EMPIRICAL IDENTIFICATION OF SUCCESS-ENHANCING WEB SITE SIGNALS IN E-TAILING: AN ANALYSIS BASED ON KNOWN E-TAILERS AND THE THEORY OF REASONED ACTION

Dennis C. Ahrholdt

Great potential remains unused in e-tailing because of consumers' general lack of trust in e-tailers. This study is focused on the comprehensive identification of trust-enhancing, and therefore success-enhancing, Web site signals. The main research goal is a comparison of their efficiency regarding the building of a trust-based intention to transact—identifying the managerial tactics with which to convert Web site visitors into buyers. By adopting a signal typology and analyzing a structural equation model with partial least squares, followed by an importance-performance analysis, particular signals, which already require investments at an early point in the business activity, are revealed to have a potential to establish a competitive advantage in e-tailing.

In 2009, the turnover of physical goods' e-tailing in the business-to-consumer (B2C) sector in the United States reached approximately $135 billion (Grau 2009, 2010). The turnover is expected to increase approximately 11 percent a year until 2013, totaling approximately $207 billion (Grau 2009, 2010). In spite of these impressive numbers, a considerable e-tailing potential is unattained because most customers are still unfamiliar with online shopping (Meziane and Kasiran 2008; Verhoef, Neslin, and Vroomen 2007). In 2008, e-tailing turnover in the United States was just short of 7 percent compared to total retail turnover (Mulpuru, Johnson, and Hult 2008). Furthermore, only one in three people who use the Internet to look for product information will also purchase that product online. Online searches are used mostly in preparation for purchases made in brick-and-mortar retail outlets (Forsythe et al. 2006; Venkatesh and Agarwal 2006; Verhoef, Neslin, and Vroomen 2007). Consequently, the conversion rates—that is, the ratio of visitors who purchase from an e-tailer's Web site to the total number of visitors to that Web site—are rather small. Even with respect to well-known firms, these rates are, on average, only about 4 percent ("Cyber Monday Report 2009" 2009). Customers are reluctant to purchase from individual e-tailers or to engage in e-tailing in general. This reluctance does not stem from price criteria (Frambach, Roest, and Krishnan 2007; Johnson et al. 2004) but from the special character of purchasing via distance selling, in combination with the Internet's particularities: Consumers generally perceive that the Internet carries an increased risk and uncertainty, and, above all, they lack trust in individual e-tailers (Benbasat, Gefen, and Pavlou 2008).

The central role that trust plays in buyer–seller relationships derives from the prevailing asymmetry in information between the buyer and seller (Akerlof 1970; Spence 1973; Stiglitz 1975). Asymmetrical information is particularly present in e-tailing because the buyer's level of information is insufficient: The Internet-based distance trade is a service and therefore an experience good (Nelson 1970) whose quality can be judged only after completion of the distance trade. The exchange of resources (i.e., the disclosure of personal information and the financial transaction, on the one hand, and the delivery of goods, on the other) occurs asynchronically. The safe transmission of sensitive financial data for the transaction and the e-tailer's general integrity in dealing with personal data can be assessed only long after completion of the transaction. Moreover, the buyer cannot form an idea of the quality and implementation of the contract beforehand because e-tailing often takes place in different or uncertain areas of jurisdiction. In contrast to a purchase at a brick-and-mortar retailer, an opportunity to inspect the physical product and the personal communication with a salesperson are lacking. The purchase of a physical product via the Internet can therefore, in summary, be regarded as a metaproduct, that is, a bundle of different components. This bundle consists not only of the physical product but

Dennis C. Ahrholdt (Dr. rer. pol., University of Hamburg), Postdoctoral Researcher, Institute for Operations Research, School of Business, Economics and Social Science, University of Hamburg, dennis.ahrholdt@uni-hamburg.de.

The author thanks two anonymous reviewers and Wolfgang Brüggemann (University of Hamburg) for helpful and constructive comments.

Journal of Marketing Theory and Practice, vol. 19, no. 4 (fall 2011), pp. 441–458.

ISSN 1069-6679/2011 $9.50 + 0.00.
DOI 10.2753/MTP1069-6679190406

also of services concerning the product and the customer, that is, the initiation, completion, payment, delivery, and postpurchase service, as well as the data security and data protection. A complete evaluation of the metaproduct quality before the purchase is thus not possible.

Overall, e-tailers always face the challenge of mitigating the consumer's lack of information by using the only interaction space between the buyer and seller—the Web site. Through this channel, they need to create trust in the metaproduct's high quality. In the case of experience goods like the metaproduct, however, only performance-related information substitutes—so-called signals—are available to reduce the information asymmetries before the purchase (Akerlof 1970; Spence 1973). Given the growing importance of e-commerce, the question of how customer trust can be created in this context is being examined more often. Nonetheless, as Gefen, Benbasat, and Pavlou (2008) mention, previous research has often failed to focus on concrete trust or success-enhancing factors' functionality and identification. Studies focused on the identification of success factors are often limited to only one or a few factors or signals, which are sometimes imprecise, that is, a bundle of different signals. Furthermore, previous research has largely overlooked the different dimensions of trust (Gefen, Benbasat, and Pavlou 2008) even though distinguishing between them is important to identify the actions that should be taken to build trust. Trust is based on beliefs in the trustee's trustworthiness, which comprises three distinct dimensions: ability, benevolence, and integrity (Giffin 1967; Mayer, Davis, and Schoorman 1995; McKnight, Choudhury, and Kacmar 2002).

Given reality's complex demands, there is no comprehensive study focusing on the identification of concrete success-enhancing measures, such as Web site signals. Furthermore, there is no comparative evaluation of many signals' efficiency regarding the building of trustworthiness beliefs, which are the central antecedents of the (initial) trust-based intention to transact.

This gap is closed in a single empirical approach in this paper. A complex structural equation model is developed, which includes expertise from literature on trust, consumer behavior, information economics, and signaling theory. The structural equation model is based on the theory of reasoned action (TRA) (Fishbein and Ajzen 1975). The main goal of this paper is to explore and compare how efficient Web site signals influence beliefs in trustworthiness and the initial trust-based intention to transact. A concrete course of action is therefore defined for e-tailer managers: Which signals need to be used to convert the Web site visitors into new customers? New steps, which support the main goal of this study, are the adoption of the renowned offline signal typology by Kirmani and Rao (2000) and empirically testing their different signal classes' belief-altering potential regarding trustworthiness. These signal constructs are built with Web site signals as formative indicators. The empirical test of the structural equation model, employing partial least squares (PLS), uses the real Web sites of market leaders as stimuli when creating a purchase scenario. Important insights are gained through an importance-performance analysis (IPA) (Martilla and James 1977; Slack 1994): For the first time, it can be statistically confirmed that—as a central antecedent of the (initial) trust-based intention to transact—trustworthiness in e-tailing simultaneously comprises three different beliefs (ability, integrity, and benevolence) and that Web site signals have the potential to reinforce these beliefs. Signals that already require investments at a relatively early point in the business activity (e.g., the general layout, technical Web site quality, size of the product range, data privacy, and pictures/3D) have a great influence on the trust-based intention to transact and, thus, on converting visitors into customers. Moreover, the IPA reveals scope to improve the quality of various signals, which shows further potential to establish a competitive advantage in e-tailing.

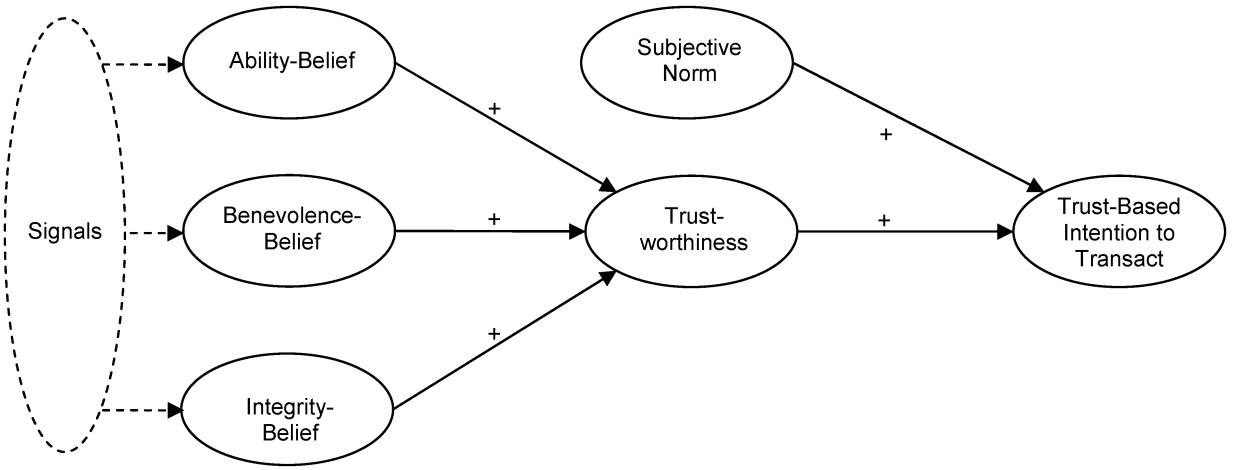
Next, the conceptual background is discussed—relevant concepts are introduced while the model is being developed. After a brief explanation of the methodological approach, the main results are presented, followed by a detailed discussion and interpretation. Conclusions and avenues for further research are presented in the last section.

