Empirical research in on-line trust: a review and critical assessment

Sonja Grabner-Kräuter\textsuperscript{a,}\textsuperscript{*}, Ewald A. Kaluscha\textsuperscript{b}

\textsuperscript{a}Department of Marketing and International Management, University of Klagenfurt, 9020 Klagenfurt, Austria
\textsuperscript{b}eBusiness Institute—Business Technologies, University of Klagenfurt, 9020 Klagenfurt, Austria

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Abstract

Lack of trust is one of the most frequently cited reasons for consumers not purchasing from Internet vendors. During the last four years a number of empirical studies have investigated the role of trust in the specific context of e-commerce, focusing on different aspects of this multi-dimensional construct. However, empirical research in this area is beset by conflicting conceptualizations of the trust construct, inadequate understanding of the relationships between trust, its antecedents and consequents, and the frequent use of trust scales that are neither theoretically derived nor rigorously validated. The major objective of this paper is to provide an integrative review of the empirical literature on trust in e-commerce in order to allow cumulative analysis of results. The interpretation and comparison of different empirical studies on on-line trust first requires conceptual clarification. A set of trust constructs is proposed that reflects both institutional phenomena (system trust) and personal and interpersonal forms of trust (dispositional trust, trusting beliefs, trusting intentions and trust-related behaviours), thus facilitating a multi-level and multi-dimensional analysis of research problems related to trust in e-commerce.

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\textsuperscript{*}Corresponding author.
E-mail addresses: sonja.grabner@uni-klu.ac.at (S. Grabner-Kräuter), ewald.kaluscha@biztec.org (E.A. Kaluscha).
1. Introduction

Trust, in general, is an important factor in many social interactions, involving uncertainty and dependency. On-line transactions and exchange relationships are not only characterized by uncertainty, but also by anonymity, lack of control and potential opportunism, making risk and trust crucial elements of electronic commerce. Buying on the Internet presents numerous risks for consumers over and above the transaction process itself being perceived as risky (Einwiller et al., 2000; Einwiller and Will, 2001). On-line transactions often do not involve simultaneous exchange of goods and money—spatial and also temporal separation between exchange partners is common. Consumers are required to share sensitive personal information (such as mailing address, telephone number) and financial information (such as credit card numbers), although on-line firms often are located in different parts of the country or even in other countries and have limited history of prior on-line transactions (Bhattacherjee, 2002). Because of the fierce competition in electronic markets the on-line consumer is inundated with a myriad of similar offerings to choose from and overwhelmed by conflicting marketing messages. The on-line consumer cannot personally inspect products or services and does not know what the retailer will do with the personal information that is collected during the shopping process. There seems little assurance that the customer will get what she or he sees on the computer screen, at a certain time and in the quantity ordered. Having only limited cognitive resources available, consumers seek to reduce the uncertainty and complexity of transactions and relationships in electronic markets by applying mental shortcuts. One effective mental shortcut is trust, which can serve as mechanism to reduce the complexity of human conduct in situations where people have to cope with uncertainty (Luhmann, 1989).

Lack of trust is one of the most frequently cited reasons for consumers not purchasing from Internet vendors (e.g. Lee and Turban, 2001, p. 75). “In essence, consumers simply do not trust most Web providers enough to engage in relationship exchanges with them” (Hoffman et al., 1998). The importance of initiating, building, and maintaining trust between buyers and sellers as key facilitators of successful e-commerce is increasingly being recognized in academic as well as in practitioner communities. Meanwhile, a number of empirical studies have investigated the role of trust in the specific context of e-commerce, focusing on different aspects of this multi-dimensional construct. However, empirical research in this area is beset by conflicting conceptualizations of the trust construct, inadequate understanding of the relationships between trust, its antecedents and consequents, and the frequent use of trust scales that are neither theoretically derived nor rigorously validated (Bhattacherjee, 2002). Elements and determinants of on-line trust are used interchangeably in many studies (Shankar et al., 2002). Therefore, it is difficult and ineffective to summarize and compare the results of different studies with the aim of deriving recommendations for building and maintaining on-line trust without clarifying conceptual problems first.

The major objective of this paper is to provide an integrative review of the empirical literature on trust in e-commerce in order to contribute to the development
of the topic. Although the focus is on empirical findings, first the basic question is addressed why trust is so important in electronic commerce. The analysis centres on conditions of e-commerce transactions that are relevant for the formation of trust problems. Drawing on the theory of information (Hirshleifer and Riley, 1979) two types of uncertainty are described: system-dependent and transaction-specific uncertainty. The different types of uncertainty or risk are also relevant for the understanding of different conceptual types of trust which are (often implicitly) investigated in various empirical studies. We then provide an overview of research findings that clearly indicates a need for better conceptual trust definitions and make out gaps in knowledge that could be addressed by future research.

2. The importance of trust in electronic commerce

2.1. Uncertainty as a basic transaction dimension relevant for the importance of trust in e-commerce

Trust has been defined in many different ways, as shortly will be discussed later. However, across disciplines there is agreement that trust only exists in an uncertain and risky environment. “The need for trust only arises in a risky situation” (Mayer et al., 1995, p. 711), trust would not be needed if actions could be undertaken with complete certainty and no risk. One important reason for the importance of trust in e-commerce is the fact that in a virtual environment the degree of uncertainty of economic transactions is higher than in traditional settings. Internet-based commercial transactions can bring about several risks that either are caused by the implicit uncertainty of using open technological infrastructures for the exchange of information (system-dependent uncertainty) or can be explained by the conduct of actors who are involved in the on-line transaction (transaction-specific uncertainty).

System-dependent uncertainty comprises events that are beyond the direct influence of actors and can be characterized as exogenous or environmental uncertainty. In general, the concept of exogenous uncertainty refers to uncertainty of the world (Hirshleifer and Riley, 1979). Exogenous uncertainty is caused by dynamic forces of the environment and the complexity of relevant environmental factors (Brielmaier and Diller, 1995). In the context of electronic commerce exogenous uncertainty primarily relates to potential technological sources of errors and security gaps or to put it economically to technology-dependent risks that cannot be avoided by an agreement or a contract with another actor who is involved in the transaction.

The smooth and secure processing of an on-line transaction depends on the functioning of the hardware and software that is used as well as on the security of the data exchange services including the cryptographic protocols that are used. Technical safety gaps can emerge either in the data channel or on the “final points” of the process or the e-commerce system. In business-to-consumer e-commerce “final points” of the e-commerce system are the desktop system of the customer, the server of the Internet retailer and eventually the servers of the involved banks and operators of the electronic marketplace. The user can directly control transactional
security only within his own system but not in the systems of other actors involved in the transaction. Web retailers can try to reduce system-dependent uncertainty by facilitating encrypted transactions, installing firewalls, utilizing authentication mechanisms and ensuring privacy seals and disclosures (Pavlou, 2003). What is relevant for the acceptance of e-commerce is not the objective security of the electronic channel as transaction medium but the subjective risk perception of the consumer.

Transaction-specific uncertainty can be seen as a kind of endogenous or market uncertainty that results from decisions of economic actors and is caused by an asymmetric distribution of information between the transaction partners (Weiber and Adler, 1995b). From the perspective of the consumer transaction-specific uncertainty relates to the Internet merchant and his potential behaviours in the transaction process. An important element of transaction-specific uncertainty is the quality of the products and services that are offered on the Web, which depends on the seller's ability and willingness to perform. The quality assessment in electronic markets often is more difficult than in traditional markets. In situations where buying decisions are made in a computer-mediated environment many elements of personal interaction disappear or are inapplicable (e.g. facial play, gesture, body language) that are used in the real world (Winand and Pohl, 2000).

Several authors have argued that the exercise of trust and the search for information are alternative mechanisms to absorb uncertainty (Luhmann, 1989; Wicks et al., 1999). To put it simply, the more a person trusts in a given situation, the less additional information she or he needs to make a certain decision. On the other hand, if there is little trust, there will be the need for more complete information in order to reduce system-dependent and/or transaction-specific uncertainty and to create more trust. The perceived level of uncertainty and possible adverse outcomes of an action influence the balance between trust and information needed for coping with uncertainty (Tomkins, 2001). From a managerial point of view one may conclude already at this point that in the early stages of the adoption of new technologies such as the Internet, it is important to provide both information concerning the basic functioning and security of the e-commerce system to reduce system-dependent uncertainty and information concerning characteristics and processes of the Web merchant to reduce transaction-specific uncertainty.

