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Chapter 7

WHAT WE REALLY KNOW ABOUT ANTECEDENTS OF TRUST: A CRITICAL REVIEW OF THE EMPIRICAL INFORMATION SYSTEMS LITERATURE ON TRUST

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ABSTRACT

The importance of trust for information systems research has been shown in different domains such as e-commerce, virtual communities, and generally in the adoption of new technologies. Due to its importance, a plethora of studies has identified numerous antecedents helping to build trust. However, a recent study pointed out that measurement model mis-specification questions the reliability of empirical results published in the information systems field. Since trust is supposed to be increasingly in demand due to the increasing complexity technological progress will cause, it is important to investigate the current body of knowledge on trust regarding its reliability to guide future research. To achieve this goal, this chapter is guided by two research questions: a) What different antecedents of trust have been identified in the information systems literature? and b) how reliable are the reported results in terms of measurement model specification? To answer the two research questions, we conducted a literature review among the eight journals of the AIS senior scholars' basket of journals, and reviewed all trust-related articles published between 1995 and 2012. To assessing the reliability of the reported results, we rely on the insights on measurement model specification. Regarding research question 1, we identified a plethora of different antecedents that have been identified for different trust relationships in different contexts in the literature. Regarding research question 2, we found that measurement model mis-specification issues might be a serious issue in information systems trust research. The most common issue we identified is the use of formative indicators in reflective measurement models. As a result, the identified structural relationships between trust and its antecedents in these studies might acutally be insignificant, due to Type I errors. Nevertheless, we identified some recent articles that addressed this problem and used correctly specified measurement models. However,

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other recent articles still suffer from measurement model mis-specification, and we thus what to highlight again the importance of specifying correct measurement models to increase the reliability of the information systems knowledge base on trust. To the best of our knowledge this chapter is the first literature review on information systems trust research especially focusing on the reliability of the published results in terms of methodological rigor.

Keywords: Trust, antecedents, information systems research, measurement model specification

INTRODUCTION

> "One should expect trust to be increasingly in demand as a means of enduring the complexity of a future which technology will generate (Luhmann, 1979, p. 16)."

New information systems (IS) are usually developed to ease the life of their users in the professional or private context. Therefore the systems we are using become increasingly automated and opaque (Lee & See, 2004). This trend comes with both, advantages – e.g, the possibilty to achieve our intended goals better or faster – and disadvantages – e.g., the loss of at least some control over the systems. Consequently, information systems designers have to solve the challenge of designing their systems in a way that the advantages can be leveraged and the disadvantages are diminished.

Research has identified trust as a useful concept to overcome comparable situations of social or technical complexity that are characterized by a loss of control (Gefen, Karahanna, & Straub, 2003; Luhmann, 1979). IS research has shown the importance of trust in various areas, including e-commerce (Gefen et al., 2003) the adoption of new technologies (Wang & Benbasat, 2005), and virtual communities (Leimeister, Ebner, & Krcmar, 2005). The different areas of interests usually come with different points of view and objectives leading to varying interpretations and conceptualisations of trust and its antecedents.

The goal of this chapter is to systemize and condense the results from different research areas within the IS discipline by conducting a systematic literature review, to create a consistent knowledge base of the various insights on different antecedents of trust, valuable for IS design. In particular we focus on two research questions:

1. What different antecedents of trust have been identified in the IS literature?
2. How reliable are the reported results in terms of measurement model specification?

While former literature reviews concerning trust in the IS field have focused mainly on different dimensions of trust (Bhattacherjee, 2002; Gefen & Straub, 2004), we focus on the antecedents of trust. Additionally, we investigate the measurements of trust across the different studies to ascertain the reliability of the reported results. This evaluation is motivated by a recent contribution by Petter, Straub and Rai (2007), who highlighted the problem of measurement model mis-specification in the IS literature, threatening the reliability of our knowledge base. For our literature review, we reviewed all trust articles published in the eight journal included in the Senior Scholars' Basket of Journals (Senior

Scholars Forum, 2007) from 1995 onwards. We focus on the contributions since 1995 because many researchers build upon the theory provided by Mayer, Davis and Schoorman (1995) or base their measurement models on the work of McAllister (1995).

In the remainder of this chapter we first provide our definition of trust, and theoretical foundations of trust used in the IS literature on trust. We then provide a theoretical background on measurement theory before we discuss how, according to the underlying theory, trust can be measured. Next, we provide details on the methodology of our literature review, and present our results. Afterwards, we discuss the results and limitations of our literature review before the chapter closes with a conclusion.

TRUST THEORY

Definition of Trust

In the 1990s, the number of articles dealing with trust has grown dramatically throughout various disciplines (Ebert, 2009). This increasing interest is also reflected by several special issues in major journals in fields such as Management (Rousseau, Sitkin, Burt, & Camerer, 1998), Information Systems (Benbasat, Gefen, & Pavlou, 2008, 2010) and Human Computer Interaction (Corritore, Kracher, & Wiedenbeck, 2003). One reason for this development is that trust has been identified as an effective means for overcoming the increasing complexity of technology, organizations and interpersonal interactions, practitioners had to face (Lee & See, 2004). The importance of trust is manifold – ranging from a *"key to understanding the relationship development process"* (Morgan & Hunt, 1994, p. 32) to being *"a glue that holds the relationship together"* (Singh & Sirdeshmukh, 2000, p. 156).

Additionally, the concept of trust is widely used in many different research disciplines, such as marketing, psychology, information systems and strategic management (Ebert, 2009). As a result, even within the IS discipline, multifarious research approaches to study trust and trust relationships exist (Gefen et al., 2003; McKnight, Carter, Thatcher, & Clay, 2011; McKnight, Choudhury, & Kacmar, 2002b; Söllner, Hoffmann, Hoffmann, Wacker, & Leimeister, 2012; Wang & Benbasat, 2005).

The variety of viewpoints on trust has also led to a plethora of definitions. Nevertheless two critical components can be identified throughout the various definitions: confident expectations and a willingness to be vulnerable (Rousseau et al., 1998). In this chapter, we use an adaptation of the definition by Mayer et al. (1995), since it covers both critical components, and is the most frequently cited definition of trust (Rousseau et al., 1998). Consequently, trust is defined as the willingness of a trustor to be vulnerable to the actions of a trustee based on the expectation that the trustee will perform a particular action important to the trustor, irrespective of the ability to monitor or control the trustee (Mayer et al., 1995, p. 712).

