaptation involved the

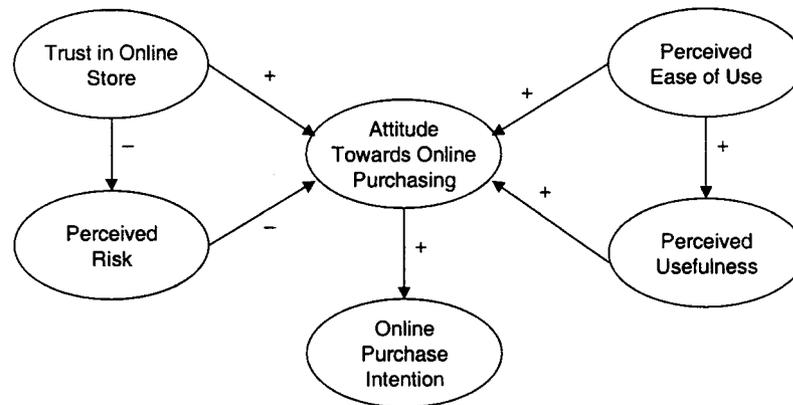


Figure 1 Conceptual model (adapted from Ajzen & Fishbein, 1980; Davis, 1989; Jarvenpaa *et al.*, 2000).

replacement of the word 'Internet' with 'This website' to increase consistency in the unit of analysis for each construct (Ajzen & Fishbein, 1980; DeVellis, 1991). Also, we changed the wording of the ease-of-use and usefulness items to make them more suitable for e-commerce websites. The resulting items can be found in the Appendix.

Sample

Our sample consisted of a group of undergraduate students who enrolled for a mandatory IS course at a Dutch academic institution. Each student was notified in class of the survey, and invited to participate for partial class credit.

Before the subjects started the survey, their task was to study two specific websites carefully. The first one was the website of a 'pure player' CD store: this website was a newcomer to the Dutch CD market and sold its products only over the internet. The second one was the website of a 'bricks-n-clicks' CD store. This website represented a large and well-known chain of CD stores in the Netherlands. Like the first online store, the website's purpose was to sell CDs directly over the internet.

After the students had studied the websites, they were asked to complete a survey for each website. Respondents returned the questionnaires both at home and on campus. It was possible to submit the responses through the internet or return them handwritten.

Results

Eventually, 228 students took part in the survey. Table 1 provides information on their internet experience and their experience with online shopping.

As the profile data show, this group is relatively homogeneous in terms of age and balanced in terms of internet experience. The gender balance in the current sample is similar to the gender balance of the entire population of internet users (Kehoe *et al.*, 1999). The online purchase experience of the respondents is heterogeneous, and this reveals a large set of inexperienced

Table 1 Profile of respondents sample (N=228)

Question	Count	Percentage
Age (years)		
19–20	85	37
21–22	83	36
23–24	39	17
≥25	20	9
Missing	1	
Gender		
Male	164	72
Female	64	28
Years of experience with the Internet		
None	0	0
1 year	16	7
2 years	59	26
3 years	75	33
4 years or more	77	34
Missing	1	
Number of times product bought on the internet		
None	149	66
Once	33	14
Twice	18	8
Three times	6	3
Four times or more	20	9
Missing	2	

online purchasers and a small set of very experienced online purchasers.

Reliability and validity

We used Cronbach's α and exploratory factor analysis to examine the reliability and unidimensionality of each construct. Passing of these tests is a prerequisite for further analysis (Nunally, 1967; DeVellis, 1991). To obtain acceptable values, we modified the trust and perceived risk scales, in line with the modifications that Jarvenpaa

et al made (see the appendix for the exact changes). Table 2 displays the resulting α coefficients for each of the constructs and for each of the websites. All resulting scales are unidimensional and sufficiently reliable.

We estimated the model's parameters using the scales and structural equation modelling (SEM). The goodness-of-fit measures, depicted in Table 3, show good fit with the data and consequently, we can proceed with an analysis of the path parameters.

Figure 2 displays the path coefficients that the SE package has estimated, along with the squared multiple correlations of the intermediate and dependent variables.

The data supported a strong positive relation between attitude towards online purchasing and intention to purchase online. The only predictor of attitude that was significant in both cases was the perceived risk. Perceived ease-of-use was a significant predictor only in the case of the bricks-n-clicks online store. The relation between trust and risk and the relation between perceived ease-of-use and perceived usefulness were supported.