2.2. Lack of consensus about the meaning(s) of trust and the need for conceptual clarification

The notion of trust has been examined under various contexts over the years. As many types and views of trust as there are, there are also many fields which study the phenomenon (Marsh, 1994). Researchers in different disciplines agree on the importance of trust in the conduct of human affairs, but there also appears to be equally widespread lack of agreement on a suitable definition of the concept (Hosmer, 1995; Rousseau et al., 1998; Bhattacharya and Devinney, 1998; Husted, 1998). Personality psychologists traditionally have viewed trust as a belief, expectancy, or feeling that is deeply rooted in the personality and has its origins
in the individual’s early psychological development (e.g. Rotter, 1967, 1971). Social psychologists define trust as an expectation about the behaviour of others in transactions, focusing on the contextual factors that serve either to enhance or inhibit the development and maintenance of trust (Lewicki and Bunker, 1995). Economists and sociologists have been interested in how institutions and incentives are created to reduce the anxiety and uncertainty associated with transactions (e.g. Granovetter, 1985; Zucker, 1986; Williamson, 1993). Additionally, within business schools, there are different approaches to the study of trust across domains such as finance (e.g. Güth, 2001; Ferrary, 2002), marketing (e.g. Ganesan, 1994; Morgan and Hunt, 1994; Doney and Cannon, 1997; Geyskens et al., 1997; Swan et al., 1999), and management (e.g. Mayer et al., 1995; Gill and Butler, 1996; Inkpen and Currall, 1998; McKnight et al., 1998; Wicks et al., 1999; Luo, 2002), partly drawing on trust constructs developed in other disciplines. Overall, trust has been defined by researchers in many different ways, which often reflect the paradigms of the particular academic discipline of the researcher. There are literally dozens of definitions of trust, which many researchers find contradictory and confusing. These problems very much apply to the e-commerce domain research (McKnight and Chervany, 2002; Jones, 2002). Before interpreting and comparing the results of different empirical studies on the multi-dimensional concept of (on-line) trust, a concise explanation of the most important meanings and types of trust is required. However, the following discussion of different trust constructs does not aim at reaching consensus on a single definition of trust. We rather try to provide a framework that facilitates a multi-level and multi-dimensional analysis of e-commerce trust and allows the integration of trust-related constructs or trust types that have their roots in different disciplines.

Drawing on the work of Luhmann (1989) trust can be seen as a mechanism to reduce the complexity of human conduct in situations where people have to cope with uncertainty. Without trust people would be confronted with the incomprehensible complexity of considering every possible eventuality before deciding what to do. The impossibility of controlling the actions of others or even just fully understanding their motivations makes the complexity of human interactions so overwhelming that it can actually inhibit intentions to perform many behaviours (Gefen, 2000). Trust is a very effective complexity reduction method, although it does not really enable people to control or even anticipate without error the behaviour of others. But trust does make it possible for people to create a comprehensible organization of their activities. This functional perspective is adequate to integrate various trust-related constructs or trust types that have their roots in different disciplines.

The relative importance of trust depends—among other factors—upon the complexity and the context of an action. To analyse trust decisions in the context of (electronic) market transactions different types of trust have to be distinguished. First, trust can be conceptualized on different levels of analysis, reflecting the array of entities, individuals, dyads, groups, networks, systems, firms and inter-firm alliances in which trust and related processes play a role (Rousseau et al., 1998). Many theorists and researchers of trust focus on interpersonal relationships. However, the analysis of trust in the context of electronic commerce should consider
impersonal forms of trust as well, because in computer-mediated environments such as electronic markets personal trust is a rather limited mechanism to reduce uncertainty. The technology itself—mainly the Internet—has to be considered as an object of trust (Shankar et al., 2002, p. 4). Luhmann (1989) speaks of system trust whereby a system is assumed to be operating in a predictable way (e.g. legal systems or electronic commerce systems are expected to function). This impersonal form of trust primarily helps to reduce system-dependent uncertainty, but it can also influence the perception of transaction-specific risks. It can be assumed that in the early stages of the adoption of new technologies such as the Internet on-line trust might have more to do with the general reliability and the functioning of the technology whereas in later stages, trust may depend more on differences in firms’ implementation of Internet technology.

Institutionally based trust production, in which formal mechanisms are used to provide trust that does not rest on personal characteristics or on past history of exchange (Zucker, 1986), helps to reduce both system-dependent and transaction-specific uncertainty. Besides traditional intermediary institutions such as banks or consumer organizations new intermediary mechanisms such as trusted third parties play an important role in e-commerce, as they can help to promote trust among trading partners, minimize misrepresentation of product and service quality and encourage consumer confidence in conducting on-line business transactions (e.g. Froomkin, 1996). With the growing inclusion of trusted third parties in e-commerce and the increasing sophistication of the relevant technology consumers’ concerns about security of credit card numbers and personal data are likely to diminish in the near future. When investigating the influence of system trust in on-line purchasing decisions it makes sense to define this construct as a belief, e.g. about the reliability and security of e-commerce systems.

One of the most frequently cited definitions in the literature on trust in e-commerce is the one worked out by Mayer et al. (1995, p. 712), who define trust as “the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party”. This definition of trust is applicable to a relationship between (at least) two parties—a trustor and a trustee—and is personal in nature, i.e. the object of trust is another person or a group of persons, but not an abstract or technical system. In the literature on trust in e-commerce usually the buyer is seen as the party who places him or herself in a vulnerable situation. The Internet merchant then is the trustee, the party in whom trust is placed and who has the opportunity to take advantage of the trustor’s vulnerability. To understand why a given party will be judged as trustworthy corresponding characteristics of the trustee which inspire that trust have been examined by different authors (Husted, 1998). Mayer et al. (1995) have found that ability, benevolence and integrity explain a major portion of a trustee’s trustworthiness.

When discussing the importance of trust in the context of commercial transactions it makes sense to regard companies as entities that act in a particular way and to treat organizational trust as a sub-construct of interpersonal trust. From this
perspective organizations such as Internet vendors can be seen as objects of trust. McKnight and Chervany (1996, 2002) have proposed a trust typology that comprises different forms of interpersonal trust. They distinguish between the constructs trusting beliefs and trusting intentions. In the context of e-commerce trusting beliefs include the on-line consumer’s beliefs and expectancies about trust-related characteristics of the Internet merchant (McKnight and Chervany, 2002). The on-line consumer wants the Internet seller to be willing and able to act in the consumer’s interest, to be honest in transactions (and not divulge personal information to other vendors), and to be capable of delivering the offered goods as promised. Trusting intention then is the extent to which the on-line consumer is willing to depend on, or intends to depend on, the selling party in a given situation even though she/he can not control the Web vendor. Both trusting beliefs and trusting intentions have a person- or organization-specific direct object (the Internet merchant or Web vendor) but are cross-situational in that the trustee trusts the other party across various contexts (e.g. the consumer is willing to purchase goods from a certain merchant both in his brick-and-mortar store as well as his on-line shop).

Mayer et al. (1995) as well as McKnight and Chervany (2002) emphasize the difference between trust and trusting behaviours. “Trust is the willingness to assume risk; behavioural trust is the assuming of risk” (Mayer et al., 1995, p. 724). Whether or not the trustor will take a specific risk is influenced by trusting beliefs, trusting intentions and by the perceived risk of the trusting behaviour. Within an economic framework trust-related behaviour can be described as a risky advance concession in the expectation of a positive outcome without any explicit contractual security or control measure against opportunistic behaviour (Ripperger, 1998). The probability that the on-line consumer will make a risky advance concession in a specific situation (e.g. providing his credit card number or other sensible information) depends considerably on his assessment of the trustworthiness of the seller, but also his assessment of the functional reliability of the e-commerce system, and, last but not least on his general disposition to trust.