CONCEPTUAL BACKGROUND AND MODEL DEVELOPMENT

Trust in Online Environments

Trust building is, overall, an active process in which the potential trustor decides—based on certain information—whom he or she will trust to what extent and in which situational context (Rousseau et al. 1998). Spanning all scientific disciplines, two components of trust can be discerned: a cognitive component (trusting beliefs) and a behavioral component (trusting intention) (Mayer, Davis, and Schoorman 1995; McKnight, Choudhury, and Kacmar 2002). Trusting beliefs are a trustor's beliefs about a trustee's trustworthiness, whereas trusting intentions are a trustor's intention to interact with a trustee (Gefen, Benbasat, and Pavlou 2008). Although various trustworthiness beliefs have

Figure 1
Trust in the Context of the Theory of Reasoned Action



Note: + = positive influence.

been studied, the majority can be clustered into the dimensions of ability, benevolence, and integrity (McKnight, Choudhury, and Kacmar 2002; Schoorman, Mayer, and Davis 2007). Ability is that group of competencies that enables a party to have influence within a specific domain. Benevolence describes the extent to which a trustee is believed to want to benefit the trustor aside from an egocentric profit motive. Integrity involves the trustor's perception that the trustee follows a set of principles that the trustor finds acceptable (Mayer, Davis, and Schoorman 1995).

The two-component character of trust justifies its integration into the renowned TRA (Ajzen 2008; Fishbein and Ajzen 1975), which highlights the general distinction between beliefs that form a cognitive attitude and behavioral intentions. As the only antecedent of behavior, the intention to realize a certain behavior plays a central role. This behavioral intention is determined by two parameters: first, by an individual's personal attitude toward that specific behavior or the particular entity to which the behavior refers (Eagly and Chaiken 1993) and, second, by the subjective norm, that is, what important reference people expect from the individual with regard to the behavior in question. This subjective norm mirrors the social pressure (Agarwal and Prasad 1998). At the same time, the attitude is deduced from the individually weighted beliefs. These beliefs describe a person's individual cognitive assessment of the behavior or the particular entity. Extrapolating from the TRA, the three distinct trustworthiness dimensions of ability, integrity, and benevolence can be interpreted as beliefs with regard to a particular entity (McKnight, Choudhury, and Kacmar 2002). Thus, these beliefs form a trustworthiness attitude (subsequently, trustworthiness) as a cognitive trust component, which is in turn the predecessor of the behavioral trust component (subsequently, trust-based intention to transact [TIT]) (see Figure 1). Given the TRA and the presented relationships between trust and its components, positive effects are hypothesized.

Before the signals are integrated into the model, clarification is required regarding which form of trust is being analyzed. The form of trust most relevant for e-tailing transactions is calculus-based trust. In contrast to spontaneous trust, which is built mostly from past experience with the trustee, calculus-based trust is built through an extensive process in which the trustor considers all dimensions of trustworthiness based on the available information about the trustee. Consequently, the whole process of calculus-based trust building is cognitively complex, making it applicable only to consciously involved behavior, for example, in extensive purchase decision processes such as those that prevail in e-tailing: Consumers mostly display goal-oriented search behavior, that is, their demand is very specific (Forsythe et al. 2006; Rousseau et al. 1998; Wolfinbarger and Gilly 2001).

Given the described economic relevance (and taking unfamiliarity with e-tailing into account), this study focuses on the trust that trustors form during their first visit to an e-tailing Web site or during a subsequent visit (if no prior transaction occurred) when they have no estimation of trust (i.e., the so-called initial trust; McKnight, Cummings, and Chervany 1998). The consumers must therefore form an

Table 1
Characteristics of Signals (Based on Kirmani and Rao 2000)

	Default-Independent Signals		Default-Contingent Signals	
	Sale-Independent	**Sale-Contingent**	**Revenue-Risking**	**Cost-Risking**
Main Criteria	Main expenditure (investment) arises regardless of whether the vendor fulfills his or her promise to offer high-quality products and services.		Main expenditure (lost future revenues/direct costs) depends on the vendor's (non)fulfillment of his or her promise to offer high-quality products and services.	
Business Objective	Future amortization of the expenditure; anticipation of this business objective reduces the customer's uncertainty.		Minimization of the expenditure risk; expenditure correlates negatively with the offered product or service's quality.	
Example	Seal of approval	Rebate coupons	Display of available stock	Warranty
Further Characteristics				
Concretization of the expenditure	Investment occurs before a transaction	Expenditure is directly linked to a transaction	Signal risks the firm's future revenue	Signal risks the firm's future costs
Size of the expenditure	Approximate fixed	Variable	Variable	Variable
Consumer benefit	No direct personal advantage	Direct personal advantage	No direct personal advantage	Direct personal advantage
Potential for abuse	Generally, none	High	Generally, none	High

initial calculus-based trustworthiness attitude. Because of the asymmetric distribution of information, the potential customer can only use the information conveyed via the Web site (signals).

Trust Transfer via Signals

Information economics provides indications regarding what kind of information is relevant to the potential customer to form favorable trustworthiness beliefs. In the case of experience goods, such as the described metaproduct, only the use of performance-related information substitutes (i.e., signals) can reduce the information asymmetries prior to the purchase. Signaling theory's main conclusion is the idea that it makes economic sense to signal high quality if, and only if, a vendor offers high-quality products or services. Conversely, a misleading signal is not worth the expense for firms that do not maintain high-quality standards. Therefore, firms have to use signals to reduce potential buyers' uncertainty regarding products' nonperceptible quality and to form positive trustworthiness beliefs (Akerlof 1970; Spence 1973; Stiglitz 1975).

In the following, the typology for the classification of signals in an offline context by Kirmani and Rao (2000) (see Table 1) is adopted for Web site signals. This typology has direct management implications because it includes a perspective on investment and financing. It thus supports the main goal of the paper to identify managerial tactics through which to efficiently induce trust via Web site signals to convert visitors into new customers.

Kirmani and Rao (2000) distinguish between default-independent signals and default-contingent signals (see Table 1). In order to convey the default-independent signals, the vendor is faced with an investment (e.g., time, money, and effort) regardless of whether his or her promise to the (potential) customers (i.e., the claim to offer high-quality products or services) is fulfilled. As a rule, this expense is incurred before or, at the latest, at the moment of the transaction. An example in an online context is a seal of approval (e.g., BBBOnLine [www.bbb.org], s@fer-shopping [www.safer-shopping.com]): The licensing fee for a seal of approval is levied regardless of the truthfulness of the firm's claim. Hence, money is invested today with the objective of generating the reflux of money through future transactions. The investment sends a signal that the firm will fulfill its quality obligation, in order not to endanger future revenues, which are generated, for example, through satisfied buyers' repeated transactions.

In contrast, the main expenditure (i.e., direct costs or lost future revenues) on default-contingent signals will not commence until a firm fails to fulfill its claim to provide high-quality services or products. In general, this kind of expense can be found—if it occurs at all—after a transaction. Up-front investments in the communication of default-contingent signals are therefore low. A typical default-contingent signal is warranty: The main expense

for the firm (in this case, costs as a result of repairs) does not arise until it becomes clear that the product is not of high quality (the costs of communicating a warranty are very low). There is thus a negative correlation between the expense and the quality of products offered (Spence 1973). Such a signal is thus suitable to credibly communicate the firm or the product's quality, thereby strengthening the consumer's beliefs in the firm's trustworthiness.

These two main signal classes can be further divided into their different characteristics (see Table 1). Expenditure on default-independent sale-independent signals (DI SI signals) is nearly fixed and arises before and independently of a product purchase, whereas expenditure on default-independent sale-contingent signals (DI SC signals) is linked to a product purchase (e.g., rebate coupons, which can be viewed as a firm expense). Contrary to DI SI signals, the consumer receives a direct personal benefit from DI SC signals (e.g., a rebate). Thus, there is a great risk that consumers may potentially abuse DI SC signals (e.g., by selling rebate coupons).

The class of default-contingent revenue-risking signals (DC RR signals) is determined by the assumption that in order to generate higher returns in the future, the firm has to use signals today. However, at the same time, the firm risks incurring an expense (interpreted as lost future revenues) because the signal may also produce a negative effect. Such signals thus link future revenues to the claim that high-quality products and services are offered. The expenditure on the installation or communication of such a signal is relatively low in comparison to the risked revenue. An example is the display of available stock, which can be provided at no or little cost, as this function is usually integrated into normal shop software. The display of high stock levels can have a promotional effect (through positive inferences of the investment in the available stock and the turnover rate), whereas the display of low or no available stock can jeopardize revenues (through anticipation of a delivery delay). Nevertheless, consumers receive no direct personal benefit from a DC RR signal. Therefore, they generally have no opportunity to abuse the signal.

Like the DC RR signals, the default-contingent cost-risking signals (DC CR signals) implicitly contain the firm's credible commitment to offering a high-quality product in order to avoid the negative consequences (interpreted as costs) linked to a low-quality product. The expenditure on the communication or implementation of DC CR signals is far lower than potential future costs could be. As mentioned above, a warranty would be an example of such a signal. The consumer receives a direct personal benefit (in the case of a warranty, through the product repair). There is therefore a potential for abuse: The consumer could deliberately handle the product carelessly and subsequently claim damages, which are not intended to be covered by the warranty.

According to current knowledge, there is no published work that uses the signal typology of Kirmani and Rao (2000) as a basis for empirical tests. This is remarkable because Aiken et al. (2004) call for the inclusion of the signal classes as constructs (in structural equation modeling [SEM]). Consequently, the model contains four constructs based on the signal typology as exogenous variables. As explained above, the main focus is on customers' trust-building interpretation of Web site signals when they lack information concerning the metaproduct. Therefore, potentials to alter beliefs can be attributed to the signal constructs and their associated (formative) signals:

- the belief-altering potential of DI SI signals,
- the belief-altering potential of DI SC signals,
- the belief-altering potential of DC RR signals, and
- the belief-altering potential of DC CR signals.