In the original definition, Mayer et al. (1995) did not use the terms trustor and trustee as frequently as we do in our adaptation. They often used the term party resembling the trustor or the trustee. We decided to avoid using the term party, since we encountered criticism for using party when relating to trust in IT artifacts – e.g., trust in the Internet. Since it does not

change the content of the definition and even makes the definition more precise, we decided to use the terms trustor and trustee more frequently instead.

Furthermore, trust depends very much on a specific context. Abdul-Rahman and Hailes (2000), e.g., use the example of a mother who has high trust in her car mechanic to repair her car. However, when it comes to babysitting her child, she would not trust the car mechanic, since she does not trust the mechanic in all contexts, but only in the context of repairing her car.

When it comes to IS trust research, two major theoretical foundations of trust are used in the literature and will be outlined in the subsequent sections.

Interpersonal Trust

The first important theoretical foundation used in IS trust research is based on insights from interpersonal respectively interorganizational trust, developed, e.g., by Mayer et al. (1995). These insights were adopted for studying trust relationships among human beings that are mediated by IT and were shown to be very valuable for explaining the success of IS-related phenomena, such as e-commerce (Gefen et al., 2003) and virtual communities (Leimeister, Sidiras, & Krcmar, 2006). Due to the intense use in IS research, a huge pool of theoretical insights could be developed (e.g., Gefen et al. (2003), McKnight, Choudhury and Kacmar (2002a), McKnight et al. (2002b), and Pavlou and Gefen (2004)), and future research can build upon these insights. Furthermore, there are plenty of evaluated measurement instruments ready to be used in future research. A well-established model of the causality underlying interpersonal trust theory is illustrated in Figure 1. The figure is based on a model developed by Mayer et al. (1995) and shows that trust is determined by the three factors of trustworthiness[100]: ability, benevolence and integrity.

Ability reflects the trustor's perception that the trustee has the necessary skills, competencies, and characteristics enabling him to have influence in a specific domain. Benevolence reflects the trustor's perception that the trustee does not only follow an egocentric profit motive, but also wants to do good to the trustor. Integrity reflects the trustor's perception that the trustee adheres to a set of principles that is acceptable for the trustor (Mayer et al., 1995). Some researchers extend these dimensions, e.g., by adding predictability (Gefen & Straub, 2004) or omit one of the three, e.g. integrity (Singh & Sirdeshmukh, 2000). Nevertheless, the underlying logic is to use these or related dimensions.

The consequence of trust is risk-taking in relationship. This term represents a group of actions that depend on the situation that the trustor is in. As an example, Mayer et al. (1995) describe a supervisor who allows an employee to handle an important account rather than handling it personally. Another example could be the decision to transact with an online store (Gefen et al., 2003). Whether trust leads to risk-taking also depends on the perceived risk involved. Assuming a given level of trust, the trustor might, e.g., be willing to provide information such as his address to a trustee, but not more critical information, such as credit card information.

[100] In the interest of accuracy, we want to mention that these factors actually should form 'trustworthiness' and not trust. However, trust researchers were not able to observe an empirical difference between trustworthiness and trust (Gefen, 2004; Gefen, Benbasat, & Pavlou, 2008). We thus stick to the terms that have been used by Mayer et al. (1995) for the remainder of this chapter.

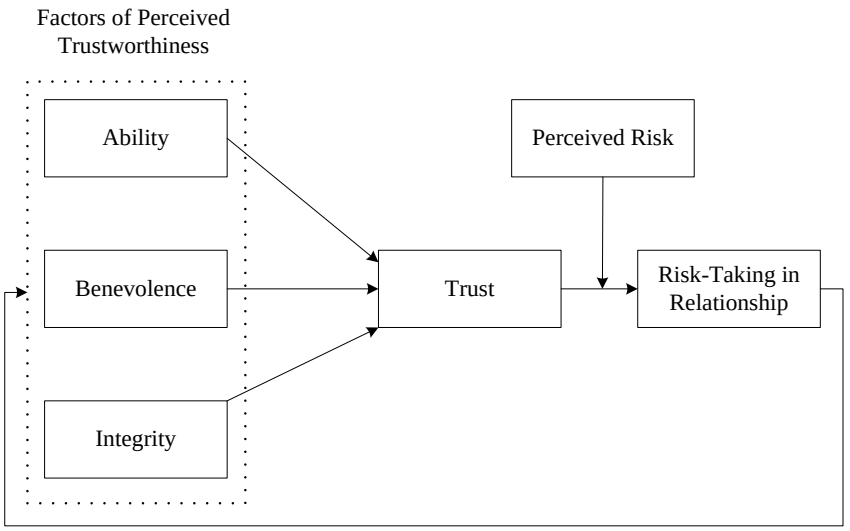

Figure 1. Causal model of interpersonal trust (adapted from Mayer et al. (1995)).

After taking a risk, the trustor will experience a positive or negative outcome of this decision, and will update his perceptions about the dimensions of trust.

Institution-Based Trust

The second important theoretical foundation used in IS trust research is institution-based trust. This kind of trust refers to trust in the structural conditions prevalent (McKnight et al., 2002a).

The concept of institution-based trust has its origins in sociology, which deals with topics such as the structures that make an environment feel trustworthy (e.g., a legal system ensuring that private property is protected) (Zucker, 1986). In the context of the Internet, research on e-commerce showed that institution-based trust in the Internet is an important driver for e-commerce adoption and use of end-users (McKnight et al., 2002b). Institution-based trust has two dimensions: structural assurance and situational normality.

Structural assurance refers to a person's belief that appropriate structures, as such guarantees, regulations and legal resources are in place to promote successful interaction in a particular environment (Shapiro, 1987; Zucker, 1986). With regard to the Internet, an example for structural assurance is the existence of legal and technical measures such as data encryption protecting the user from losing privacy or money (McKnight et al., 2002a).

Situational normality refers to a person's belief that taking risk in a particular environment will likely lead to a successful outcome (Baier, 1986; Garfinkel, 1963; Lewis & Weigert, 1985). In the context of e-commerce, a person that perceives situational normality to be high would belief that the Internet is a well ordered environment and that doing business on the Internet is in general a good idea, since in general the vendors in this environment have attributes such as ability, benevolence and integrity (McKnight et al., 2002a).