Discussion

The result of this research suggests that perceived risk and perceived ease-of-use are antecedents of attitude towards online purchasing. The effect of perceived risk was strongly negative in both cases, and the effect of perceived ease-of-use was positive in one case. The data did not support a positive effect from trust in the online store and from the perceived usefulness of the website. Trust in store appears to be indirectly related to a positive attitude through its direct negative effect of perceived

risk. In sum, contributions from both the trust perspective and the technology perspective could be found, although the contribution of the technology perspective appears to be less.

Our results are only partly in line with other TAM studies. The impact of perceived ease-of-use on perceived usefulness is in line with earlier research. The lack of effect of perceived usefulness and perceived ease-of-use on attitudes towards online purchasing is not. One explanation for this result is that the dependent variables of our study are narrower in scope to the ones commonly found in TAM models. TAM models focus on *usage* intention of the technology, as opposed to *purchase* intention. In an e-commerce context, usage intention is broader in scope than purchase intention. This is because a person may use an online store not only to purchase, but also to learn about products and services. Hence, respondents do not intend to purchase items at the online store, even though they perceive the store as useful.

A second, related explanation is that – in retrospect – perceived usefulness may have been too narrowly operationalised. For example, 'speed' and 'convenience' are included in the scale, but perceptions about the price levels of the online store are not. A more detailed assessment of the perceived usefulness of online stores may reveal more appropriate items. Perhaps, our operationalisation failed to tap salient aspects of usefulness, and in doing so tampered its predictive value.

It is interesting to compare the results from this study to the study from Jarvenpaa *et al*. This study looked at the impact of trust and perceived risk in a similar empirical setting. Our results partly corroborate their findings. We did find a positive effect of trust in the store on perceived risk, and an effect of perceived risk on the attitude towards online purchasing. In contrast, we did not find any effect of trust in the store on attitude.

How can these differences be explained? Why were trust, ease-of-use, and usefulness not significant in our study, even though previous research has found empirical support for them? We believe it is conceivable that trust, ease-of-use, and usefulness are 'threshold' variables. This means that once a certain evaluation level is reached, the variable no longer contributes to

Table 2 Reliability coefficients for each construct

	Number of items	Pure player (n = 218)	Bricks-n-clicks (n = 212)
Trust in store	3	0.69	0.79
Risk	3	0.80	0.80
Ease-of-use	5	0.87	0.95
Usefulness	3	0.80	0.84
Attitude	3	0.92	0.93
Intention	4	0.91	0.92

Table 3 Goodness-of-fit values

Goodness-of-fit measure	Acceptable values (Hair <i>et al.</i> , 1998)	Pure player	Bricks-n-clicks
χ^2	NS	285 ($p < 0.001$)	275 ($p < 0.001$)
RMSEA	< 0.08	0.05	0.05
GFI	No established thresholds (the higher the better)	0.90	0.89
NFI	0.90	0.90	0.93
TLI	0.90	0.96	0.97

RMSEA, root mean square error of approximation; GFI, goodness-of-fit index; NFI, normed fit index; TLI, Tucker–Lewis index.

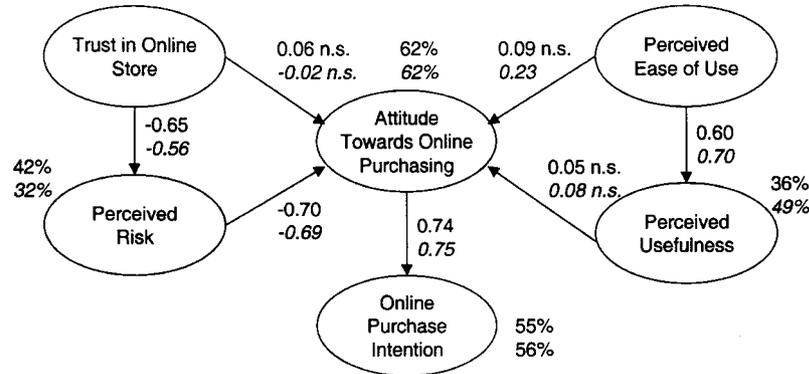


Figure 2 SEM estimation results. Standardised path coefficients are significant at $p < 0.005$ except otherwise noted. Normal font represents values of the pure player online store, italics font represents values of the bricks-n-clicks player. Percentages indicate squared multiple correlations (variance explained).

a favourable attitude. Hence, these variables affect attitudes only on low evaluation levels, that is, when respondents evaluate them as being poor. A shopper may or may not purchase at a trustworthy website, but he/she will definitely *not* purchase at an untrustworthy site. A shopper may or may not purchase at a user-friendly website, but he or she will definitely *not* purchase at an user-unfriendly website.