Web Site Signals

To identify Web site signals and their classification according to the presented typology, a synthesis is gathered from papers published between 2002 and 2008 in 54 relevant journals. In addition, numerous online shops are examined. Based on consultation with experts, the 24 most important signals are identified (see Table 2). The experts in question are the e-commerce head of a clothing manufacturer operating worldwide, the Web application developer of one of the biggest online travel agents worldwide, a sales manager of one of the world's biggest multichannel retailers, the key account head of a big Internet shopping portal, two chief executive officers of medium-size e-tailers, three Ph.D. students whose research focuses on the online environment, a trend scout and analyst of an online trend-scouting agency, and two experienced sales and e-commerce management consultants. The 24 signals are typologized according to the following theoretical analysis (see Table 2).

The vendor has to invest to generate all the DI SI signals listed in Table 2 regardless of whether the vendor fulfills his or her promise to offer a high-quality metaproduct. Furthermore, this investment is not directly linked to a transaction: To establish a shop presence (technical quality, general layout), a large expenditure of money, time, and effort is required. For example, the costs of professional

Table 2
Formative Indicators of the Belief-Altering Signal Constructs

Signal	Expert Rank
Default-Independent Sale-Independent	
Seal of approval	18
Status display	5
Different order methods (telephone, fax, e-mail, online)	16
Large product pictures and/or 3D representation	11
Data privacy statement and secure data transfer (e.g., SSL)	10
Personal contact possibilities (telephone, live chat)	4
Impersonal contact possibilities (e-mail, contact form)	12
Clearly displayed order process	2
General layout (font, color, navigation)	21
Large product range	17
Technical quality	3
Search function	6
Default-Independent Sale-Contingent	
Determinability of date of delivery	7
Rebates	15
Special offers	8
Default-Contingent Revenue-Risking	
Product recommendations	20
Available stock	14
Customer product rating	22
Customer e-tailer rating (e.g., via forum or chat)	23
Product test reports from neutral sources	24
Default-Contingent Cost-Risking	
Communication of implied warranty	13
Communication of extended warranties	9
Financing options	19
(Many) Different payment methods (risky for e-tailer, e.g., purchase on account)	1

shop software can reach $70,000 (Ahrholdt 2010, p. 98); improving the Web presence by installing secure data transfer (e.g., SSL) or (data) seals of approval (e.g., VeriSign [www.verisign.com] or TRUSTe [www.truste.com]) induce up-front licensing fees; rich media tools (e.g., 3D representation; see www.scene7.com) require extra expenditure, as do intelligent search functions that automatically offer similar products or connect the customer to service agents if the requested product is not available. Even the implementation of detailed product descriptions and the indexing for the shop's internal search function require a great deal of work. Expenditure also increases if the product range's variety increases (Jarvenpaa, Tractinsky, and Vitale 2000). Up-front investments (staff, telephone, and Internet access) are also needed to ensure contact options and different ordering methods (telephone, fax, e-mail, online chat) (Aiken and Boush 2006). If status is displayed, the e-tailer's expenditure arises from the implementation of such a function in the order-handling process and from possible modifications of the shop software, as well as from the introduction of an automated inventory management. The expenditure on all the above-mentioned signals is mainly fixed. In general, there is no potential for abuse and no direct (monetary) gain for customers.

In contrast to the previous signals, expenditure on the three DI SC signals in Table 2 is directly linked to a transaction. The explanation of special offers is similar to the already described rebate signal. The signal of giving a choice of delivery dates (e.g., through different shipment options or specified delivery dates) is less typical. The main part of the expense (costs of storage space, bound capital, and handling if the product is completed at a specific date but not yet paid for) is linked directly to the transaction. This expense is therefore variable even though, as with the status display signal, a small part is fixed (costs of installation). The option to specify the date of delivery is similar

to a reservation, which customers could abuse. If customers find a better or cheaper product during the reservation time, they could revoke the buying contract and indirectly receive a monetary benefit.

Five signals are categorized as DC RR signals (see Table 2). The risk of losing future revenue depends on the vendor's (non)fulfillment of his or her promise to offer a high-quality metaproduct. Any user-generated evaluation in integrated forums, guestbooks, or chats may have negative effects on product sales, which cannot be quantified beforehand and are thus variable (Dellarocas and Wood 2008). Compared to the risked revenue, the costs of installing such customer areas on an e-tailer's Web site are very low. Furthermore, no customers receive a direct personal advantage. Similar arguments hold for product recommendations (e.g., in the form of a sales rank) and product test reports from neutral sources (Aiken and Boush 2006; Netessine, Savin, and Xiao 2006).

In addition to the previously discussed example of warranties, two further signals are categorized as DC CR signals (see Table 2). If an e-tailer offers payment methods such as purchase on account, he or she risks costs in the form of lost receivables (Patrick and Park 2006). The e-tailer cannot be sure of having the product returned in case of payment default. From a customer's point of view, such payment methods are comparable to a small warranty or a right of withdrawal. Customers have the option to inspect a product and may return it without much expense if they are not satisfied. The interpretation of financing options is similar to the line of argument regarding risky payment methods. The e-tailer also risks costs in the form of lost receivables, which arise from low product quality, abuse of the financing option, or the customer's insolvency.

The presented Web site signals are attributed to the relevant belief-altering signal construct as formative indicators, that is, the signals causally determine the constructs' potential. This is in line with the study's intention to identify the Web site signals' total effect on the TIT. Owing to the conceptual background, it can be assumed that the signal constructs' belief-altering potential has a positive effect on the three trustworthiness beliefs, as do the formative signal indicators. No further hypotheses can be formulated at this stage: first, because of the innovative—and partly explorative—character of the analyses and, second, because the few studies that try to identify Web site success signals are often limited to only one or a few imprecise signals and are therefore unsuitable for developing specific assumptions about the respective signals (for an overview, see Ahrholdt 2010). The model is thus complete.

EMPIRICAL ANALYSIS

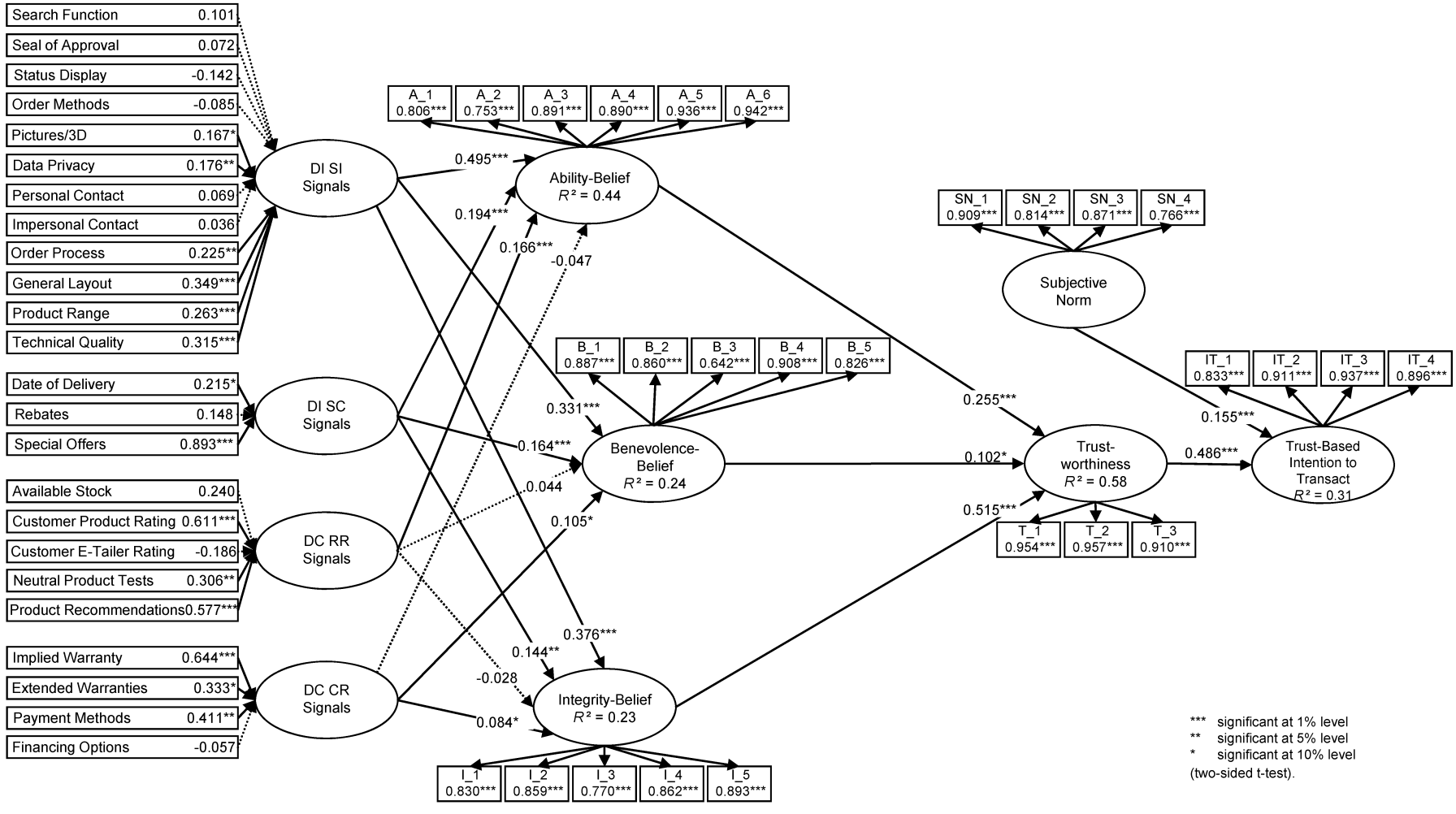
Method

For a quantitative analysis of the above-postulated cause-and-effect relationships between not-directly-observable (latent) constructs and between latent constructs and observable indicators (see Figures 1 and 2), only methods that permit the processing of such variables are suitable. These requirements are met by structural equation models. To estimate structural equation models, covariance-based methods (Jöreskog 1977) or the variance-based PLS approach (Wold 1980) can be used. The analysis was carried out with the PLS algorithm, as this method permits an explicit and unproblematic integration of formatively operationalized constructs—here, the signal constructs. It suits complex model structures with a large number of indicators because it does not lead to estimation problems. Furthermore, it does not require normally distributed data. On the whole, PLS supports the study's primary aim to make predictions—here, the prediction of the TIT (Chin and Newsted 1999; Henseler, Ringle, and Sinkovic 2009).