MEASUREMENT THEORY

Reflective versus Formative Measurement Models

Due to its multi-dimensional character, trust is usually measured as a latent variable with multiple indicators (all 77 of the 77 reviewed articles use this way of measurement). In general, two different types of measurement models for such constructs are prevalent in the literature – the principal factor (reflective) model and the composite latent variable (formative) model (Jarvis, Mackenzie, & Podsakoff, 2003).

If researchers follow the reflective measurement approach, the underlying assumption is that the single indicators correlate highly with each other and that this correlation is caused by the underlying latent variable. This means that a change in the latent construct is reflected by a change in all of the respective indicators (Fornell & Bookstein, 1982; Jarvis et al., 2003).

When using the formative measurement model instead, researchers follow the assumption that the latent variable is defined and thus caused by its indicators. So the causal logic is the opposite of the reflective measurement model. In the formative model, changes in one or more of the underlying indicators cause a change in the latent variable (Diamantopoulos & Winklhofer, 2001; Fornell & Bookstein, 1982; Jarvis et al., 2003).

The two types of measurement are visualized in Figure 2 (without including measurement error or correlation between indicators).

Based upon the theoretical differences between these two kinds of measurement models, Jarvis et al. (2003) created four rules to decide whether a measurement model should be interpreted as reflective or formative for a certain use.

Distinguishing between Reflective and Formative Measurement Models

Jarvis et al. (2003) base their decision rules upon four sets of questions. At first the direction of causality between the latent variable and the indicators needs to be investigated. The measurement model is a reflective model if the causality flows from the latent variable to the indicators and a formative model if it flows from the indicators to the latent construct. Second, it has to be determined whether the indicators are interchangeable or if dropping an indicator causes a conceptual problem. For reflective measurement models the indicators should be interchangeable because a change in the latent variable causes changes in all of the indicators. Due to the fact that formative indicators define and cause the latent variable, they cannot be interchangeable because dropping an indicator would change the definition of the latent variable. The third step for researchers is to investigate whether the indicators should correlate with each other or not. For reflective measurement models the indicators need to correlate highly with each other because changes in the latent variable are supposed to cause changes in all respective indicators. For formative measurement models a correlation is not forbidden but correlations between two indicators that are too high would suggest that both cover a quite similar aspect and therefore could be redundant. As a fourth and final step the antecedents and consequences of the single indicators should be investigated. Reflective indicators should all have the same antecedents and consequences because they should be interchangeable and reflect the whole variable. Formative indicators instead need not to have

the same antecedents and consequences because they usually capture different aspects of the whole latent variable. Table 1 displays the detailed decision rules from Jarvis et al. (2003).

Concerning the consequences of using misspecified measurement models, Jarvis et al. (2003) state:

> "Our simulation results provide strong evidence that measurement model misspecification of even one formatively measured construct within a typical structural equation model can have very serious consequences for the theoretical conclusions drawn from that model. The entire model could appear to adequately fit the data, even though the structural parameter estimates within that model exhibit very substantial biases that would result in erroneous inferences. This is not simply a measurement model or construct validity problem, because its effects clearly extend into the estimates of the structural parameters that drive the development and testing of marketing theory. More specifically, the results indicate that paths emanating from a construct with a misspecified measurement model are likely to be substantially inflated, thus leading to Type I errors. However, paths leading into a construct with a misspecified measurement model are likely to be deflated, thus leading to Type II errors (Jarvis et al., 2003, p. 212)."

A Type I error means that *"paths are labeled as statistically significant when there is actually no relationship between the constructs"* (Petter et al., 2007, p. 630) whereas a Type II error means that *"a statistically significant path between constructs is found to be* nonsignifica*nt"* (Petter et al., 2007, p. 630). Therefore, measurement model misspecification questions the investigated model as a whole and the theoretical implications drawn from the results.

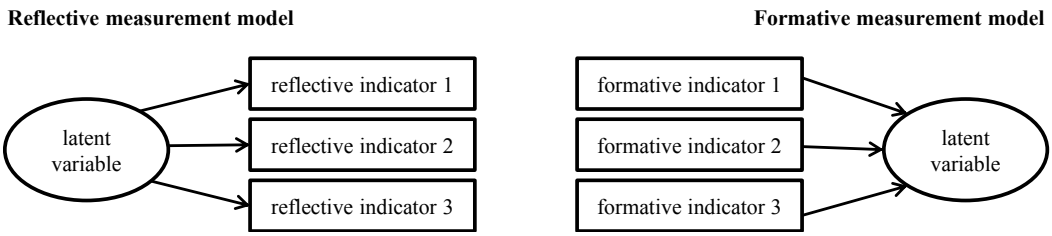

Figure 2. Reflective versus formative measurement model (Söllner et al., 2010, p. 68).

Table 1. Summary of decision rules provided by Jarvis et al. (2003) (Söllner et al., 2010, p. 68)

	Formative measurement model	**Reflective measurement model**
1. Direction of causality between latent variable and the indicators impled by the conceptual definition	Direction of causality is from the indicators to the latent variable	Direction of causality is from the latent variable to the indicators
2. Interchangeability of the indicators	Indicators need not to be interchangeable	Indicators should be interchangeable
3. Correlation among the indicators	Not necessary for indicators to correlate highly with each other	Indicators are expected to correlate highly with each other
4. Nomological net of the indicators	Nomological net of the indicators may differ	Nomological net of the indicators should not differ

To avoid Type I and Type II errors, the researchers choice of measurement model and the underlying theory need to be in line (see Table 2) (Diamantopoulos & Siguaw, 2006).

COMBINING TRUST AND MEASUREMENT THEORY

Based upon the provided trust theory and the background on measurement models we will now evaluate what type of measurement is suitable for trust.

Figure 1, following Mayer et al.'s (1995) theory, shows that the flow of causality is coming from the dimensions (ability, benevolence, integrity) leading to trust and from there on proceeds to trust's consequences (grouped as risk taking in relationships). Following the criteria by Jarvis et al. (2003) presented above, a formative measurement model should be used to measure trust using indicators like ability, benevolence, integrity and propensity to trust – whereas a reflective measurement model should be used to measure trust using risk-taking-related indicators, like intention to purchase or intention to share information. Figure 3 illustrates the way these two types of measurement are usually visualized in the literature (without including measurement error or correlation between indicators), and provides an evaluation of both types using the decision rules by Jarvis et al. (2003).