To this point, trust has been treated as a situational construct. But trust can also be conceptualized as a cross-situational, cross-personal construct, encompassing individual characteristics of the trustor. Following the trust typology proposed by McKnight and Chervany (1996) this type of trust is called dispositional trust. Mayer et al. (1995) include a very similar construct “propensity to trust” in their trust model. These constructs have their roots in personality psychology (e.g. Rotter, 1967) and recognize that people develop, over the course of their lives, generalized expectations about the trustworthiness of other people. Rotter’s widely used Trust Index focuses on a generalized trust in others, something akin to a personality trait that a person would presumably show in different situations. Dispositional trust is proposed to be a stable within-party factor that will affect the likelihood a person will trust other individuals or groups of individuals (Mayer et al., 1995). Thus Internet vendors cannot influence dispositional trust by applying certain trust building strategies or measures. However, indicators for dispositional trust should be included in empirical studies either as moderating variable or as antecedent of trusting beliefs, intentions and behaviours.
3. Review of empirical studies on trust in e-commerce

The following section provides an overview of the results of 11 empirical studies on trust in the field of electronic commerce ranging from the year 1999 to the year 2002. In order to increase the comparability of the examined studies, a selection procedure had to be defined. To be included in the review the studies had to meet the following selection criteria: (1) focus on business-to-consumer e-commerce, because business-to-business relationships significantly differ from relationships between consumers and on-line companies, e.g. when it comes to decision making and negotiations, (2) use of primary data directly acquired from consumers, to further reduce bias-effects, (3) theory-guided research, because empirical research has to be guided by theoretical frameworks, clearly defined constructs and validated scales, (4) trust being investigated as a dependent and/or independent variable in the research model, to distinguish between trust, its antecedents and outcomes, (5) understandable operationalization of trust, and, (6) a quantitative research approach, to facilitate a comparison and critical assessment. Because the willingness to buy on-line and actual risk taking depend both on the consumer’s trust in a specific party (Web merchant) and in the Internet as transaction medium, the review includes studies that investigate different dimensions of trust.

Several empirical studies on on-line trust that did not meet the above-mentioned criteria were not included in the overview, primarily because the operationalization of trust was not understandable (e.g. Salam et al., 1998; Laberge and Caird, 2000; Chircu et al., 2000; Krishnamurthy, 2001; Roy et al., 2001; Fogg et al., 2002; Park, 2002; Yoon, 2002). However, for other purposes these studies could of course provide useful insights.

Although all reviewed studies meet the defined selection criteria some of them differ considerably in the profiles of their samples, the applied methodology, and the conceptualization and operationalization of trust. To compare the conceptualizations and findings of the studies they are assigned to the trust constructs proposed in Section 2.2. A comprehensive overview of the reviewed studies is provided in Table 1.

3.1. Context of the studies

Most of the reviewed studies explored consumers’ trust in relation to (particular) on-line merchants or on-line service providers (Jarvenpaa et al., 1999, 2000; Gefen, 2000; Gefen and Straub, 2000; Pavlou and Chellappa, 2001; Koufaris and Hampton-Sosa, 2002; partly also Bhattacherjee, 2002, and Pavlou, 2003; de Ruyter et al., 2001 used offline role-playing scenarios). Two of the 11 investigated papers examined antecedents and/or consequences of consumers’ trust in electronic commerce in a

1 Although an extensive search for prior theory-guided, empirical studies has been carried out, this overview is not claiming to incorporate all possible research results available to date. The studies were collected on the Internet using several search engines, e.g. Google.com and through the available sources of the university’s library, e.g. Science Direct.
<table>
<thead>
<tr>
<th>Study</th>
<th>Context</th>
<th>Sample (usable responses)</th>
<th>Particular theoretical framework</th>
<th>Methodology</th>
<th>Analytic techniques (hypotheses testing)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jarvenpaa et al. (1999, 2000)</td>
<td>Exploring initial trust in an Internet store and cross-cultural investigation, using online book stores and travel sites</td>
<td>184 students (Australia), 198 students (Israel), 115 subjects of an offline panel (Finland)</td>
<td>Exchange theory, balance theory, theories of reasoned action and planned behaviour</td>
<td>Experiential survey approach (Australia and Israel), participants performed four shopping activities at on-line bookstores and on-line travel-sites; offline panel survey (Finland); cross-cultural validation of the study</td>
<td>Factor analyses (structural equation modelling) and regression analyses</td>
</tr>
<tr>
<td>Gefen (2000)</td>
<td>Exploring trust in an e-commerce vendor, using an on-line book-store</td>
<td>217 students (USA)</td>
<td>—</td>
<td>Experiential survey approach, participants performed product search at an on-line bookstore</td>
<td>Confirmatory analysis (structural equation modelling) with LISREL 8 Confirmatory analysis with PLS, post-hoc analysis with PLS</td>
</tr>
<tr>
<td>Gefen and Straub (2000)</td>
<td>Exploring trust in an e-commerce vendor, using an on-line travel agency</td>
<td>161 students (USA)</td>
<td>Technology acceptance model, theory of reasoned action</td>
<td>Experiential survey (free simulation experiment), participants performed search for round trip at an on-line travel agency</td>
<td>ANOVAs (analyses of variance) and MANOVA</td>
</tr>
<tr>
<td>de Ruyter et al. (2001)</td>
<td>Exploring the antecedents of trust, relative advantage and perceived risk in the adoption of e-services</td>
<td>202 participants (Netherlands)</td>
<td>Adoption process theory, signalling theory</td>
<td>Experimental study, participants were presented with offline role-playing scenarios</td>
<td>Multiple linear regression</td>
</tr>
<tr>
<td>Lee and Turban (2001)</td>
<td>Exploring the antecedents of consumer trust in Internet shopping</td>
<td>405 students (China)</td>
<td>—</td>
<td>Survey</td>
<td>Multiple linear regression</td>
</tr>
<tr>
<td>Pavlou and Chellappa (2001)</td>
<td>Exploring the antecedents of trust in electronic commerce transactions</td>
<td>276 students (three studies) (USA)</td>
<td>—</td>
<td>Field study with on-line questionnaire, regular survey, experimental study using manipulated Web-sites</td>
<td>Least-squares multiple regression analysis</td>
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<tr>
<td>Study</td>
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<td>Bhattacherjee (2002)</td>
<td>Developing a new scale for measuring trust and testing it for the antecedents of willingness to transact with an e-commerce company, using a bookstore</td>
<td>147 students, 122 online banking users (USA)</td>
<td>—</td>
<td>Experiential survey after a tour at an online bookstore, on-line survey</td>
<td>Confirmatory factor analyses (structural equation modelling)</td>
</tr>
<tr>
<td>Kim and Prabhakar (2002)</td>
<td>Exploring initial trust in the adoption of online banking</td>
<td>266 Internet users (196 used on-line banking) (USA)</td>
<td>Social network theory</td>
<td>On-line survey</td>
<td>Multiple logistic regression analysis</td>
</tr>
<tr>
<td>Koufaris and Hampton-Sosa (2002)</td>
<td>Exploring the antecedents of initial trust in an online company, using several e-vendors</td>
<td>111 students (USA)</td>
<td>Technology acceptance model, theory of planned behaviour</td>
<td>Experiential survey with on-line questionnaire, participants visited an unfamiliar Web-site and performed a product search</td>
<td>Confirmatory factor analyses (structural equation modelling)</td>
</tr>
<tr>
<td>Pavlou (2002)</td>
<td>Exploring the effect of trust in e-commerce on several factors including consumers’ intention to transact</td>
<td>102 students, 155 Internet users (USA)</td>
<td>Theory of planned behaviour, theory of reasoned action, technology acceptance model</td>
<td>Three exploratory surveys (first on predefined on-line book store, second on self-selected familiar on-line vendor, third on on-line companies in general)</td>
<td>Partial least-squares regression analysis</td>
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</table>
### Investigated trust concepts and results