Based on the rationale presented above, the exogenous belief-altering signal constructs are operationalized formatively, whereas all other constructs are measured reflectively. The novel formative signal constructs are built following the works by Jarvis, MacKenzie, and Podsakoff (2003) and Petter, Straub, and Arun (2007): After the literature review and the classification of the 24 signals mentioned above, the final step to ensure content validity is further consultation with the above-mentioned experts. To evaluate the clarity of the classification as well as its content relevance, the p_{sa} and c_{sv} indices are used (Anderson and Gerbing 1991). Almost without exception, the respective indices show very good results (see Table 3). The questions are designed with reference to authors who use structural equation models, but while those authors examine the evaluation of (mostly very few) measures as indicators, they do not primarily focus on the efficiency of those measures (for an overview, see Ahrholdt 2010). Therefore, they only use the indicators in reflective measurement models, whereas they are included as formative indicators in this study. This questionnaire's final design is similar to that of Lim et al. (2006) and Palmer (2002) (see Table 4). A 10-point Likert scale is used here.

The reflective measurement model for the construct trustworthiness is also newly developed, using the relevant literature on trust (see Table 5). The indicators are exchangeable indications of their underlying construct trust. Established scales are used for the other constructs. For the operationalization of the dimensions of trustworthiness,

Figure 2
PLS Results of the Research Model



*** Significant at the 1 percent level; ** significant at the 5 percent level; * significant at the 10 percent level (all two-sided *t*-tests).

Table 3
Quality Criteria (Weights, Significance, Variance Inflation Factor [VIF], Conditioning Index [CI], p_{sa} and c_{sv} Index) of Formative Constructs

Construct	Indicator	Weight	*t*-Value Two-Sided Test	VIF	CI	p_{sa} Index	c_{sv} Index
Test Criterion		≥ |0.05|	2.583 (1% level) 1.963 (5% level) 1.646 (10% level)	< 2	<20		
DI SI Signals	Search Function	0.1007	1.214 (n.s.)	1.313	30.21	12/13	11/13
	Seal of Approval	0.0719	0.974 (n.s.)	1.144		12/13	11/13
	Status Display	–0.1416	1.593 (n.s.)	1.121		12/13	11/13
	Different Order Methods	–0.0851	1.156 (n.s.)	1.258		12/13	11/13
	Pictures/3D	0.1674	1.656	1.324		12/13	11/13
	Data Privacy	0.1757	2.025	1.423		1	1
	Personal Contact Possibilities	0.0687	1.070 (n.s.)	1.465		7/13	3/13
	Impersonal Contact Possibilities	0.0364	0.542 (n.s.)	1.476		11/13	10/13
	Quality of Order Process	0.2246	2.499	1.422		1	1
	General Layout	0.3492	3.111	1.336		10/13	8/13
	Large Product Range	0.2628	2.847	1.153		12/13	11/13
	Technical Quality	0.3150	3.213	1.408		12/13	11/13
DI SC Signals	Date of Delivery	0.2150	1.810	1.040	5.61	6/13	2/13
	Rebates	0.1480	1.232 (n.s.)	1.114		10/13	8/13
	Special Offers	0.8927	10.773	1.095		1	1
DC RR Signals	Available Stock	0.2403	1.587 (n.s.)	1.140	8.15	9/13	6/13
	Customer Product Rating	0.6114	3.428	1.126		6/13	2/13
	Customer E-Tailer Rating	–0.1862	1.158 (n.s.)	1.143		6/13	2/13
	Neutral Product Test Reports	0.3063	1.936	1.067		9/13	6/13
	Product Recommendations	0.5769	3.351	1.111		5/13	0
DC CR Signals	Implied Warranty	0.6438	3.337	1.153	5.16	5/13	0
	Extended Warranties	0.3328	1.678	1.241		12/13	11/13
	Methods of Payment	0.4115	2.294	1.147		11/13	10/13
	Financing Option	–0.0566	0.364 (n.s.)	1.119		5/13	0

n.s. = not significant.

the reflective scales by Schlosser, White, and Lloyd (2006) are applied, which are constructed in line with the scales by Schoorman, Mayer, and Davis (1996). The scale by Song and Zahedi (2005), who transferred the scale by Ajzen (2006) to the online context, is used for the subjective norm, and the scale by Lim et al. (2006) for the TIT.

Sample and Procedure

The data were collected by means of an online survey. Such a data collection has been employed successfully in recent marketing research (e.g., Völckner et al. 2010) and guarantees that the participants had used the Internet as a medium of information.

After an introduction to the survey, the participants were asked to imagine the following scenario (see also Urban et al. 1997): They are planning the purchase of a specific camera and, during a final research effort, they find an e-tailer's Web site. They were then asked to examine the Web site and consider whether they could imagine purchasing from that e-tailer. Participants were assigned to one of two actual shops from which they had not yet purchased a product. The Web sites in question belonged to the two biggest B2C e-tailers worldwide (Amazon.com and the Otto Group).

All the participants knew their assigned e-tailer by name, but the majority of the participants did not know their assigned e-tailing Web site. On visiting the Web site, the participants thus had—as required—no spontaneous trust attitude to the described metaproduct's quality. On average, the participants spent 300 seconds examining their assigned e-tailing Web site before starting the questionnaire. After data cleansing, 247 data sets were available for the analy-

Table 4
Question Design for Signal Constructs

I have the impression that . . .
Default-Independent Sale-Independent
[. . .] offers a search function with which I can quickly find what I am looking for.
[. . .] shows many seals of approval from neutral sources.
I can easily obtain information about my order through a status display as well as a tracking and tracing option.
[. . .] offers many order methods (e.g., e-mail, online, fax, phone).
[. . .] offers a customer-friendly product presentation with large product pictures and/or a three-dimensional representation.
[. . .] has a strong data privacy statement and offers secure data transfer (e.g., SSL).
I can contact employees of [. . .] personally and at any time (e.g., via telephone or live chat).
[. . .] provides many impersonal contact possibilities.
the order process of [. . .] is easy and convenient and clearly displays all the steps in advance.
the general layout (font, color, navigation) of [. . .]'s Web site is pleasant.
[. . .] offers many products.
the technical quality (no errors, short loading times) of [. . .]'s Web site is excellent.
Default-Independent Sale-Contingent
I am able to determine the date of delivery (e.g., through many shipping options).
[. . .] offers attractive rebates (e.g., bonus points, rebate coupons, shipping discounts).
[. . .] explicitly offers special bargain offers.
Default-Contingent Revenue-Risking
[. . .] provides up-to-date product recommendations (e.g., novelties, highlights, seasonal products).
[. . .] clearly displays the available stock and/or the delivery time.
[. . .] provides many customer product ratings.
[. . .] publishes detailed customer ratings about itself (e.g., via a forum, guestbook, or chat).
[. . .] publishes many test reports on its products from neutral sources.
Default-Contingent Cost-Risking
[. . .] displays information about the implied warranty, which is easy to find, clear, and precise.
[. . .] offers further extended warranties of their own accord (e.g., best price guarantee, longer warranty periods).
[. . .] offers good financing options.
[. . .] offers payment methods that give me more control and security (e.g., purchase on account).

Table 5
Question Design for Trustworthiness

Trustworthiness	
T_1	On the whole, I have the impression that [. . .] is trustworthy.
T_2	Altogether, [. . .] is trustable.
T_3	My opinion is that I can trust [. . .] completely.

sis. The participants' (128 female, 119 male) average age (25.1 years) as well as their level of education and income is slightly above average compared to that of the Internet user population.

Results

The PLS path model was estimated using the SmartPLS 2.0 (Ringle, Wende, and Will 2005) software applications. The results are displayed in Figure 2.