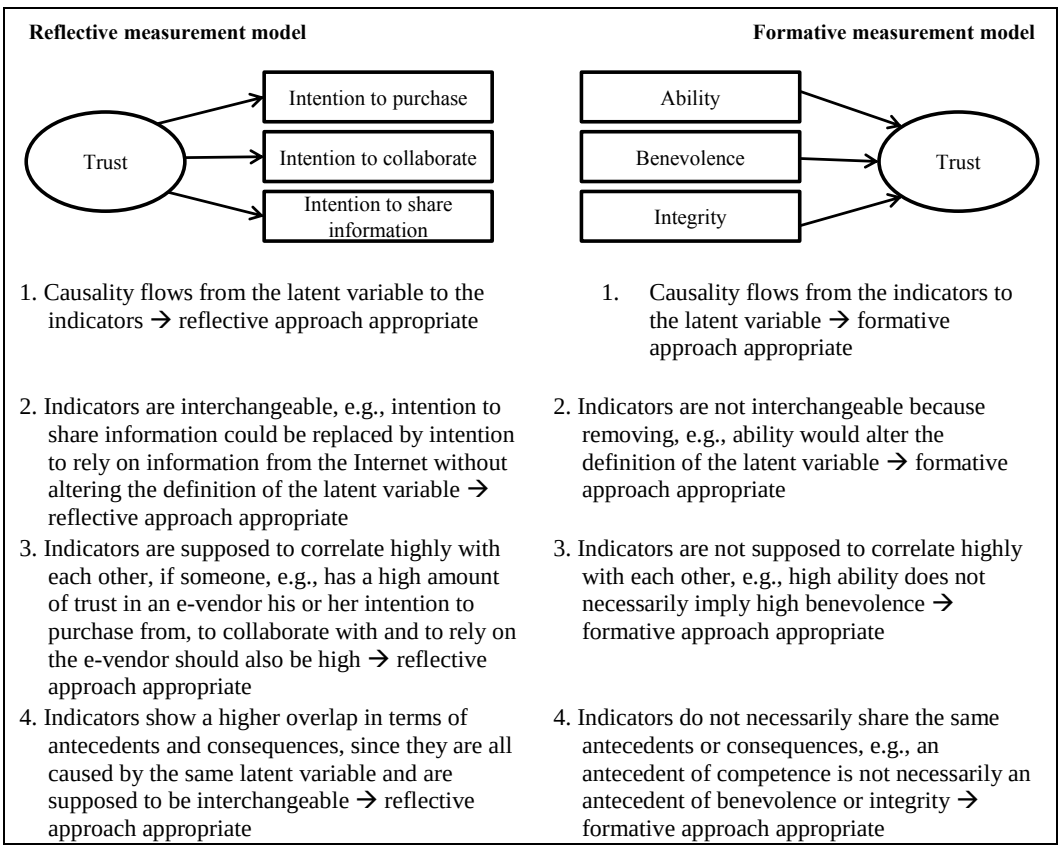

Figure 3. Reflective and formative measurement models for trust deriving from trust theory.

Table 2. Choosing a measurement prespective (adapted from Diamantopoulos and Siguaw (2006))

		'Correct' auxiliary theory	
		Reflective	**Formative**
Researcher's choice of measurement perspective	Reflective	Correct decision	Type I error
	Formative	Type II error	Correct decision

Our evaluation of both types of measurement models shows that the formative as well as the reflective measurement model derived from theory fulfills all four aspects found in the guidelines and hence is correctly specified. Based upon this theory based understanding of trust measurement, we will review trust measurement models found in the literature in order to get an insight about the reliability of the presented results.

METHODOLOGY OF THE LITERATURE REVIEW

Literature reviews have gained more and more importance due to the increasing number of books, journals, conferences and workshops. A literature review should describe, summarize, assess, appraise, resolve or integrate selected research results with a focus on the methodology, theory, content or other aspects. The aim of a literature review is the analysis of relevant work with special focus on specific research questions (Webster & Watson, 2002).

Due to the huge number of contributions on trust and the argument that the major contributions will probably be found in leading journals (Webster & Watson, 2002), we limited our review to the eight journals of the AIS senior scholars' basket of journals (Senior Scholars Forum, 2007). We reviewed the papers published in these journals from 1995 on, since the number of articles on trust has greatly increased since then (Ebert, 2009) and Mayer et al.'s (1995) work is used as a foundation of many IS contributions on trust. In detail, we reviewed the following journals and issues:

- European Journal of Information Systems (EJIS), Volume 4 (Issue 1) – 21 (6)
- Information Systems Journal (ISJ), 5 (1) – 22 (6)
- Information Systems Research (ISR), 6 (1) – 23 (4)
- Journal of the Association of Information Systems (JAIS), 1 (1) – 13 (12)
- Journal of Information Technology (JIT), 10 (1) – 27 (4)
- Journal of Management Information Systems (JMIS), 12 (1) – 29 (2)
- Journal of Strategic Information Systems (JSIS), 4 (1) – 21 (4)
- Management Information Systems Quarterly (MISQ), 19 (1) – 36 (4)

To identify relevant papers in these journals, we conducted a database search using the Business Source Premier database by EBSCO as our default database. Due to availability restrictions, the following adaptations to the search process had to be made: For the ISJ issues 5 (1) – 7 (4), and all JIT issues, we checked the websites of the journals. For all JSIS issues, we used the ScienceDirect database by Elsevier. For the JAIS issues 1 (1) – 3 (1), we used the AIS eLibrary. Independent of the journal or database, we always searched for the term "trust"

in the title, abstract and keywords of every paper. Following this method, 167 papers were identified. All identified papers were then screened regarding their fit for the literature review. For example, the JMIS published a special issue on trust in online environments in 2008. This special issue came with an editorial (Benbasat et al., 2008) and a research agenda (Gefen et al., 2008). Such articles were not considered in the review, since they did not present original research, but summarize the articles in the special issue or resemble the opinion of the authors on future research necessary. Furthermore, our focus is on insights that have been empirically tested. Consequently, we did not consider qualitative papers in this literature review, and quantitative papers not addressing any antecedents or consequences of trust. After conducting this first check, 77 papers remained. Figure 4 provides a graphical distribution of the papers on the different journals.