<table>
<thead>
<tr>
<th>Study</th>
<th>Dispositional trust</th>
<th>System trust</th>
<th>Interpersonal trust</th>
<th>Trusting behaviour</th>
<th>Other variables</th>
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<tr>
<td>Jarvenpaa et al. (1999, 2000)</td>
<td>—</td>
<td>—</td>
<td>Perceived size (IV), perceived reputation (IV), initial trust in Internet store (MeV), perceived risk (MeV)</td>
<td>Willingness to buy (DV)</td>
<td>Attitude toward internet store (MeV)*</td>
</tr>
<tr>
<td>Gefen (2000)</td>
<td>Disposition to trust (IV)</td>
<td>—</td>
<td>Trust in vendor (MeV)</td>
<td>Intended inquiry (DV), intended purchase (DV)</td>
<td>Purchase intention (DV)</td>
</tr>
<tr>
<td>Gefen and Straub (2000)</td>
<td>—</td>
<td>—</td>
<td>Social presence (IV), trust in e-service provider (MeV)</td>
<td>Purchase intention (DV)</td>
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<tr>
<td>de Ruyter et al. (2001)</td>
<td>—</td>
<td>—</td>
<td>Organizational reputation (IV), perceived risk (IV), trust in the e-service (DV)</td>
<td>—</td>
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</tr>
<tr>
<td>Lee and Turban (2001)</td>
<td>Individual trust propensity (MoV)</td>
<td>Trustworthiness of Internet shopping medium (IV); contextual factors (IV) partly n.s.; consumer trust in Internet shopping (DV)</td>
<td>Trustworthiness of Internet merchant (IV) partly n.s.</td>
<td>—</td>
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<tr>
<td>Pavlou and Chellappa (2001)</td>
<td>—</td>
<td>—</td>
<td>Perceived privacy (IV), perceived security (IV), satisfaction with past outcomes in general (CV)</td>
<td>Perceived privacy (IV), perceived security (IV), trust in the store (DV), reputation (CV)</td>
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### Table 1 (continued)
Investigated trust concepts and results

<table>
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<td>Trusting belief</td>
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<td>Bhattacherjee (2002)</td>
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<td>Trust in the on-line firm (MeV)</td>
<td>Willingness to transact (DV)</td>
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<td>Trust in the bank (IV) n.s.</td>
<td>—</td>
<td>Use of Internet banking (DV)</td>
</tr>
<tr>
<td>Kim and Prabhakar (2002)</td>
<td>Propensity to trust (IV)</td>
<td>Initial trust in the electronic channel (MeV), structural assurances (IV)</td>
<td>—</td>
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<tr>
<td>Koufaris and Hampton-Sosa (2002)</td>
<td>Propensity to trust (CV) n.s.</td>
<td>—</td>
<td>Perceived usefulness (MeV), perceived ease of use (MeV), initial trust in the vendor (MeV)</td>
<td>Intention to return (DV), intention to purchase (DV)</td>
<td>—</td>
</tr>
<tr>
<td>Pavlou (2003)</td>
<td>—</td>
<td>Satisfaction with past outcomes in general (CV)</td>
<td>Trust in e-retailer (IV), perceived usefulness (MeV), perceived ease of use (MeV), perceived risk (MeV), perceived reputation (CV)</td>
<td>Intention to transact (DV, MeV)</td>
<td>Actual transaction (DV)</td>
</tr>
</tbody>
</table>

IV—Independent variable, DV—Dependent variable, MeV—Mediating variable, MoV—Moderating variable, CV—Control variable.

All results included in this table were reportedly significant, except were stated “n.s.” (not significant).

*Jarvenpaa et al. included also the control variables frequency of Internet usage, frequency of Internet shopping, shopping enjoyment in general, attitude towards computers, past direct shopping experiences, Web-shopping risk perception, however the results concerning these variables were only partially included in their papers. Therefore they are not included in Table 1.
rather general form, not linking the survey to a particular Web merchant, i.e. system trust (Lee and Turban, 2001; Kim and Prabhakar, 2003). Two of the studies were conducted in the context of on-line banking (Kim and Prabhakar, 2002; Bhattacherjee, 2002, for the confirmatory study only).

3.2. Samples and methodologies

The majority of the reviewed studies used convenience samples consisting of undergraduate and/or MBA students who were administered questionnaires by the researchers or pointed to on-line questionnaire forms (Jarvenpaa et al., 2000; Gefen, 2000; Gefen and Straub, 2000; Lee and Turban, 2001; Pavlou and Chellappa, 2001; Koufaris and Hampton-Sosa, 2002). Three studies included both students, for a first exploratory study, and “ordinary” Internet users/consumers, for a confirmatory study, in their samples (Jarvenpaa et al., 1999; Bhattacherjee, 2002; Pavlou, 2002). Only one of the studies, Kim and Prabhakar (2002), exclusively used a sample of “ordinary” Internet users/consumers for their purpose. In one study (de Ruyter et al., 2001), subjects were referred to only as “participants” making it impossible to determine further characteristics.

Concerning the applied methodologies, the approaches used by the researchers can be assigned to three categories. In the majority of studies an experiential survey approach was employed, i.e. participants were asked to navigate to a specified or self-selected Internet company and had to perform several predefined tasks (e.g. to surf through the Web-page, perform a product search) and afterwards report on their impressions by filling out a questionnaire (Jarvenpaa et al., 2000; Gefen, 2000; Gefen and Straub, 2000, implemented a free simulation experiment with treatments freely chosen by the subjects; Bhattacherjee, 2002, for the pilot study only; Koufaris and Hampton-Sosa, 2002; Pavlou, 2002). A second group of studies applied a “basic” survey approach, i.e. subjects were administered a questionnaire or they were pointed to an on-line-questionnaire form without previously visiting any e-commerce Web-site (Jarvenpaa et al., 1999, for Finnish participants; Lee and Turban, 2001; Bhattacherjee, 2002, confirmatory study only; Kim and Prabhakar, 2002). The third category represents two studies that do not fit into either one of the mentioned categories. Pavlou and Chellappa (2001) used a mix of two surveys and one experimental study, whereas de Ruyter et al. (2001) conducted an experiment using offline role-playing scenarios.

3.3. Conceptualization and findings

Taking a closer look at the conceptualizations of the 11 studies revealed that nine of them were conducted using research models including trust as well as its assumed antecedents and outcomes (Jarvenpaa et al., 1999, 2000; Gefen, 2000; Gefen and Straub, 2000; Pavlou and Chellappa, 2001; Koufaris and Hampton-Sosa, 2002; Bhattacherjee, 2002; Kim and Prabhakar, 2002; and Pavlou, 2003, who in fact used a model in which he tested only consequences of trust, but also controlled for two variables being antecedents of trust). The residual two studies utilized research
models exclusively focused on the antecedents of trust (de Ruyter et al., 2001; Lee and Turban, 2001).

Jarvenpaa et al. (1999, 2000) developed a causal research model assuming that the two independent variables perceived size of an Internet store and its perceived reputation are positively related to consumers’ initial trust in the Internet store. They posited that trust in the store would have a direct positive effect on the attitude toward the store and an indirect positive effect on attitude through the mediating variable perceived risk associated with buying from that store. Additionally, they assumed both latter constructs would have a direct effect on the consumers’ willingness to buy from the Internet store. Applying the trust constructs of Section 2.2, it can be seen that Jarvenpaa et al.’s research model focuses exclusively on interpersonal trust. More precisely we can assign consumers’ willingness to buy from the Internet store to the sub-construct of trusting intention, whereas the main variable “trust in store” reflects trusting beliefs related to characteristics of trustworthiness of the Internet merchant. Using structural equation modelling techniques, Jarvenpaa et al. (2000) found that their model provided a good fit to the data from both the online travel-sites and on-line bookstores. All path coefficients were significant at the 0.05 level except for the path between perceived size and trust in the bookstore sites. Perceived reputation had a much stronger effect on trust than perceived size. In a cross-cultural validation of the same setting in Israel and a shortened setting in Finland (Jarvenpaa et al., 1999) the results of the original study were confirmed. In contrast to hypothesized cultural influences (based on Hofstede’s culture dimensions) no strong cultural effects were found regarding the antecedents of trust.