Before any assertions can be made, the quality of the estimation results and the model need to be evaluated (Hair et al. 1998; Henseler, Ringle, and Sinkovic 2009). The size of the sample ($N = 247$) fulfills the minimum requirement for the model ($N_{min} = 120$) (Chin 2004). The reflective measurement models are checked for indicator reliability by means of the size and significance (through bootstrapping) (Efron 1979) of the loadings (Chin 1998a; Hulland 1999), as well as for the constructs' convergent and discriminant validity by means of a matrix of cross loadings, internal consistency (IC), average variance extracted (AVE), and Fornell–Larcker criterion (Bagozzi and Yi 1988; Chin 1998b; Fornell and Larcker 1981). With the exception of indicator B_3 (see Table 6), the results are excellent. Because B_3 is only insignificantly below the conservatively set threshold value of 0.7, the indicator is not eliminated (cf. Bagozzi and Baumgartner 1994; Chin 1998b; Hulland 1999). The evaluation of formative measurement models starts with the constructs' development and operationalization. Because

Table 6
Quality Criteria of Reflective Constructs

Latent Variable	Indicator	Loading	*t*-Value Two-Sided Test	Internal Consistency	Average Variance Extracted	Fornell–Larcker	Cross-Loading
Test Criterion		≥ 0.707		≥ 0.7	≥ 0.5		
Ability	A_1	0.8057	22.395	0.9499	0.7606	OK	OK
	A_2	0.7529	18.161				OK
	A_3	0.8909	57.905				OK
	A_4	0.8901	44.806				OK
	A_5	0.9364	89.720				OK
	A_6	0.9415	11.152				OK
Benevolence	B_1	0.8866	46.737	0.9161	0.6887	OK	OK
	B_2	0.8595	32.835				OK
	B_3	0.6418	12.186				OK
	B_4	0.9079	50.963				OK
	B_5	0.8261	26.225				OK
Integrity	I_1	0.8299	29.514	0.9250	0.7121	OK	OK
	I_2	0.8593	40.143				OK
	I_3	0.7703	16.988				OK
	I_4	0.8620	43.137				OK
	I_5	0.8927	67.216				OK
Trustworthiness	T_1	0.9543	116.476	0.9584	0.8848	OK	OK
	T_2	0.9570	112.011				OK
	T_3	0.9097	76.411				OK
Subjective Norm	SN_1	0.9086	61.762	0.9063	0.7083	OK	OK
	SN_2	0.8144	18.839				OK
	SN_3	0.8708	29.836				OK
	SN_4	0.7656	13.736				OK
Intention to Transact	IT_1	0.8329	28.072	0.9414	0.8011	OK	OK
	IT_2	0.9106	64.400				OK
	IT_3	0.9370	102.108				OK
	IT_4	0.8962	49.299				OK

the four signal constructs are new, the new formative constructs' conceptual width has to be determined carefully (Diamantopoulos and Winkelhofer 2001; Henseler, Ringle, and Sinkovic 2009).

Because of the preliminary work (i.e., the literature review, investigation of online shops, and expert interviews), a high content validity can be assumed (Götz, Liehr-Gobbers, and Krafft 2010; Petter, Straub, and Arun 2007). In addition, the size, the algebraic sign, and the significance of the weights are examined. The empirical *t*-values required for the significance evaluation are again determined by means of bootstrapping. Even though ten indicators do not meet the significance test criterion (see Table 3), none are eliminated; these indicators do not compromise the construct's conceptual content, which is, on the contrary, determined by the complete set of indicators (Bollen and Lennox 1991). The intention of this study is to identify the individual formative indicators' relative effect on the TIT; a weight that is not significant and too low is such an insight. To test the multicollinearity of formative indicators, the variance inflation factor (VIF) (Hair et al. 1998) and the conditioning index (CI) (Belsley 1991; Belsley, Kuh, and Welsch 1980) are used. All the conservatively set test criteria are clearly met, with the exception of the CI of the DI SI signal construct (30.21), which slightly exceeds the threshold value of 30 (Belsley, Kuh, and Welsch 1980) (see Table 3). However, the surmise of substantial multicollinearity is overcome by a variance decomposition (Hair et al. 1998). Inspection of the pairwise correlations of the construct values confirms the discriminant validity of the formative constructs (see Table 7).

The results of the quality criteria of the inner structural model are satisfactory. The coefficients of determination of ability (0.44), trustworthiness (0.58), and TIT (0.31)

Table 7
Quality Criteria (Pairwise Correlation) of Formative Constructs

	DI SI Signals	DI SC Signals	DC CR Signals	DC RR Signals
DI SI Signals	1			
DI SC Signals	0.3650	1		
DC CR Signals	0.2943	0.2301	1	
DC RR Signals	0.3471	0.4091	0.2899	1

Table 8
Quality Criteria (Path Coefficients, f^2, and Stone–Geisser Test) of Reflective Constructs

	Path to Trustworthiness		Path to Trust-Based Intention to Transact		Stone–Geisser Test
	Path Coefficient	f^2	Path Coefficient	f^2	
Test Criterion	≥ |0.05|	> 0	≥ 0.05	> 0	> 0
Ability	0.255***	0.112	—	—	0.312
Benevolence	0.102*	0.012	—	—	0.153
Integrity	0.515***	0.263	—	—	0.145
Trustworthiness	—	—	0.486***	0.304	0.508
Subjective Norm	—	—	0.155***	0.035	—
Intention to Transact	—	—	—	—	0.229

*** Significant at the 1 percent level (two-sided test); n.s. = not significant.

Table 9
Quality Criteria (Path Coefficients and f^2) of Formative Constructs

	Path to Ability		Path to Benevolence		Path to Integrity	
Construct	Path Coefficient	f^2	Path Coefficient	f^2	Path Coefficient	f^2
Criteria	≥ |0.05|	> 0	≥ |0.05|	> 0	≥ |0.05|	> 0
DI SI Signals	0.495***	0.347	0.331***	0.113	0.376***	0.143
DI SC Signals	0.194***	0.052	0.164***	0.028	0.144**	0.021
DC RR Signals	0.166***	0.036	0.044 (n.s.)	0.004	–0.028 (n.s.)	0.003
DC CR Signals	–0.047 (n.s.)	0.004	0.105*	0.013	0.084*	0.007

*** Significant at the 1 percent level (two-sided test); ** significant at the 5 percent level (two-sided test); * significant at the 10 percent level (two-sided test); n.s. = not significant.

are roughly good (Chin 1998b). Those of benevolence (0.24) and integrity (0.23) are between weak and moderate (Chin 1998b). The Stone–Geisser tests, the calculation of effect sizes (f^2), as well as the assessment of the path coefficients' size and significance for further evaluation yield results that lie mostly far above the test criterion in question (see Tables 8 and 9). Meanwhile, the DC CR signals for ability-belief and DC RR signals for integrity-belief and benevolence-belief exhibit nonsignificant path coefficients. In line with the argument presented in the formative quality evaluation, none of the three paths is excluded from the study. The test of the beliefs of trustworthiness's mediating effects, as well as the test of trustworthiness's mediating effect is carried out with the criterion variance accounted for (Baron and Kenny 1986; Helm, Eggert, and Garnefeld 2010). Both tests yield good results and confirm the suitability of the developed model. Finally, the test of unobserved heterogeneity (finite mixture partial least squares analysis; Ringle, Wende, and Will 2010; Sarstedt and Ringle 2010) yield no results.

In summary, the quality of the model can be described as good. The results are further enhanced by the innovative and partly explorative character of the survey, the complex nature of transaction behavior, as well as the large range of the model. On the whole, assertions based on the model are suitable. As has been noted, it is possible to detect trustworthiness's strong and significantly positive effect on the TIT (see Figure 2 and Table 8). The subjective norm's influence is also confirmed, although its influence is much less than that of trustworthiness. However, it is important that individuals are convinced that online buying behavior is supported by people whose opinion they value. The central construct trustworthiness clearly shows the postulated antecedent relations. It is formed by the three distinct beliefs: with a path coefficient of 0.515, integrity has the highest influence; the effects of ability and benevolence are smaller with coefficients of 0.255 and 0.102, respectively. Because 9 of the 12 signal constructs' effects are significantly positive, this shows the adequacy of the assumed cause-and-effect relationship. The large positive potential of the default-independent signal constructs and the weak potential of the DC RR construct are particularly noteworthy (see Figure 2 and Table 9).

In summary, however, all signal constructs have belief-altering potential. As postulated above, the belief-altering potential of these constructs is positively determined by signals (see Figure 2 and Table 3). Significantly positive effects are found for 6 of 12 signals associated with the DI SI signal construct (pictures/3D, data privacy, order process, general layout, product range, and technical quality), 2 out of 3 signals associated with the DI SC signal construct (date of delivery, special offers), 3 of 5 associated with the DC RR signal construct (customer product rating, neutral product tests, and product recommendations), and 3 of 4 signals associated with the DC CR signal construct (implied warranty, extended warranties, and payment methods).

DISCUSSION AND IMPLICATIONS FOR THEORY AND PRACTICE

Most of the postulated positive cause-and-effect relationships are supported by the results of this study. To convert a Web site visitor (with a specific product demand) into a buyer, the visitor has to be convinced that the e-tailer is trustworthy, that is, benevolent, capable, and has integrity. E-tailers can influence the belief dimensions positively by using Web site signals.

To the best of the author's knowledge, there is no study that confirms the separate and simultaneous influence of benevolence and integrity in an initial trust setting. Schoorman, Mayer, and Davis (2007) speculate that such a separate apperception is only developed in the course of a relationship (i.e., with experience). This is not confirmed here. Another reason for the difficulty that prior, mainly experimental, studies had with determining a separate apperception, and which Schoorman, Mayer, and Davis might have overlooked, could have been their insufficient number of experimental variables, which is in contrast to the 24 signal variables included in this study.