Figure 4 shows that we initially identified at least ten papers in each journal based on our search criteria. This shows that trust studies have been published in all major journals throughout the IS discipline. Figure 5 shows the distribution of the papers over time. This illustration shows that trust started to become a major IS construct in 2002 with a peak of trust-related papers in 2008. This peak is related to a big special issue of the JMIS (Benbasat et al., 2008) which accounts for eight of the 14 reviewed papers in 2008. After 2008, the interest in trust-related research decreased until 2011. In 2012, another increase of trust-related research can be observed. However, even though the number for the initially identified papers increase from six to 13 comparing 2011 and 2012, the number of papers we included in the review remained constant (four). Despite the fact that this observation is only based on one year, it could be a hint for a methodology-related change in IS trust research. The special issue of the MISQ in 2010 (Benbasat et al., 2010), e.g., did not publish traditional empirical papers, as have been published in the 2008 special issue of the JMIS. Instead, papers reporting results based on NeuroIS (Dimoka, 2010; Dimoka, Pavlou, & Davis, 2011; Riedl, Hubert, & Kenning, 2010) studies have been published.

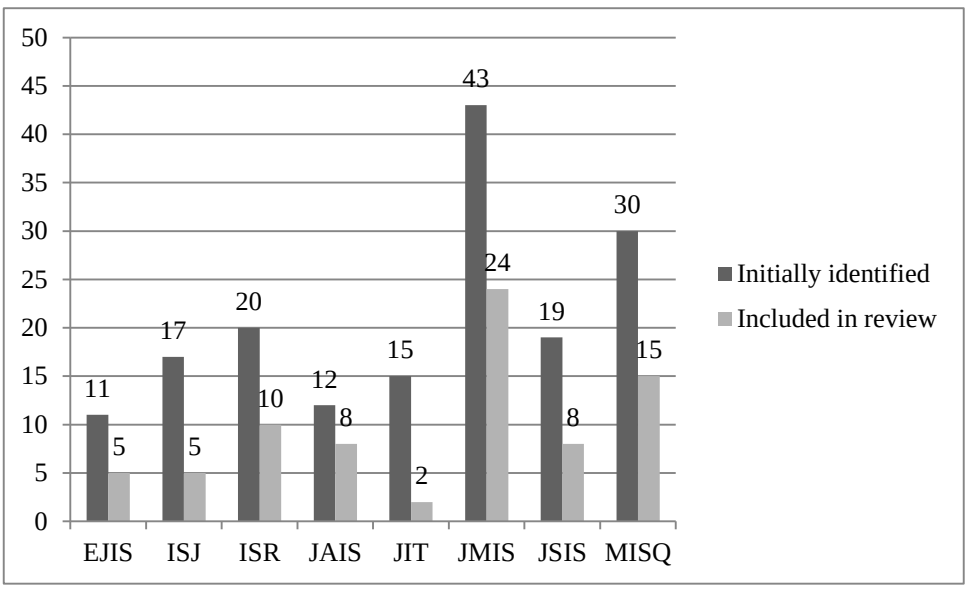

Figure 4. Graphical illustration of the distribution of the papers among the eight journals.

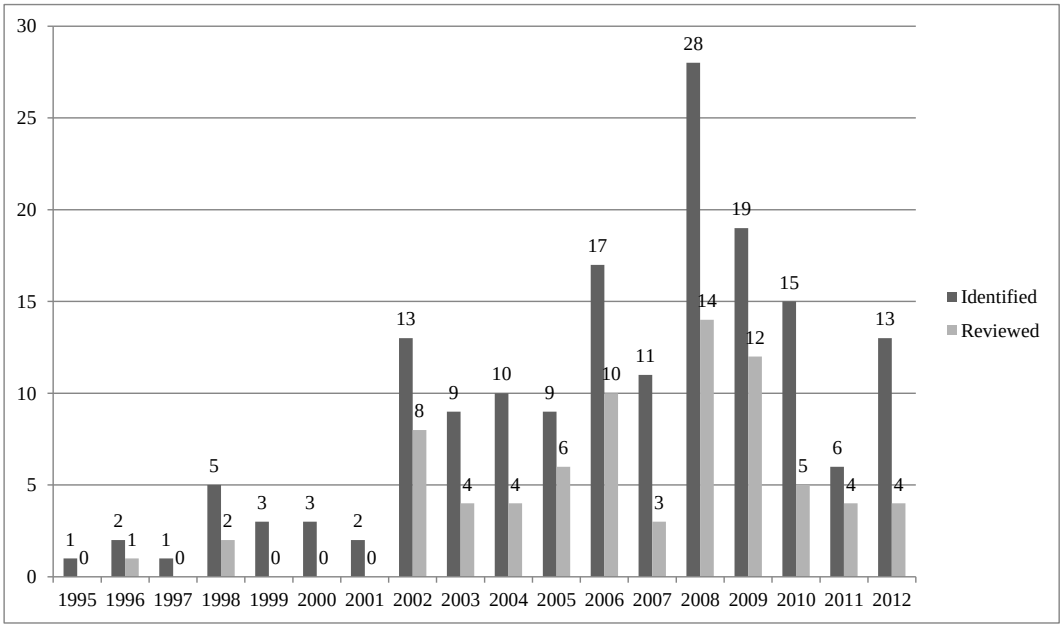

Figure 5. Graphical illustration of the distribution of the papers between 1995 and 2012.

Regarding the operationalization of the literature review, Swanson and Ramiller (1993) reviewed the abstract, introduction, discussion section and conclusion in their literature review. With our interest in details on theory, methodology and results, we had to expand this method; we thus, additionally checked the theory, research design, research method and results sections of all remaining papers. The results of the review will be captures using the concept matrix (Webster & Watson, 2002) shown in Figure 6.

RESULTS

Trustees Studied in the IS Literature

Trust is usually viewed as being part of a relationship between a trustor and a trustee. The trustor is usually a human being trusting different kinds of trustees (e.g., the Internet or a vendor (McKnight et al., 2002b)). Based on the results of our review, we identified four different categories of trustees :

- Human beings
- Organizations
- Institutions
- IT artifacts

Human beings as trustees. One part of IS trust research investigates trust relationships among human beings that are mediated by IT. Jarvenpaa, Knoll and Leidner (1998) and Kanawattanachai and Yoo (2007), e.g., focus on trust among members of virtual teams,

wheras Chai, Das and Rao (2011) investigate trust among different bloggers. It is important to mention that we only applied this category if we were absolute sure that the trustee is another person. There are, e.g., some papers investigating trust between buyers and sellers on marketplaces such as eBay. Here we decided to use the category organization, since the trustees might be persons but also organizations.