Gefen (2000) developed a model expecting familiarity with an e-commerce vendor and an individual’s disposition to trust to be predictors of trust in an e-commerce vendor. Gefen furthermore assumed that familiarity and trust would affect the consumer’s intention to inquire for a product and the intention to purchase a product from the e-commerce vendor and that familiarity would have an additional positive direct effect on inquiry and purchase. Trust in the e-commerce vendor is conceptualized as trusting belief, intentions to inquire for a product from the vendor and to purchase a product represent trusting intentions. Gefen tested the hypotheses using LISREL 8 whereby all hypothesized relationships were supported, i.e. trust was indeed affected by familiarity, although to a much higher degree it was enhanced by the individual’s disposition to trust. Intended purchase and intended inquiry were also both significantly affected by trust in the e-commerce vendor.

Gefen and Straub (2000) generated a research model in which they expected the predictor variable social presence on the Web-site to affect trust in an e-service provider. They further assumed that trust in the e-service provider on the other hand would be positively related to the consumers’ purchase intention. In addition they hypothesized that perceived usefulness of the Web-site would affect the purchase intention and that the perceived usefulness would be on its part affected by perceived ease of use of the Web-site and social presence on the Web-site.² Trust in the

²Perceived ease of use and perceived usefulness are variables of the Technology Acceptance Model, developed by Davis. For further details we refer the reader to Davis (1989).
e-service provider is conceptualized as trusting belief, the consumers’ purchase intention can be categorized as trusting intentions. Data from the study, analysed using confirmatory factor analysis with partial least squares, confirmed all hypotheses related to trust, i.e. social presence affected consumers’ trust in the electronic service provider and trust on the other hand positively affected the purchase intention.

In their study de Ruyter et al. (2001) investigated the impact of organizational reputation, relative advantage and perceived risk on the three dependent variables trust in the service, perceived quality and behavioural intentions of customers towards adopting e-services. Aside from these main effects de Ruyter et al. also hypothesized several two- and three-way interactions between the predictors and each of the dependent variables. Trust is conceptualized as trusting belief. The intention to use an e-service could be categorized as trusting intention; however, the researchers do not investigate the influence of trust(ing beliefs) on (trusting) intentions. Running variance analyses the researchers found that the main effects on all three dependent variables were significant, except the assumed effect of relative advantage on trust. In fact a high organizational reputation significantly increased the consumers’ trust in the e-service, while a higher amount of perceived risk toward the e-service decreased the level of trust.

Lee and Turban (2001) presented a comprehensive model including four hypothesized antecedent dimensions of trust: firstly the trustworthiness of the Internet merchant, secondly the trustworthiness of the Internet shopping medium, composed of technical competence of the medium, reliability of the medium and medium understanding of the consumer, thirdly contextual factors, such as effectiveness of third party certification and effectiveness of the security infrastructure and fourthly, other factors, not fitting the other three dimensions but possibly having an effect on trust. The dependent variable in Lee and Turban’s model is consumers’ trust in Internet shopping. Additionally, consumers’ propensity to trust (dispositional trust) is included as moderating variable that supposedly moderates all relationships between trust and its antecedents. The variables trustworthiness of the Internet shopping medium and contextual factors are indicators for system trust. Consumer trust in Internet shopping in this study is defined as the willingness of a consumer to be vulnerable to the actions of an Internet merchant in an Internet shopping transaction and thus has to be categorized as trusting intention, which is influenced—among other factors—by the assessment of the trustworthiness of the Internet merchant, representing trusting beliefs. Lee and Turban tested their hypotheses using multiple linear regression. The results confirmed the moderating effect of trust propensity on perceived integrity. The results further indicated a strong direct effect of perceived integrity (one element of trustworthiness of the Internet merchant) on consumer trust toward Internet shopping.

Pavlou and Chellappa (2001) developed a research model to investigate on how perceived privacy and perceived security promote trust in e-commerce transactions. The constructs perceived privacy and perceived security are situation-specific. Both can be directed to some extent toward a particular Internet company, i.e. their
privacy policy or used methods for encryption, as well as to the Internet shopping medium in general, i.e. access of unwanted, criminal third parties. In other words, these two variables include notions both of impersonal trust and interpersonal trust. The hypothesized relationships among perceived privacy and perceived security and the dependent variable consumers’ trust in the transaction with the on-line company (conceptualized as trusting beliefs) received empirical support. The results of regression analyses indicate that the influence of perceived security on trust was highly significant, whereas the effect of perceived privacy was marginally significant. The effect of perceived privacy was substantially reduced when other antecedents of trust (reputation and satisfaction with past outcomes) were controlled for.

Bhattacherjee’s (2002) study aims primarily at the theoretical conceptualization and empirical validation of a new scale to measure individual trust in on-line firms. His trust model postulates that familiarity with the electronic company is a predictor for the consumer’s trust in the on-line firm and for the consumer’s willingness to transact with the on-line firm and secondly, that the individual’s trust in the on-line company is directly related to her/his willingness to transact with that company. To put it in the proposed trust typology, trust is conceptualized as trusting belief that affects trusting intention, which is expressed by the user’s willingness to engage in subsequent transaction with the on-line firm. Bhattacherjee tested the hypotheses via structural equation modelling using EQS. Both trust and familiarity were significant predictors of the consumers’ willingness to transact and furthermore familiarity was a significant predictor of trust. However, the results left a large proportion of variance unexplained in both dependent variables, suggesting that other predictors should be included in the research model, too.

Kim and Prabhakar (2002) placed their research in the field of Internet banking. They hypothesized the consumers’ propensity to trust, structural assurances (e.g. guarantees) and word of mouth referrals (both relational content and tie strength) to be antecedents of consumers’ initial trust in the electronic channel as banking medium. On the other hand, Kim and Prabhakar assume that consumers’ initial trust in the e-channel as banking medium is positively related to the dependent variable of consumers’ adoption of Internet banking. Additionally, they postulate consumers’ trust in the bank itself to be a second influencing factor on consumers’ adoption of Internet banking. Structural assurances and trust in the electronic channel as banking medium are indicators of system trust, whereas trust in the bank is conceptualized as a trusting belief. The actual adoption of Internet banking can be interpreted as trust-related behaviour. Kim and Prabhakar performed multiple logistic regression analysis to test their hypotheses. The results confirmed their hypotheses for the effect of propensity to trust, structural assurances and word of mouth referrals (relational content significant only) on the dependent variable initial trust in the electronic channel as banking medium. The expected positive relationship between initial trust in the e-channel and the use of Internet banking also was confirmed. However, consumers’ trust in the bank was found to have no significant impact on the use of Internet banking, contrary to the researchers’ expectations.
The multi-stage research model developed by Koufaris and Hampton-Sosa (2002) hypothesized the variables perceived usefulness and perceived ease of use of the Web-site (both constructs of the technology acceptance model developed by Davis, 1989) to be predictors for consumers’ trust in the on-line company at the first contact with its Web-site. Consumers’ trust in a specific on-line company is conceptualized as trusting belief and is postulated to be an antecedent both of consumers’ intention to return to the on-line company and consumers’ intention to purchase from the on-line company, variables that can be categorized as forms of trusting intentions. Koufaris and Hampton-Sosa tested the fit of their research model using structural equation modelling techniques. They found that trust was significantly affected by perceived usefulness and perceived ease of use and that on the other hand trust itself significantly affected consumers’ intention to return and to purchase from the on-line company. Surprisingly, the construct propensity to trust which was included as a control variable did not have a significant effect on trusting beliefs.