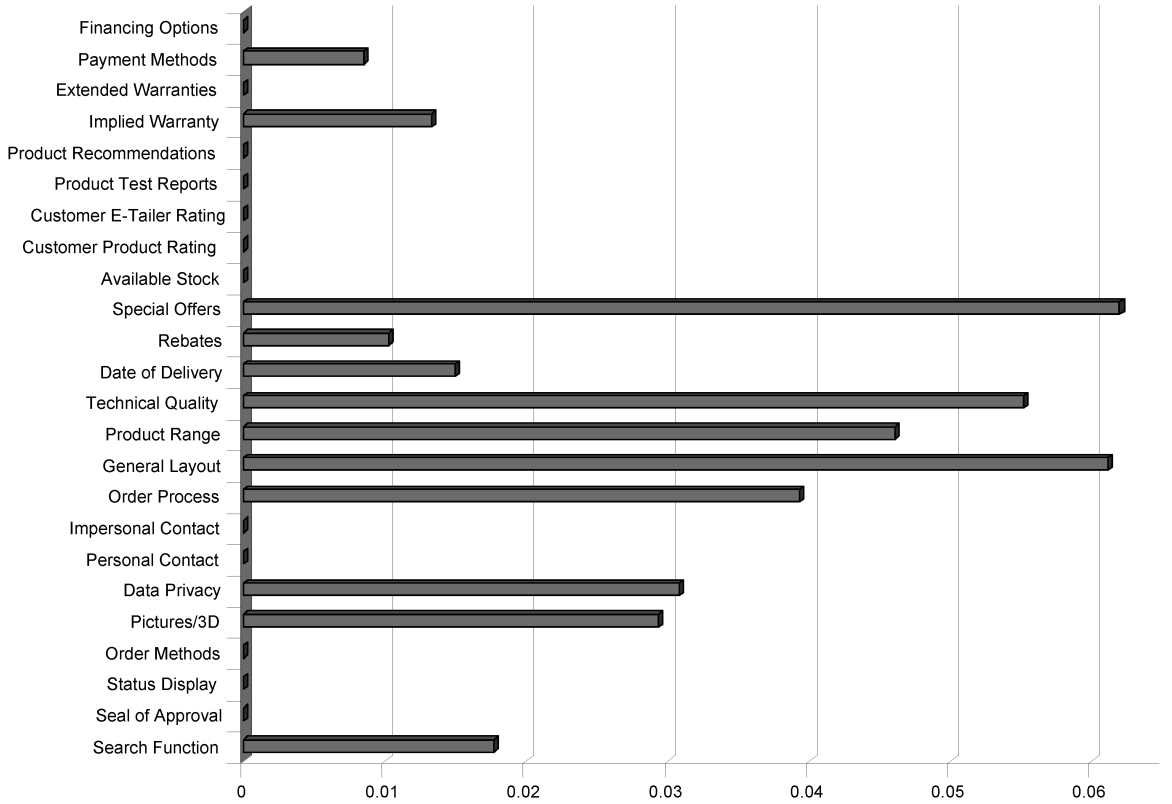
The finding that, rather than ability and benevolence, integrity has the highest influence on trustworthiness is conclusive: Potential customers, who mostly know the evaluated market leader by name, should anticipate that the e-tailer has sufficient competencies to fulfill the distance trade. From a signal theoretical point of view, benevolence's comparatively small effect can also be explained: in a standard economic interaction process, the trustee will be motivated mostly by his or her own monetary interest rather than by benevolence. Given signaling theory, monetary interest plays a particularly central role: A rational vendor will fulfill his or her commitments so as not to risk long-term returns. The transfer of altruistic motives via signals is therefore made difficult in this context. The expectation of integrity is far more important. A potential customer could fear a misuse of customer data. One reason for this fear could be individual product recommendations (even during an initial visit to the Web site) based on clickstream data. Thus, the postulation is supported that a product purchase via the Internet has a metaproduct character that also includes the customer's integrity demands.

As a result of the default-independent signal constructs' large potential, the cash-intensive signals that require the main expenditure before or at the time of the product purchase are most important for building favorable beliefs in trustworthiness and, therefore, for the TIT. Hence, establishing a successful shop presence requires strong financial backing.

To obtain a more detailed insight into the individual signals' efficiency with regard to the TIT, their total effects are shown in Figure 3 (nonsignificant total effects have a value of zero).

The default-independent signal constructs' already described strong effect is associated with a large number of the associated formative indicators' relatively strong total effects. In particular, the signals special offers, general layout (font, color, and navigation), technical quality, size of product range, order process, data privacy, and pictures/3D are identified as success factors for e-tailers known only by name. The use of these success signals is therefore advisable.

Figure 3
Total Effects of Signals on Trust-Based Intention to Transact

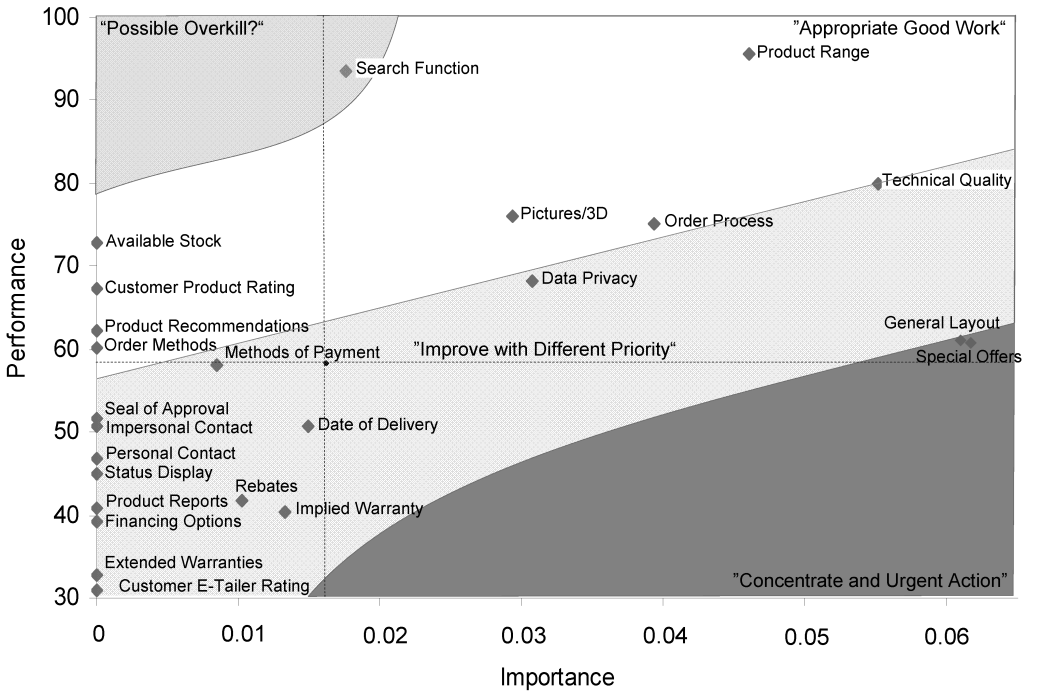


To facilitate an interpretation and prioritization of measures for management beyond the scope of the total effects, an IPA's priority matrix provides an evaluation of e-tailers' current performance regarding the signal indicators (Martilla and James 1977; Slack 1994). To evaluate a formative indicator's performance, the mean values of the survey participants' evaluations are used as the basis to calculate the performance index (scale 0 to 100). Each performance index is juxtaposed to the indicator's importance for the respective construct on the importance axis. Here, the formative signal indicators' total effects on the construct TIT are used as importance criteria. This relevance describes a performance modification's impact on the construct TIT. Thus, the increase in a formative indicator's performance index by one point is followed by an increase in the TIT by the associated value of importance, that is, the total effect.

The calculation of the performance indices and the total effects' arithmetic mean results in two lines that divide the diagram into four quadrants (dashed lines in Figure 4): possible overkill, keep up with the good work, low priority, and concentrate here (Martilla and James 1977). Since the priority matrix's standard form does not take any interdependencies into account and a strict orientation along the boundaries would be imprudent, Slack (1994) developed a modified version. He interprets the different areas as excess, appropriate, improve, and urgent action. Here, both approaches are used symbiotically. Consequently, Slack's borderlines, which are based on (reversed) 9-point scales, are adapted to the 100-point scales used by Martilla and James (1977). The resulting areas are interpreted as follows (see Figure 4): The section "Appropriate Good Work" shows e-tailers' current strengths. These signals should maintain their present quality. The "Possible Overkill?" area shows signals whose quality maintenance could be reconsidered. The two areas that offer the e-tailer potential are the "Concentrate and Urgent Action" area and the "Improve with Different Priority" area. The quality of the signals in the "Improve with Different Priority" area should be increased with a priority depending on their importance. The "Concentrate and Urgent Action" area harbors the largest potential to enhance the TIT. Here, there are signals that are relatively important but whose performance is insufficient.

The main potential for e-tailers (known by name) can be found in the signals special offers, general layout, techni-

Figure 4
Priority Matrix of Formative Signal Indicators



cal quality, and data privacy. If these signals are improved, positive effects (i.e., an increase in conversion rates) can be expected. Measures that management could use to utilize this potential could be many attractive individualized special offers, a harmonious Web site with low complexity, an intuitive navigation with elements that appear three-dimensional (Lowry et al. 2008; Nadkarni and Gupta 2007), a shorter loading time through the use of servers with a higher bandwidth, and the prominent placement of a strong data privacy statement, as well as the use of "proper" seals of approval regarding data privacy.

CONCLUSIONS

The intention of this project was to submit the antecedents and consequences of trust in an online shopping environment to a detailed analysis and to identify managerial tactics with which to efficiently induce trust via Web site signals to convert Web site visitors into buyers. Consequently, expertise from the literature on trust, information economics, and signaling theory is integrated into the TRA. The analyzed trust is the initial calculus-based trust, which is most relevant for e-tailing transactions. This trust is built through a process in which the potential customer considers the dimensions of trustworthiness based on the information conveyed via signals on the e-tailer's Web site. An offline signal typology (Kirmani and Rao 2000), which includes a perspective on investment and financing, is newly adopted here. The developed structural equation model—with the target construct TIT—is empirically tested under real conditions, that is, a buying scenario is created and the two market leaders' Web sites function as stimuli. The hypothesized cause-and-effect relationships are mostly confirmed.