Organizations as trustees. Based on the number of antecedents identifed, the biggest part of IS trust research focuses on trust relationships between human beings and organizations. Examples are eBay (Ba & Pavlou, 2002), Amazon (Van Slyke, Shim, Johnson, & Jiang, 2006) or web vendors in general (McKnight et al., 2002b). As already pointed out, we applied this category as soon as the trustee could be not a single person but also an organization, e.g., a seller on eBay. Furthemore, we used this category for communites, e.g., the community of sellers (Pavlou & Gefen, 2005), as long as this communities did not act as institutions.

Institutions as trustees. Besides human beings and organizations, IS trust research also investigates trust relationships between human beings and institutions. Dinev et al. (2006), e.g., focus on the impact of perceived risk on trust in the Internet, and G. Kim, Shin and Lee (2009) investigate trust in mobile banking. The example of G. Kim et al. (2009) illustrates how we decided to use the category institutions instead of organizations. G. Kim et al. (2009) focus on mobile banking as a whole, like the Internet, and not on single organizations offering mobile banking. Thus, they focus the trust relationship between human beings and mobile banking as an institution.

IT artifacts as trustees. The fourth kind of trust relationships investigated in IS trust research are relationships between human beings and IT artifacts. Cyr, Head, Larios and Bing (2009), e.g., address the question how a web site needs to be designed for being perceived as trustworthy and Wang and Benbasat (2008) focus on understanding human trust in recommendation agents. We used this category if we were sure – based on the information provided in the papers – that the trustee is the IT artifact itself and not the entity providing the IT artifact. Lots of studies on trust in e-commerce use experimental designs including web sites but focus on the trust relationship between the human being and the organization providing the web site, not the web site itself (e.g., Lim, Sia, Lee and Benbasat (2006)).

Antecedents of Trust Identified in the IS Literature

After presenting the results regarding the different trust relationships studied in IS trust research, this section focuses on the existing insights on how each trust relationship can be built or supported. Since building or supporting trust requires knowledge about factors impacting trust, we reviewed all papers regarding the antecedents of trust they investigated. Table 3 shows the results of this analysis. We only reported antecedents that were found to be significant at least at the level of 0.05. Due to the plethora of different antecedents, we tried to avoid redundant antecedents – e.g., we did not report ‘propensity to trust’ and ‘disposition to trust’ as two antecedents, since both constructs differ only in wording. Furthermore, we did not highlight ‘popular’ antecedents that have been more frequently used.

Paper	Antecedents of trust		Measurement model specification		
	Trustee(s)	Antecedents	Measurement model(s) used for trust	Correctly specified?	Reason
A					
B					
C					

Figure 6. Concept matrix of the literature review.

Table 3. Antecedents of trust identified in IS trust literature

Trustee(s)	Antecedents (at least significant at the level of 0.05)
Human beings	Ability (Jarvenpaa et al., 1998) Benevolence (Jarvenpaa et al., 1998) Collaborative values (Stewart & Gosain, 2006) Early communication level (Jarvenpaa, Shaw, & Staples, 2004) Executive's communication (Iacovou, Thompson, & Smith, 2009) Executive's knowledge (Iacovou et al., 2009) Forking norm (Stewart & Gosain, 2006) Freedom beliefs (negative) (Stewart & Gosain, 2006) Initial trustworthiness (Jarvenpaa et al., 2004) Integrity (Jarvenpaa et al., 1998) In-group bias (Robert Jr, Dennis, & Hung, 2009) Named credit norm (negative) (Stewart & Gosain, 2006) Perceived control (Krasnova, Spiekermann, Koroleva, & Hildebrand, 2010) Process beliefs (Stewart & Gosain, 2006) Propensity to trust (Jarvenpaa et al., 1998) Reciprocity (Chai et al., 2011) Social ties (Chai et al., 2011) Task-oriented communication (Kanawattanachai & Yoo, 2007)
Organizations	Actualized benefits (Montoya, Massey, & Khatri, 2010) Assurance (Gefen, 2002) Buyer's past experience (Pavlou & Gefen, 2005) Calculative-based (Gefen et al., 2003) Characteristic-based mode (Gefen, 2004) Cognitive trust in buyers (Sun, 2010) Customer endorsement (Lim et al., 2006) Customer satisfaction (H.-W. Kim, Xu, & Koh, 2004) Disposition to trust (Bélanger & Carter, 2008) Distributive justice (Turel, Yuan, & Connelly, 2008) Familiarity (Bhattacherjee, 2002) Harmonius conflict resolution (Goo, Kishore, Rao, & Nam, 2009) Informational justice (Turel et al., 2008) Information quality (H.-W. Kim et al., 2004) Institution-based mode (Gefen, 2004) Institution-based situational normality (Gefen et al., 2003) Institution-based structural assurance (Gefen et al., 2003) Mutual dependence (Goo et al., 2009) Negative ratings (negative) (Ba & Pavlou, 2002) Perceived business tie (Stewart, 2006) Perceived control (Krasnova et al., 2010) Perceived ease of use (Awad & Ragowsky, 2008) Perceived effectiveness of escrow services (Pavlou & Gefen, 2004)

Table 3. (Continued)