Pavlou (2003) integrates trust and risk as well as variables of the technology acceptance model into a research model that places all variables under the nomological structure of the theory of reasoned action (Ajzen, 1991). He posits that trust in the e-commerce retailer affects consumers’ perceived risk of the transaction, the perceived ease of use and usefulness of the Web-site as well as the consumers’ intention to transact. In addition, Pavlou expected a positive correlation between transaction intention and actual transaction. The control variables reputation of the retailer, satisfaction with past Internet transactions and Web-shopping frequency are included in the model as well, assuming that they also have an effect on trust in the on-line company. The variable satisfaction with past outcomes of Internet transactions can be interpreted as an indicator of system trust. Trust is conceptualized as (trusting) belief that the Web retailer is trustworthy. The consumers’ intention to transact can be interpreted as indicator of interpersonal trust as well, representing a form of trusting intention. In order to examine the proposed hypotheses Pavlou employed PLS. The results confirmed the hypothesized effects of trust in the electronic retailer on perceived risk, perceived usefulness and perceived ease of use as well as on the consumers’ intention to transact with the retailer. In a confirmatory study, the hypothesized effect of transaction intention on the actual transaction was supported. The control variables reputation and satisfaction were found to have a significant effect on the consumer’s intention to transact.

3.4. Operationalization of trust constructs

In all of the reviewed studies questionnaires were used to collect the required data, in most cases including demographic characteristics. Trust items were usually measured on seven-point Likert scales using “strongly agree” and “strongly disagree” as anchors. The research instruments were generated by reusing and adapting items previously developed and/or by creating new items based on the relevant literature. Researchers used scales deployed in the context of marketing
Regarding the utilized instruments’ discriminant and convergent validities were checked for by applying different forms of factor analyses with rotations (e.g. VARIMAX or EQUAMAX). In all studies the reliability of the constructs was assessed by computing Cronbach’s alpha. For a more detailed description of the operationalizations of trust, trust propensity and trust-relevant characteristics of the trustee see Table 2.

3.5. Limitations

Limitations of the reviewed studies concerning the conceptualization of trust already were discussed above. Other limitations that usually are mentioned by the researchers themselves relate to population and sampling decisions. Six of the reviewed studies used convenience samples made up of students, a large number of them also being Internet users and often Internet shoppers. As students are not representative of the entire on-line consumer population the results may not be generalizable to other types of customers. It seems imperative for future trust research that representative samples are used more frequently, especially for confirmatory studies. As is true of most social science research, the chosen sample size very often primarily depends on the amount of money available (Randall and Gibson, 1990). More attention to the purpose of the research, sampling design, and intended data analytic procedures would be desirable. Small sample sizes can cause severe problems concerning the adequacy and applicability of certain analytic techniques, e.g. structural equation modelling.3

Due to practical constraints (e.g. sample size) researchers often were not able to investigate a large set of variables. The studies had to focus on a rather small number of variables, thus excluding other potential determinants of on-line trust; e.g. Koufaris and Hampton-Sosa (2002) pointed to prior experience with the Web and trust in on-line shopping in general, variables that also were supposed to influence trust in the Internet merchant, but were not controlled in the study. Similar to reduced external validity because of sampling problems, a number of researchers identified their applied methodologies as sources of limited generalizability. Several studies used well-known on-line companies (e.g. Amazon.com) to test their trust-models (e.g. Gefen, 2000). The findings could be different both for less well-known Internet merchants and other products or services. De Ruyter et al. (2001) used an experimental laboratory setting with offline role-playing scenarios not providing real-life stimuli. Another methodological problem that occurred was that in all but

3 For effective structural equation modelling, a total sample size of at least 200 subjects is recommended as well as a minimum of three manifest variables for each latent variable (e.g. University of Texas’ Statistical Services FAQ, http://www.utexas.edu/cc/faqs/stat/general/gen6.html).
<table>
<thead>
<tr>
<th>Study</th>
<th>Operationalization of trust (final items)</th>
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</thead>
<tbody>
<tr>
<td>Jarvenpaa et al. (1999, 2000)</td>
<td>Trust in Internet store: This store is trustworthy. This store wants to be known as one who keeps promises and commitments. I trust this store keeps my best interest in mind.</td>
</tr>
<tr>
<td>Gefen (2000)</td>
<td>Trust in e-vendor: Even if not monitored, I'd trust Amazon.com to do the job right. I trust Amazon.com. Propensity to trust: I generally trust other people. I tend to count upon other people. I generally have faith in humanity. I generally trust other people unless the give me reason not to.</td>
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<tr>
<td>De Ruyter et al. (2001)</td>
<td>Trust: I can trust this service. I can trust that possible problems will be solved well. I can trust this service less than other services.</td>
</tr>
<tr>
<td>Lee and Turban (2001)</td>
<td>Trust in Internet shopping: Internet shopping is unreliable. Internet shopping cannot be trusted, there are just too many uncertainties. In general, I cannot rely on Internet vendors to keep the promises that they make. [Supposed characteristics of the trustee:] Perceived integrity: Internet merchants are honest with their customers. Internet merchants act sincerely in dealing with customers. Perceived ability: Internet merchants have the ability to handle sales transactions on the Internet. Internet merchants have sufficient expertise and resources to do business on the Internet. Internet merchants have adequate knowledge to manage their business on the Internet. Trust propensity: It is easy for me to trust a person/thing. My tendency to trust a person/thing is high. I tend to trust a person/thing, even though I have little knowledge of it. Trusting someone or something is not difficult (all items based on Cheung and Lee, 2000).</td>
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<tr>
<td>Pavlou and Chellappa (2001)</td>
<td>Trust in store: I believe that my transaction with this store is likely to be safe. My transaction with this store is likely to be reliable. This store will promptly inform me if any problems occur with my transaction.</td>
</tr>
<tr>
<td>Bhattacherjee (2002)</td>
<td>Overall trust: Overall, Amazon is trustworthy. [Supposed characteristics of the trustee:] Ability: Amazon has the skills and expertise to perform transactions in an expected manner. Amazon has access to the information needed to handle transactions appropriately. Integrity: Amazon is fair in its conduct of customer transactions. Amazon is fair in its customer service policies following a transaction. Benevolence: Amazon is open and receptive to customer needs. Amazon makes good-faith efforts to address most customer concerns.</td>
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<tr>
<td>Kim and Prabhakar (2002)</td>
<td>Trust in bank: The bank will behave according to its commitments. The bank will keep the spirit of its agreement with me. The commitments made to me will be honored by the bank. The bank may use confidential information about me to its own advantage. The bank may take advantage of changed situations (e.g. Fed’s interest rate change). The bank may take advantage of my weakness/problems. The bank may interpret ambiguous information in its own favor. Initial trust in e-channel: When I first considered using Internet banking: I expected the Internet to perform as well as other technologies such as the telephone. I expected the Internet to be available for use without interruption of service. I was very confident that the Internet would perform reliably as I expected it to perform. I thought that the Internet has the capability to provide a desired level of service in adverse or hostile conditions (e.g., natural disasters). I believed that the Internet...</td>
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<td>Study</td>
<td>Operationalization of trust (final items)</td>
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<td>Koufaris and Hampton-Sosa (2002)</td>
<td>banking system resists attacks that can compromise the bank’s data and services. Trust propensity: One should be very cautious when using new technologies. If possible, it is best to avoid using new technologies for financial transactions. In dealing with a new business, one is better off being cautious until it has provided evidence that it is trustworthy. Trust in vendor: This company is trustworthy. I trust this company keeps my best interest in mind. This company wants to be known as one who keeps promises and commitments. This company will not always be honest with me (reversed). I believe in the information that this vendor provides me. This company is genuinely concerned about me (items partly based on Jarvenpaa et al., 2000). Trust propensity: It is easy for me to trust a person/thing. My tendency to trust a person/thing is high. I tend to trust a person/thing, even though I have little knowledge of it. Trusting someone or something is not difficult (based on Cheung and Lee, 2000).</td>
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<tr>
<td>Pavlou (2003)</td>
<td>Trust in retailer: This Web retailer is trustworthy. This Web retailer is known as one that keeps promises and commitments. I trust this Web retailer keeps my best interests in mind (based on Jarvenpaa et al., 2000).</td>
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two studies (Kim and Prabhakar, 2002, who explored trust in Internet banking; Pavlou, 2003, in the second, confirmatory survey) only trusting beliefs and intentions were measured, i.e. participants were not required or even not allowed to actually perform a shopping transaction, most likely because of limited research budgets. Future research more often should include other trust-related behaviours apart from Internet banking.