For the first time, it is statistically confirmed that, in an initial calculus-based trust setting, trustworthiness in e-tailing is simultaneously formed from three different beliefs (ability, integrity, and benevolence). In the present context—that is, the investigation of e-tailers known only by name—the formation of trustworthiness is mainly influenced by integrity. Trustworthiness is identified as the central determinant of the TIT. The different Web site signals function as trust-building indicators: their belief-altering potentials can mainly be confirmed. In summary, Web site signals that are mediated via the beliefs in trustworthiness play a critical role in the formation of the TIT. The novel comprehensive approach comparing the efficiency of signals reveals that, in particular, the default-independent signals that already require investments at a relatively early point in the business activity (e.g., the general layout, technical Web site quality, size of the product range, data privacy, and pictures/3D) should be used by e-tailers be-

cause of their comparatively strong influence on the TIT (see Figure 3). An IPA reveals that special offers, the general layout, technical Web site quality, and data privacy offer the e-tailer further potential. If managers focus on measures that enhance the quality of these signals, they can gain a powerful competitive advantage.

Besides the many insights that this work provides, there are a few limitations that can be addressed in further research. Even though the survey participants were required to have adopted the Internet as an information medium, there might have been a selection bias in recruiting experienced participants through online promotions. Although the intention to transact has a high validity in predicting the actual transaction behavior (Pavlou, Liang, and Xue 2007), an investigation of real transaction behavior would enhance the model's validity. Furthermore, the priority matrix does not take interdependencies into account. The elimination of a less important signal might have a negative effect. For example, potential customers may feel that the contact options merely meet the normal standard; they do not constitute a trust-enhancing factor, although their absence could well be a factor of failure. Moreover, it should be examined whether the success signals can be transferred to other product categories.

Further research is also needed to understand how the quality of signals that have potential with respect to the IPA can be improved. In addition, the current results' sustainability may be limited and should therefore be verified: If many e-tailers adopt the identified efficient success signals, they will become the standard. Moreover, the Internet research area is particularly subject to a constant dynamic, which implies that its success factors are also subject to dynamic change and further development. Avatars, tagging elements for navigation, celebrity testimonials, or music could be the next stage of signal constructs' development. Even though the participants had no spontaneous trust attitude, based on former experience, toward the metaproduct's quality, the integration of a variable "image"—due to all the participants knowing the e-tailer by name—as well as the use of unknown e-tailers as stimulus could also be advisable. To further enhance the explanatory power, additional constructs can be integrated into the model, such as the behavioral control (Ajzen 1985) or the disposition to trust (Mayer, Davis, and Schoorman 1995). Conceivably, the approach could be coupled with other theories such as the technology acceptance model (Davis, Bagozzi, and Warshaw 1989).

REFERENCES

Agarwal, Ritu, and Jayesh Prasad (1998), "A Conceptual and Operational Definition of Personal Innovativeness in the Domain of Information Technology," *Information Systems Research,* 9 (2), 204–215.

Ahrholdt, Dennis (2010), *Erfolgsfaktoren Einer E-Commerce-Website—Empirische Identifikation Vertrauensfördernder Signale im Internet-Einzelhandel* [Success Factors of an E-Commerce Website—Empirical Identification of Trust-Enhancing Signals in Internet Retailing], Wiesbaden: Gabler.

Aiken, Damon K., and David M. Boush (2006), "Trustmarks, Objective-Source Ratings, and Implied Investment in Advertising: Investigating Online Trust and Context-Specific Nature of Internet Signals," *Journal of the Academy of Marketing Science,* 34 (3), 308–323.

——, Ben S. Liu, Robert D. Mackoy, and Gregory E. Osland (2004), "Building Internet Trust: Signalling Through Trustmarks," *International Journal of Internet Marketing and Advertising,* 1 (3), 251–267.

Ajzen, Icek (1985), "From Intentions to Actions: A Theory of Planned Behavior," in *Action Control: From Cognition to Behavior,* Julius Kuhl and Jürgen Beckmann, eds., New York: Springer, 11–39.

—— (2006), "Constructing a Theory of Planned Behavior Questionnaire," Department of Psychology, University of Massachusetts, Amherst (available at http://people.umass.edu/aizen/pdf/tpb.measurement.pdf).

—— (2008), "The Theory of Planned Behavior: A Bibliography," Department of Psychology, University of Massachusetts, Amherst (available at http://people.umass.edu/aizen/tpbrefs.html).

Akerlof, George Arthur (1970), "The Market for 'Lemons': Quality Uncertainty and the Market Mechanism," *Quarterly Journal of Economics,* 84 (3), 488–500.

Anderson, James C., and David W. Gerbing (1991), "Predicting the Performance of Measures in a Confirmatory Factor Analysis with a Pretest Assessment of Their Substantive Validities," *Journal of Applied Psychology,* 76 (5), 732–740.

Bagozzi, Richard P., and Hans Baumgartner (1994), "The Evaluation of Structural Equation Models and Hypothesis Testing," in *Principles of Marketing Research,* Richard P. Bagozzi, ed., Cambridge, UK: Blackwell, 386–422.

——, and Youjae Yi (1988), "On the Evaluation of Structural Equation Models," *Journal of the Academy of Marketing Science,* 16 (1), 74–94.

Baron, Reuben M., and David A. Kenny (1986), "The Moderator–Mediator Variable Distinction in Social Psychological Research: Conceptual, Strategic, and Statistical Considerations," *Journal of Personality and Social Psychology,* 51 (6), 1173–1182.

Belsley, David A. (1991), *Conditioning Diagnostics: Collinearity and Weak Data in Regression,* New York: Wiley.

——, Edwin Kuh, and Roy E. Welsch (1980), *Regression Diagnostics,* New York: Wiley.

Benbasat, Izak, David Gefen, and Paul A. Pavlou (2008), "Special Issue: Trust in Online Environments," *Journal of Management Information Systems,* 24 (4), 5–11.

Bollen, Kenneth A., and Richard Lennox (1991), "Conventional Wisdom on Measurement: A Structural Equation Perspective," *Psychological Bulletin,* 110 (2), 305–314.

Chin, Wynne W. (1998a), "Issues and Opinion on Structural Equation Modeling," *MIS Quarterly,* 22 (1), 7–16.

——(1998b), "The Partial Least Squares Approach for Structural Equation Modelling," in *Modern Methods for Business Research,* George A. Marcoulides, ed., Mahwah, NJ: Lawrence Erlbaum, 295–336.

——(2004), "Frequently Asked Questions—Partial Least Squares & PLS-Graph" (available at http://disc-nt.cba.uh.edu/chin/plsfaq/plsfaq.htm).

——, and Peter R. Newsted (1999), "Structural Equation Modeling Analysis with Small Samples Using Partial Least Squares," in *Strategies for Small Sample Research,* Rick H. Hoyle, ed., Thousand Oaks, CA: Sage, 307–341.

"Cyber Monday Report 2009" (2009), Coremetrics (available at www.coremetrics.com/downloads/benchmark-2009-cyber-monday.pdf).

Davis, Fred D., Richard P. Bagozzi, and Paul R. Warshaw (1989), "User Acceptance of Computer Technology: A Comparison of Two Theoretical Models," *Management Science,* 35 (8), 982–1002.

Dellarocas, Chrysanthos, and Charles Wood (2008), "The Sound of Silence in Online Feedback: Estimating Trading Risks in the Presence of Reporting Bias," *Management Science,* 54 (3), 460–476.

Diamantopoulos, Adamantios, and Heidi M. Winkelhofer (2001), "Index Construction with Formative Indicators: An Alternative to Scale Development," *Journal of Marketing Research,* 38 (2), 269–277.

Eagly, Alice H., and Shelly Chaiken (1993), *The Psychology of Attitudes,* Fort Worth: Harcourt Brace Jovanovich.

Efron, Bradley (1979), "Bootstrap Methods: Another Look at the Jackknife," *Annals of Statistics,* 7 (1), 1–26.

Fishbein, Martin, and Icek Ajzen (1975), *Belief, Attitude, Intention, and Behavior: An Introduction to Theory and Research,* Reading, MA: Addison-Wesley.

Fornell, Claes, and David F. Larcker (1981), "Evaluating Structural Equation Models with Unobservable Variables and Measurement Error," *Journal of Marketing Research,* 18 (1), 39–50.

Forsythe, Sandra, Liu Chuanlan, David Shannon, and Liu Chun Gardner (2006), "Development of a Scale to Measure the Perceived Benefits and Risks of Online Shopping," *Journal of Interactive Marketing,* 20 (2), 55–75.

Frambach, Ruud T., Henk C.A. Roest, and Trichy V. Krishnan (2007), "The Impact of Consumer Internet Experience on Channel Preference and Usage Intentions Across the Different Stages of the Buying Process," *Journal of Interactive Marketing,* 21 (2), 26–41.

Gefen, David, Izak Benbasat, and Paul A. Pavlou (2008), "A Research Agenda for Trust in Online Environments," *Journal of Management Information Systems,* 4 (4), 275–286.

Giffin, Kim (1967), "The Contribution of Studies of Source Credibility to a Theory of Interpersonal Trust in the Communication Process," *Psychological Bulletin,* 68 (2), 104–120.

Götz, Oliver, Kerstin Liehr-Gobbers, and Manfred Krafft (2010), "Evaluation of Structural Equation Models Using the Partial Least Squares (PLS) Approach," in *Handbook of Partial Least Squares: Concepts, Methods and Applications,* Vincenzo Esposito Vinzi, Wynne W. Chin, Jörg Henseler, and Huiwen Wang, eds., Berlin: Springer, 691–712.