Trustee(s)	Antecedents (at least significant at the level of 0.05)
	Perceived effectiveness of feedback mechanism (Pavlou & Gefen, 2004) Perceived effectiveness of institutional structures (Pavlou & Gefen, 2005) Perceived site quality (McKnight et al., 2002b) Perceived usefulness (Awad & Ragowsky, 2008) Portal affiliation (Sia et al., 2009) Positive ratings (Ba & Pavlou, 2002) Privacy concern (D. J. Kim, 2008) Procedural justice (Turel et al., 2008) Process-based mode (Gefen, 2004) Propensity to trust (M.-S. Kim & Ahn, 2007) Psychological contract violation (negative) (Pavlou & Gefen, 2005) Referral (D. J. Kim, 2008) Reliability (Gefen, 2002) Reputation (H.-W. Kim et al., 2004) Responsiveness (Gefen, 2002) Security protection (D. J. Kim, 2008) Service level (H.-W. Kim et al., 2004) Social influence (Montoya et al., 2010) Structural assurance (McKnight et al., 2002b) Supplier commitment (Hart & Saunders, 1998) System reliability (D. J. Kim, 2008) System trust (Pennington, Wilcox, & Grover, 2003) Third-party seal (D. J. Kim, 2008) Training (Montoya et al., 2010) Trusting beliefs in vendor (McKnight et al., 2002b) Trust in e-customer service provider (Turel et al., 2008)Trust in intermediary (Pavlou & Gefen, 2004) Trust in market-maker (M.-S. Kim & Ahn, 2007) Trust in service representative (Turel et al., 2008) Web Security (M.-S. Kim & Ahn, 2007) Web Usability (M.-S. Kim & Ahn, 2007) Word-of-mouth quality (Awad & Ragowsky, 2008)
Institutions	Disposition to trust (McKnight et al., 2002a) Perceived internet privacy risk (negative) (Dinev & Hart, 2006) Perceived risk (negative) (Dinev et al., 2006) Relative benefits of mobile banking (G. Kim et al., 2009) Structural assurance of mobile banking (G. Kim et al., 2009) Trust in Internet (Bélanger & Carter, 2008)
IT artifacts	Brand Awareness (Lowry, Vance, Moody, Beckman, & Read, 2008) Brand Image (Lowry et al., 2008) Calculative reason (Wang & Benbasat, 2008) Cost/benefit calculation (Li, Hess, & Valacich, 2008) Culture uncertainty avoidance (Vance, Elie-Dit-Cosaque, & Straub, 2008) Dispositional reason (Wang & Benbasat, 2008) Ease of use (Vance et al., 2008) Guarantees (Pennington et al., 2003) Image appeal (Cyr et al., 2009) Information design (Cyr, 2008) Institution-based trust (Lowry et al., 2008)

Trustee(s)	Antecedents (at least significant at the level of 0.05)
IT artifacts	Interactive reason (Wang & Benbasat, 2008) Knowledge-based reason (Wang & Benbasat, 2008) Navigational design (Cyr, 2008) Perceived decision process similarity (Al-Natour, Benbasat, & Cenfetelli, 2011) Perceived social presence (Cyr et al., 2009) Product type (negative) (Benlian, Titah, & Hess, 2012) Online product recommendation use (negative) (Benlian et al., 2012) Reputation (Li et al., 2008) Situational normality (Li et al., 2008) Subjective norm (Li et al., 2008) Trust in government (Teo, Srivastava, & Jiang, 2009) Visual appeal (Vance et al., 2008) Visual design (Cyr, 2008) Web site quality (Lowry et al., 2008)

The results presented in Table 3 show that a plethora of different antecedents has been identified in IS trust literature. Furthermore, it shows that most unique antecedents have been identified for the trust relationship between human beings and organizations, and that comparably few antecedents have been identified for the trust relationship between human beings an institutions. Another interesting point is that several antecedents were identified for multiple trust relationships. Disposition – or propensity – to trust, e.g., has been identified as an antecedent for every trust relationship. Based on these results, we can conclude that a lot of insights on trust across the different trust relationships exist.

Reliability of the Reported Results According to Measurement Theory

Since Petter et al. (2007) showed that mis-specification is prevalent in some IS studies and may impact the reliability of the observed structural relationships, we investigated the reliability of the results reported in the previous section by analyzing how trust has been measured in each of the 77 reviewed papers. For assessing the quality of the specification of the measurement models, we relied on the decision rules provided by Jarvis et al. (2003). If multiple trust constructs were used in a study, we assessed each construct seperately. If the assessment produced varying results, we reported assessments for each construct. If the assessement of the different constructs did produce consistent results, we did not differentiate between the different constructs in the presentation of our results. Regarding the measurement models used, we first relied on information provided by the authors of each paper. However, the details of information on the choice of measurement model varied highly. In many studies, we could not find any information regarding the choice of measurement model. In other studies, e.g., Gefen (2004), detailed information on the choice of measurement models and discussions why these choices are appropriate can be found. If we could not find any explicit statement, we focused on the results presented in the studies. If reflective quality criteria such as Cronbach's alpha or the composite reliability were reported, we concluded that a reflective measurement model was used. The results of our analysis are presented in Table 4.

Table 4. Quality of the measurement model specification in the reviewed papers

Paper	Measurement model(s) used for trust	Correctly specified?	Reason
Al-Natour et al. (2011)	Reflective	No, should be formative	Items address different characteristics
Awad and Ragowsky (2008)	Reflective	No, should be formative	Items address different characteristics
Ba and Pavlou (2002)	Reflective	No, should be formative	Items address different characteristics
Bélanger and Carter (2008)	Reflective	Disposition to trust: Yes	Items focus on consequences
		Trust in Internet and Trust in Government: No, should be formative	Items address different characteristics
Bélanger, Hiller and Smith (2002)	Reflective	No, should be formative	Items address different characteristics
Benlian et al. (2012)	Reflective	No, should be formative	Items address different characteristics
Bhattacherjee (2002)	Reflective	No, should be formative	Items address different characteristics
Carter and Bélanger (2005)	Reflective	No, should be formative	Items address different characteristics
Chai et al. (2011)	Reflective	No, should be formative	Scale is based on different dimensions
Chan et al. (2010)	Reflective	No, should be formative	Items address different characteristics
Choudhury and Karahanna (2008)	Reflective	No, should be formative	Items address different characteristics
Cyr (2008)	Reflective	?, items not reported	
Cyr et al. (2009)	Reflective	No, should be formative	Items address different characteristics
Dinev et al. (2006)	Reflective	Propensity to trust: Yes	Items focus on consequences
		Institutional trust: No, should be formative	Items address different characteristics
Dinev and Hart (2006)	Reflective	No, should be formative	Items address different characteristics
Everard and Galletta (2005)	Reflective	No, should be formative	Items address different characteristics
Gefen (2002)	Reflective	Yes	Focuses mainly on trust itself and consequences
Gefen (2004)	Reflective	No, should be formative	Items address different characteristics
Gefen et al. (2003)	Reflective	No, should be formative	Items address different characteristics
Goo et al. (2009)	Reflective	No, should be formative	Items address different characteristics
Hart and Saunders (1998)	Reflective	No, should be formative	Items address different characteristics
Heeseok and Byounggu (2003)	Reflective	No, should be formative	Items address different characteristics
Hess, Fuller and Campbell (2009)	Reflective	No, should be formative	Items address different characteristics
Huand, Davison and Gu (2011)	Reflective	Affect-based: Yes	Items focus on consequences
		Cognition-based: No, should be formative	Items address different characteristics
Iacovou et al. (2009)	Reflective	No, should be formative	Items address different characteristics
Jarvenpaa et al. (1998)	Reflective	Trust and Trustworthiness: Yes	Items focus on consequences