4. Discussion

The findings of all empirical studies emphasize the importance of trust in e-commerce. As a relatively young field, research on trust in and acceptance of electronic commerce is still very much in the stage of borrowing different constructs from other theories and developing eclectic research models to test selected hypothesized relationships. The “confusing potpourri” of trust definitions is partly due to the fact that trust is always situation-specific (Blomqvist, 1997). Testing trust hypotheses before it is clearly defined what the term trust means causes problems, though. So it does not seem adequate to use the definition of Mayer et al. (1995), which is personal in nature, in a study that focuses on system trust and analyses the Internet as an object of trust (e.g. Kim and Prabhakar, 2002). Moreover, the resulting research is often misinterpreted if the mental imagery conveyed by the used concepts is not clarified. “Pursuing empirical work before adequately defining concepts is like putting the cart before the horse” (McKnight and Chervany, 2002, p. 36). Respondents may easily ascribe various meanings and contents to trust if the researcher does not specify his conceptualization of trust (see also Gefen, 2000; Gefen and Straub, 2000).

In a recent paper Shankar et al. (2002) also have emphasized the lack of clear distinctions between the underlying dimensions and antecedents of on-line trust. They noticed that the investigated trust constructs are blurred and not well differentiated, and elements and determinants of on-line trust often are used interchangeably. Taking a closer look at the studies reviewed in this paper reveals that Jarvenpaa et al. (2000) for instance use the terms “consumer trust” and “trustworthiness of the store” interchangeably in their paper, and thus do not distinguish between trust itself and factors that cause trusting beliefs and intentions, making it difficult or even impossible to investigate the relationship between trust and the factors that contribute to it. Kim and Prabhakar (2002) use different definitions of trust in their study, not distinguishing between trust as a “confident expectation”, a “willingness to be vulnerable” and as a “general positive attitude towards another social entity”. Another reason why it is so difficult to summarize and compare the results of different studies is that most of the studies focus on selected aspects of the relationship between the on-line consumer and the Internet merchant, relying on limited models and ignoring some important factors that are relevant for trust-related behaviours to emerge. For instance, Jarvenpaa et al. (1999) do neither include indicators for dispositional trust nor system trust in their research model, although they are focusing on the
consumer’s initial development of trust in an Internet store. Similarly, Gefen and Straub (2000), de Ruyter et al. (2001), Pavlou and Chellappa (2001) or Bhattacharjee (2002) tested rather restricted models. Many studies are conducted as individual projects without an overall program specifying research priorities, sequencing and interrelationships. They tend to be isolated in that they address specific questions with specific methodologies, and are content to offer exploratory findings.

The concept of trust refers to a relatively broad set of meanings which are explicitly or implicitly included in the reviewed empirical studies. In most empirical studies trust has been conceptualized in relatively narrow ways, because it seems impossible to empirically test all potential relationships between trust and its antecedents and consequences in a single study. Therefore, each study measures one (or a few) particular aspect(s) of trust. However, to research a complex and multi-dimensional phenomenon such as trust effectively it is necessary to understand all the different dimensions, because otherwise, one study may unintentionally overlap another study (McKnight et al., 1998). To make sense of the extant literature on online trust ways of categorizing and relating different types of empirical and theoretical trust constructs are needed. The proposed set of trust constructs reflects both institutional phenomena (system trust) and personal and interpersonal forms of trust (dispositional trust, trusting beliefs, trusting intentions and trust-related behaviours), thus facilitating a multi-level and multi-dimensional analysis of trust-related research problems. We are not suggesting that every study should try to cover all types of trust—rather, a study should acknowledge the various types of trust that exist and specify the subset of trust that the study will employ (see also McKnight and Chervany, 1996).

The most frequently investigated trust construct in the reviewed empirical studies are trusting beliefs about trust-relevant characteristics of the Internet merchant (e.g. in Jarvenpaa et al., 1999, 2000; Gefen and Straub, 2000; Pavlou and Chellappa, 2001; Koufaris and Hampton-Sosa, 2002; Pavlou, 2002). If researchers analyse potential outcomes or consequences of trust in on-line shops, they usually focus on the willingness of the consumer to buy on-line. It can be noticed that such trusting intentions and their antecedents are examined more often (in Jarvenpaa et al., 1999, 2000; Gefen, 2000; Gefen and Straub, 2000; Bhattacharjee, 2002; Koufaris and Hampton-Sosa, 2002), whereas trust-related behaviours only are investigated in two studies (in Kim and Prabhakar, 2002 and Pavlou, 2002). It is important to keep in mind that intentions do not automatically imply behaviour. Therefore it can not be concluded that consumers who express their intention to purchase on-line will really take the risk in a concrete buying process. What also has to be taken into account is that in their decision process to buy on-line consumers usually consider both the characteristics of the related technological infrastructure (due to system-dependent uncertainty) and the characteristics of the Web retailer (due to transaction-specific uncertainty). Thus, even if a study focuses on the Web retailer as the major object of trust the role of trust in the e-commerce channel must not be neglected. The major findings of Kim’s and Prabhakar’s (2002) study in fact suggest that only Internet users who have trust in the electronic channel as a transaction medium will adopt
applications of Internet banking. As trust-related behaviour as a dependent variable was only investigated in one other study (Pavlou, 2002, the results showing a significant effect of system trust (operationalized as satisfaction with past Web transactions) on trusting beliefs), the findings of Kim and Prabhakar deserve special attention, indicating that system trust could be a necessary (but not sufficient) condition for the acceptance of e-commerce.

Another important question that has only been sparsely addressed in the research of on-line trust is the fact that trust is not a static but a dynamic phenomenon. Different phases of trust can be distinguished (Rousseau et al., 1998): the phase of trust building, where trust is formed; the phase of stabilizing trust, where trust already exists; and the phase of dissolution, where trust declines. Only in three of the reviewed studies the authors explicitly point to the phase of trust they are investigating. Jarvenpaa et al. (1999) and Koufaris and Hampton-Sosa (2002) focus on initial trust in the on-line company while Kim and Prabhakar (2002) examine initial trust in the e-commerce channel. In two other studies (Gefen, 2000 and Bhattacharjee, 2002) the inclusion of the variable “familiarity with the Web retailer” indicates that the authors are investigating the phase of stabilizing trust, whereas in six other studies no consideration of phase specific trust can be found. In Jarvenpaa et al. (2000) the phase of trust investigated was not specified, even though conceptualization and methodology are the same as in Jarvenpaa et al. (1999).

5. Managerial implications

The situation in which on-line transactions take place requires that Internet companies focus on measures and policies to build and maintain consumer trust. Accordingly, several managerial implications were proposed in the reviewed studies. The majority of authors recommend measures to improve facets of interpersonal trust (trusting beliefs and trusting intentions) and to reduce transaction-specific uncertainties. Most of these recommendations relate to the design and functionality of the merchant’s Web-site and the information provided there. For example, Jarvenpaa et al. (1999, 2000) advised the Internet store to influence the perceived size by stating the number of staff or physical outlets (“brick-and-click” companies), Gefen (2000) and similarly de Ruyter et al. (2001) argued for an “About us” section, presenting the company, its mission, identity and its e-commerce procedures, or Gefen and Straub (2000) emphasized the importance of more “social presence” on the Web-site implementing virtual communities, interactive functions to enable real-time communication with sales-representatives, etc. Other implications suggest that independent consumer testimonials (Jarvenpaa et al. 1999, 2000; Kim and Prabhakar, 2002) or quality seals from trusted third parties and links with credible sites (de Ruyter et al., 2001; Pavlou and Chellappa, 2001) can boost consumers’ trust toward the merchant. Furthermore, Koufaris and Hampton-Sosa (2002) and partly Lee and Turban (2001) stress the importance of an easy to use (i.e. usability and design aspects) and useful Web-site, for instance by including product reviews and
recommendations. To enhance Web-site awareness and perceived reputation, Gefen (2000), de Ruyter et al. (2001) and Lee and Turban (2001) call for regular advertising and marketing campaigns in various communication channels, on-line and off-line.