Grau, Jeffrey (2009), "Retail E-Commerce Forecast: Cautious Optimism," *eMarketer,* June (available at www.emarketer.com/Report.aspx?code=emarketer_2000565/).

—— (2010), "U.S. Retail E-Commerce Forecast: Room to Grow," *eMarketer*, March (available at www.emarketer.com/Report.aspx?code=emarketer_2000672/).

Hair, Joseph F., Rolph Anderson, Ronald Tatham, and William Black (1998), *Multivariate Data Analysis,* 5th ed., Upper Saddle River, NJ: Prentice Hall.

Helm, Sabrina, Andreas Eggert, and Ina Garnefeld (2010), "Modeling the Impact of Corporate Reputation on Customer Satisfaction and Loyalty Using Partial Least Squares," in *Handbook of Partial Least Squares: Concepts, Methods and Applications,* Vincenzo Esposito Vinzi, Wynne W. Chin, Jörg Henseler, and Huiwen Wang, eds., Berlin: Springer, 515–534.

Henseler, Jörg, Christian M. Ringle, and Rudolf R. Sinkovic (2009), "The Use of Partial Least Squares Path Modeling in International Marketing," in *Advances in International Marketing,* vol. 20, Rudolf R. Sinkovic and Pervez N. Ghauri, eds., Bingley, UK: Emerald, 277–319.

Hulland, John (1999), "Use of Partial Least Squares (PLS) in Strategic Management Research: A Review of Four Recent Studies," *Strategic Management Journal,* 20 (2), 195–204.

Jarvenpaa, Sirkka L., Noam Tractinsky, and Michael Vitale (2000), "Consumer Trust in an Internet Store," *Information Technology and Management,* 1 (1–2), 45–71.

Jarvis, Cheryl Burke, Scott B. MacKenzie, and Philip M. Podsakoff (2003), "A Critical Review of Construct Indicators and Measurement Model Misspecification in Marketing and Consumer Research," *Journal of Consumer Research,* 30 (2), 199–218.

Johnson, Eric J., Wendy W. Moe, Peter S. Fader, Steven Bellmann, and Gerald L. Lohse (2004), "On the Depth and Dynamics of Online Search Behavior," *Management Science,* 50 (3), 299–308.

Jöreskog, Karl G. (1977), "Structural Equation Models in Social Sciences: Specification, Estimation and Testing," in *Applications of Statistics,* Paruchuri R. Krishnaiah, ed., Amsterdam: North-Holland, 265–287.

Kirmani, Amna, and Akshay R. Rao (2000), "No Pain, No Gain: A Critical Review of the Literature on Signaling Unobservable Product Quality," *Journal of Marketing,* 64 (2), 66–79.

Lim, Kai H., Choon Ling Sia, Matthew K.O. Lee, and Izak Benbasat (2006), "Do I Trust You Online, and If So, Will I Buy? An Empirical Study of Two Trust-Building Strategies," *Journal of Management Information Systems,* 23 (2), 233–266.

Lowry, Paul Benjamin, Anthony Vance, Greg Moody, Bryan Beckman, and Aaron Read (2008), "Explaining and Predicting the Impact of Branding Alliances and Web Site Quality on Initial Consumer Trust of E-Commerce Web Sites," *Journal of Management Information Systems,* 24 (4), 199–224.

Martilla, John A., and John C. James (1977), "Importance-Performance Analysis," *Journal of Marketing,* 41 (1), 77–79.

Mayer, Roger C., James H. Davis, and F. David Schoorman (1995), "An Integrative Model of Organizational Trust," *Academy of Management Review,* 20 (3), 709–734.

McKnight, D. Harrison, Vivek Choudhury, and Charles Kacmar (2002), "Developing and Validating Trust Measures for E-Commerce: An Integrative Typology," *Information Systems Research,* 13 (3), 334–359.

——, Larry L. Cummings, and Norman L. Chervany (1998), "Initial Trust Formation in New Organizational Relationships," *Academy of Management Review,* 23 (3), 473–490.

Meziane, Farid, and Mohd Khairudin Kasiran (2008), "Evaluating Trust in Electronic Commerce: A Study Based on the Information Provided on Merchants' Websites," *Journal of the Operational Research Society,* 59 (4), 464–472.

Mulpuru, Sucharita, Carrie Johnson, and Peter Hult (2008), "The State of Retailing Online 2008," Forrester Research, Cambridge, MA.

Nadkarni, Sucheta, and Reetika Gupta (2007), "A Task-Based Model of Perceived Website Complexity," *MIS Quarterly,* 31 (3), 501–524.

Nelson, Phillip (1970), "Information and Consumer Behaviour," *Journal of Political Economy,* 78 (2), 311–329.

Netessine, Serguei, Sergei Savin, and Wenqiang Xiao (2006), "Revenue Management Through Dynamic Cross Selling in E-Commerce Retailing," *Operations Research,* 54 (5), 893–913.

Palmer, Jonathan W. (2002), "Web Site Usability, Design, and Performance Metrics," *Information Systems Research,* 13 (2), 151–167.

Patrick, Vanessa M., and C. Whan Park (2006), "Paying Before Consuming: Examining the Robustness of Consumers' Preference for Prepayment," *Journal of Retailing,* 82 (2), 165–175.

Pavlou, Paul A., Huigang Liang, and Yajiong Xue (2007), "Understanding and Mitigating Uncertainty in Online Exchange Relationships: A Principal–Agent Perspective," *MIS Quarterly,* 31 (1), 105–136.

Petter, Stacie, Detmar W. Straub, and Rai Arun (2007), "Specifying Formative Constructs in Information System Research," *MIS Quarterly,* 31 (4), 623–656.

Ringle, Christian M., Sven Wende, and Alexander Will (2005), "SmartPLS 2.0," SmartPLS, Hamburg (available at www.smartpls.de).

——, ——, and —— (2010), "Finite Mixture Partial Least Squares Analysis: Methodology and Numerical Examples," in *Handbook of Partial Least Squares: Concepts, Methods and Applications,* Vincenzo Esposito Vinzi, Wynne W. Chin, Jörg Henseler, and Huiwen Wang, eds., Berlin: Springer, 195–218.

Rousseau, Denise M., Sim B. Sitkin, Ronald S. Burt, and Colin Camerer (1998), "Not So Different After All: A Cross-Discipline View of Trust," *Academy of Management Review,* 23 (3), 393–404.

Sarstedt, Marco, and Christian M. Ringle (2010), "Treating Unobserved Heterogeneity in PLS Path Modelling: A Comparison of FIMIX-PLS with Different Data Analysis Strategies," *Journal of Applied Statistics,* 37 (8), 1299–1318.

Schlosser, Ann E., Tiffany Barnett White, and Susan M. Lloyd (2006), "Converting Web Site Visitors into Buyers: How Web Site Investments Increases Consumer Trusting Beliefs and Online Purchase Intentions," *Journal of Marketing,* 70 (2), 133–148.

Schoorman, F. David, Roger C. Mayer, and James H. Davis (1996), "Empowerment in Veterinary Clinics: The Role of Trust in Delegation," paper presented at the Eleventh Annual Meeting of the Society for Industrial and Organizational Psychology, San Diego, April 26–28.

——, ——, and —— (2007), "An Integrative Model of Organizational Trust: Past, Present, and Future," *Academy of Management Review,* 32 (2), 344–354.

Slack, Nigel (1994), "The Importance-Performance Matrix as a Determinant of Improvement Priority," *International Journal of Operations & Production Management,* 14 (5), 59–75.

Song, Jaeki, and Fatemeh Zahedi (2005), "A Theoretical Approach to Web Design in E-Commerce: A Belief Reinforcement Model," *Management Science,* 51 (8), 1219–1235.

Spence, A. Michael (1973), "Job Market Signaling," *Quarterly Journal of Economics,* 87 (3), 355–374.

Stiglitz, Joseph E. (1975), "Information and Economic Analysis," in *Current Economic Problems,* Michael Parkin and Avelino R. Nobay, eds., Cambridge: Cambridge University Press, 27–52.

Urban, Glen L., John R. Hauser, William J. Qualls, Bruce D. Weinberg, Jonathan D. Bohlmann, and Roberta A. Chicos (1997), "Information Acceleration: Validation and Lessons from the Field," *Journal of Marketing Research,* 34 (1), 143–153.

Venkatesh, Viswanath, and Ritu Agarwal (2006), "Turning Visitors into Customers: A Usability-Centric Perspective on Purchase Behaviour in Electronic Channels," *Management Science,* 52 (3), 367–382.

Verhoef, Peter C., Scott A. Neslin, and Björn Vroomen (2007), "Multichannel Customer Management: Understanding the Research-Shopper Phenomenon," *International Journal of Research in Marketing,* 24 (2), 129–148.

Völckner, Franziska, Henrik Sattler, Torsten Hennig-Thurau, and Christian M. Ringle (2010), "The Role of Parent Brand Quality for Service Brand Extension Success," *Journal of Service Research,* 13 (4), 379–396.

Wold, Herman Ole Andreas (1980), "Model Construction and Evaluation When Theoretical Knowledge Is Scarce: Theory and Application of PLS," in *Evaluation of Econometric Models,* Jan Kmenta and James B. Ramsey, eds., New York: Academic Press, 47–74.

Wolfinbarger, Mary, and Mary C. Gilly (2001), "Shopping Online for Freedom, Control, and Fun," *California Management Review,* 43 (2), 34–55.