This line of reasoning suggests another explanation of our findings: we did not select websites where trust in the store, ease-of-use, and usefulness were poorly evaluated. Indeed, the three no-effect constructs (trust, perceived usefulness, and perceived ease-of-use) received high evaluations from the respondents. While the unbridled trust in the 'pure player' may seem odd in hindsight, the reader should keep in mind that the survey was administered at a time when stock exchanges and investors were still euphoric about internet start-ups. We also observed that the two websites appeared to be well designed and offered efficient online purchasing facilities. So, we speculate that trust, perceived usefulness, and perceived ease-of-use reached threshold levels in many of the respondents' minds and this is why they did not generate any effect on their attitudes towards purchasing online.

Our conceptualisation of these constructs as threshold variables borrows from Herzberg's research on *hygiene* and *motivational* factors in the area of job satisfaction. Herzberg theorised that some factors influence job satisfaction but not dissatisfaction (achievement, recognition), while others only influenced job dissatisfaction but not satisfaction (salary, relationship with supervisor). The former ones are called motivational factors, the latter hygiene factors (Herzberg *et al.*, 1959). Similar to this line of reasoning, it is possible that some or all of the antecedents in our model are hygiene factors. In other words, perceived risk, trust in the store, perceived usefulness, and perceived ease-of-use *negatively* influence

an unfavourable attitude towards online purchasing, but do *not* positively influence a favourable attitude towards online purchasing.

Clearly, this threshold hypothesis requires further theoretical and empirical analysis, because it requires the conceptualisation of two separate attitudes (one favourable, one unfavourable). Further research may shed additional light on why antecedents appear to influence online consumer behaviour in some studies, but not in other studies.

An important limitation of our empirical study is the relatively large proportion of inexperienced online shoppers. While we are confident that our findings extend to other populations with the same profile, the generalisability of the results to larger, more experienced populations is limited. For this reason, we encourage other researchers to replicate and extend our study in settings with more experienced online shoppers.

Online consumer behaviour is a broad area of study, and we realise that our research has only investigated a modest part of this area. Besides further exploration of the threshold hypothesis, a promising direction of further research is the extent to which technology *itself* helps to build trust. This calls for an interesting mixture of both perspectives. For example, it is defensible to argue that a website's design can increase a consumer's confidence, much like a good interior design in a restaurant can promote confidence in the quality of the forthcoming food. In doing so, the technology can increase a person's trust in the store. A related subject is the degree to which specific website features help bolster trust. Are third party assurance seals and certifications of any importance? Do testimonials from consumers, or a personal note from the shop owner increase trust? To what extent, and under which conditions? We encourage other researchers to examine these subjects further.

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Appendix

All items were measured on a seven point Likert strongly disagree/strongly agree scale, unless mentioned otherwise.

Trust in store[†]

1. This store is trustworthy
2. This store wants to be known as one who keeps his promises (modified).**
3. I trust this store keeps my best interests in mind.
4. I think it makes sense to be cautious with this store (modified)(reverse).*
5. This retailer has more to lose than to gain by not delivering on their promises.*.**
6. This store's behaviour meets my expectations.*.**
7. This store could not care less about servicing students*** (modified) (reverse).

[†]* Indicates dropped item by Jarvenpaa et al. (2000); ** indicates dropped item in our own research, "modified" indicates adaptations from original work

Attitude towards online purchasing

1. The idea of using this website to buy a product of service is appealing (modified).
2. I like the idea of buying a product or service on this website (modified).
3. Using this website to buy a product or service at this store would be a good idea (modified).

Online purchase intention

1. How likely is it that you would return to this store's website?
2. How likely is it that you would consider purchasing from this website in the short term? (modified).
3. How likely is it that you would consider purchasing from this website in the longer term? (modified).
4. For this purchase, how likely is it that you would buy from this store?*

Risk perception

1. How would you characterise the decision to buy a product through this website? (a very small risk – a very big risk).**

2. How would you characterise the decision to buy a product through this website? (high potential for loss – high potential for gain)(reverse).
3. How would you characterise the decision to buy a product through this website? (a very negative situation – a very positive situation) (reverse).
4. What is the likelihood of your making a good bargain by buying from this store through the Internet? (very unlikely – very likely) (reverse).

Ease-of-use

1. Learning to use the website is easy.
2. It is easy to get the website to do what I want.
3. The interactions with the website are clear and understandable.
4. The website is flexible to interact with.
5. The website is easy to use.

Usefulness

1. The online purchasing process on this website is fast.
2. It is easy to purchase online on this website.
3. This website is useful to buy the products or services they sell.