Beyond that, the importance of providing and presenting warranty policies was recognized by many authors as an instrument to reduce both transaction-specific and system-specific uncertainty. Web merchants should devote attention to product warranty policies, return and refund policies, privacy policies, credit card loss-assurance policies, and security policies, because these measures can enhance both system and transactional trust (Jarvenpaa et al., 1999, 2000; de Ruyter et al., 2001; Lee and Turban, 2001; Pavlou and Chellappa, 2001; Kim and Prabhakar, 2002).

The analysis of different trust constructs presented in this paper implies that trust is a complex and dynamic phenomenon that cannot simply be “produced” by applying adequate instruments. Trusting beliefs, intentions and trust-related behaviours result from a delicate, situational interplay of different factors. Several of these factors—person-specific (e.g. dispositional trust that influences trusting beliefs, intentions and behaviours) and contextual factors (such as technology and legal norms related to e-commerce that affect system trust)—cannot be controlled by the on-line retailer. The complexity of the relationships between trust, its antecedents and consequents might be the cause that the majority of recommendations for trust building measures in the reviewed studies is based on intuition of the authors and not on significant research findings.

6. Implications for future research

Drawing from various items covered in the review and some additional evidence, we finally present some implications for future research. The analysis of different trust concepts has shown that on-line transactions involve trust not only between the consumer and the Internet merchant, but also between the consumer and the e-commerce system through which the transactions are executed (see also Lee and Turban, 2001). As argued in this paper, it is important to differentiate between system-dependent and transaction-specific uncertainty on the one hand, and impersonal and interpersonal forms of trust on the other. However, these two basic forms of uncertainty include a number of different events that can cause negative effects for the consumer. System-dependent uncertainty comprises events such as theft of credit card information or stealing of personal information by hackers. Negative consequences of transaction-specific uncertainty can result, e.g. from product misrepresentation, false identity information, disclosure of private consumer information and misleading advertising (Pavlou, 2002). Examination of more detailed facets of uncertainty or perceived risk and the potentially different relevance of trust could be a promising area for upcoming research.

Another avenue for future research is the relationship between the characteristics of the transaction object and trust. Different positions of a product in the
“information economic triangle” of search, experience and credence qualities\textsuperscript{4} have the effect that consumers tend to use different strategies in order to reduce uncertainty in their buying decision (Weiber and Adler, 1995a). Trust either can complement or (partly) replace other strategies to absorb uncertainty in buying processes (Grabner-Krätzer, 2002b). When the direct search for information is difficult, both information substitutes, such as brand names and reputation, and trust gain relevance. The assumption that trust might be more important, when transaction objects of e-commerce are characterized primarily by experience and/or credence qualities (e.g. booking a long-distance holiday) and transaction-specific risk is high and less important in buying processes dominated by search qualities (e.g. purchasing a book) and low transaction-specific risk, should be explored in future research.

Although well-accepted theories like Ajzen’s theory of planned behaviour (e.g. Ajzen, 1991) suggest a positive relationship between intentions and actual behaviour, situational aspects may interfere. To investigate trust-related behaviour as a consequent of trust it has to be measured in terms of actual behaviour, not willingness to engage in behaviour (Mayer et al., 1995). As the majority of the reviewed studies tested only trusting intentions, additional research should address this shortcoming.

Cross-cultural effects on consumers’ trust may prove to be another fruitful topic for future research. Exploratory results on cross-cultural trust in an Internet store (Jarvenpaa et al., 1999) showed no significant differences; however, many authors, including the researchers who conducted that special study, argue that there may be a relationship between trust and culture which needs to be further investigated (Gefen, 2000; Lee and Turban, 2001; Shankar et al., 2002). Lee and Turban (2001) also assume that national culture affects trust indirectly through the individual’s propensity to trust, providing an additional starting point for future research.

From a methodological viewpoint, more studies that use different methodologies are needed (Pavlou, 2002; Shankar et al., 2002). Studies that use a combination of methodologies can potentially explore more advanced facets of on-line trust. An interesting way to broaden the methodological base is the combination or integration of qualitative and quantitative empirical research. Both qualitative and quantitative research methods have important contributions to make to the field. Quantitative methods are most successful at verifying or confirming theories, whereas qualitative methods are particularly valuable for researchers concerned with generating new insights and developing new theoretical frameworks (Roberts, 1993).

\textsuperscript{4}The assessment of the qualities of a particular purchase can be based on three different types of qualities (Darby and Karni, 1973): search qualities, experience qualities and credence qualities. Search qualities are those that can easily be ascertained in the search process prior to purchase (e.g. the price of a product or its colour or shape). Experience qualities are those that can be discovered only after purchase as the product is used (e.g. the taste of a can of tuna fish, the functionality of a word processing program or the durability of a dishwasher). Credence qualities are those that cannot be evaluated in normal use, either because the buyer does not have the adequate evaluation know-how or because the assessment would be too expensive for him. Examples for credence qualities are product attributes concerning a special origin or production process (e.g. biologically grown) or effects of a product that are difficult to prove.
Qualitative research methods such as individual depth interviews and focus groups can be used as an adequate means to explore and understand how the on-line consumer perceives and evaluates the risks of commercial on-line transactions as well as to explore potential relationships between trust and trust-related constructs. The (additional) use of qualitative research in the design, data collection, and analysis stages of survey research as well as in experimental designs can considerably benefit quantitative research methods.

In order to take into account the dynamic nature of trust, longitudinal studies are required with a focus on the relationship between the on-line consumer and the Internet merchant rather than only focusing on singular, selective transactions. It would be challenging in future research to study if and how the effects of different strategies and measures to enhance trust (e.g. Shankar et al., 2002; Grabner-Kräuter, 2002a) depend on the particular phase of the relationship. With an extant “offline relationship” between buyer and seller the Internet merchant can try to transfer existing trust to virtual markets. Thus the focus is on stabilizing on-line trust, whereas pure-play on-line retailers, in a “newcomer-situation”, have to compensate for their lack of good reputation by investing in trust developing measures and signalling activities. Paying attention to different phases of trust also has to be reflected in population and sampling decisions, e.g. when conducting research on initial trust in e-commerce systems the sample should consist of novice Internet users.

Even though company reputation was discussed and included in some of the reviewed studies (e.g. Jarvenpaa et al., 1999, 2000; de Ruyter et al., 2001; Pavlou, 2002) none of the 11 studies explicitly investigated the interrelationship between on-line trust and branding. Future research on trust in e-commerce should try to fill this gap. Another largely unexplored factor in this context, also linked with branding and with the different phases of trust, is product quality. The interdependencies between the development of consumers’ trust in the Internet merchant and product performance could be a basis for upcoming research (Shankar et al., 2002).

With customer relationship management being adopted by an increasing number of companies questions arise what the interactions between customer relationship initiatives and on-line trust may be (Shankar et al., 2002; partly indicated by Gefen and Straub, 2000 and Park, 2002). An important principle of customer relationship management is to identify the most profitable customers and to primarily focus on satisfying their needs. However, identifying customer profiles on the Internet requires Web mining which could negatively affect consumers’ trust. Empirical research regarding these aspects is practically not existing to date but would be highly significant for practitioners.

Although this paper is knowingly limiting itself to consumer’s trust in e-commerce, on-line trust of course is relevant also for other stakeholders, such as employees and stockholders or suppliers, distributors and in on-line alliances (Shankar et al., 2002). Varying the trustor or trustee may result in different sets of antecedents and consequences of on-line trust, offering additional fields for future research.
7. Summary

In order to make progress in a scientific field, researchers need to be able to form a clear picture of the state of that progress. This paper’s primary objective was to provide an overview of empirical research on trust in electronic commerce to allow cumulative analysis of results. We proposed a set of trust constructs that facilitates a multi-level and multi-dimensional analysis of e-commerce trust and applied these trust concepts to interpret and compare the findings of 11 selected empirical studies. The analysis suggests that the willingness of on-line consumers to use the Internet for economic transactions and even more actual risk taking behaviour require both system trust and transactional trust. Based on the synopsis of empirical findings we made out several promising avenues for future research including the relationship between the properties of the product or service and on-line trust, the relationship between on-line trust and branding, and the relevance of trust in different phases of the relationship between the on-line consumer and the Web merchant.

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