Paper	Measurement model(s) used for trust	Correctly specified?	Reason
		Disposition to trust: No, should be formative	Items address different characteristics
Jarvenpaa et al. (2004)	Reflective	Yes	Items focus on consequences
Kanawattanachai and Yoo (2002)	Reflective	No, should be formative	Items address different characteristics
Kankanhalli, Tan and Kwok (2005)	Reflective	No, should be formative	Items address different characteristics
H.-W. Kim et al. (2004)	Reflective	No, should be formative	Items address different characteristics
D. J. Kim (2008)	Reflective	?, items not reported	
D. Kim and Benbasat (2009)	Formative	Yes	Items address different characteristics
D. J. Kim, Ferrin and Rao (2009)	Reflective	Disposition to trust: Yes	Items focus on consequences
		Consumer Trust: No, should be formative	Items address different characteristics
G. Kim et al. (2009)	Reflective	Propensity to trust : Yes	Items focus on consequences
		Initial Trust: No, should be formative	Items address different characteristics
M.-S. Kim and Ahn (2007)	Reflective	Propensity to trust: Yes	Items focus on consequences
		Trust in market-makers and trust in sellers: No, should be formative	Items address different characteristics
Klein and Rai (2009)	Second-order – formative + reflective	Yes	Reflective measurement of the different formative dimensions
Krasnova et al. (2010)	Reflective	No, should be formative	Items address different characteristics
Li et al. (2008)	Second-order – reflective + reflective	No, should be Second-Order – formative + reflective	Reflective measurement of different formative dimensions
Lim et al. (2006)	Reflective	No, should be formative	Items address different characteristics
Lowry et al. (2008)	Second-order – formative + reflective	?, items not reported	
McKnight et al. (2002b)	Reflective	Trusting beliefs: No, should be formative	Items address different characteristics
		Trusting intention: Yes	Items focus on consequences
McKnight et al. (2002a)	Second-order – reflective + reflective	Disposition to trust, Insitution-based trust and trusting beliefs: No, should be second-order – formative + reflective	Reflective measurement of different formative dimensions
		Trusting intentions: Yes	Reflective measurement of different reflective dimensions
Messerschmidt and Hinz (2012)	Second-order – formative + reflective	No, several problems: Each dimension should be formative + Dimensions are different constructs, since they refers to different trustees	Items address different characteristics

Table 4. (Continued)

Paper	Measurement model(s) used for trust	Correctly specified?	Reason
Mithas, Jones and Mitchell (2008)	Reflective	No, should be formative	Items address different characteristics
Montazemi, Pittaway, Qahri, Saremi and Wei (2012)	Reflective	?, items not reported	
Montoya et al. (2010)	Reflective	No, should be formative	Items address different characteristics
Nelson and Cooprider (1996)	Reflective	No, should be formative	Items address different characteristics Furthermore, partly measuring reputation not trust.
Nicolaou and McKnight (2006)	Reflective	No, should be formative	Items address different characteristics
Pavlou (2002)	NA	NA	Focus on dimensions benevolence and credibility
Pavlou and Dimoka (2006)	NA	NA	Focus on dimensions benevolence and credibility
Pavlou and Fygenson (2006)	Reflective	No, should be formative	Items address different characteristics
Pavlou and Gefen (2004)	Reflective	No, should be formative	Items address different characteristics
Pavlou and Gefen (2005)	Reflective	No, should be formative	Items address different characteristics
Pavlou, Huigang and Yajiong (2007)	Reflective	No, should be formative	Items address different characteristics
Pennington et al. (2003)	Reflective	No, should be formative	Items address different characteristics
Posey, Lowry, Roberts and Ellis (2010)	Reflective	?, items not reported	Items address different characteristics
Qureshi et al. (2009)	Reflective	No, should be formative	Items address different characteristics
Ridings, Gefen and Arinze (2002)	NA	NA	Focus on dimensions of trust
Robert Jr. et al. (2009)	Reflective	Disposition to trust: No, should be formative	Items address different characteristics
		Trust belief and trust intentions: Yes	Items focus on consequences
Rustagi, King and Kirsch (2008)	Reflective	No, should be formative	Items address different characteristics
Sia et al. (2009)	Reflective	No, should be formative	Items address different characteristics
Son, Narasimhan and Riggins (2005)	Reflective	No, should be formative	Items address different characteristics
Staples and Webster (2008)	Reflective	Yes	Items focus on consequences
Stewart (2006)	Reflective	No, should be formative	Items address different characteristics

Paper	Measurement model(s) used for trust	Correctly specified?	Reason
Stewart and Gosain (2006)	Reflective	Affective trust: Yes	Items focus on consequences
		Cognitive trust: No, should be formative	Items address different characteristics
Sun (2010)	Reflective	Affective trust: Yes	Items focus on consequences
		Cognitive trust: No, should be formative	Items address different characteristics
Teo et al. (2009)	Reflective	No, should be formative	Items address different characteristics
Turel et al. (2008)	Reflective	No, should be formative	Items address different characteristics
Van der Heijden, Verhagen and Creemers (2003)	Reflective	No, should be formative	Items address different characteristics
Van Slyke et al. (2006)	Reflective	No, should be formative	Items address different characteristics
Vance et al. (2008)	Second-order – formative + reflective	Yes	Reflective measurement of the different formative dimensions
Venkatesh and Bala (2012)	Second-order – formative + reflective	Yes	Reflective measurement of the different formative dimensions
Venkatesh, Thong, Chan, Hu and Brown (2011)	Reflective	No, should be formative	Items address different characteristics
Verhagen, Meents and Yao-Hua (2006)	Reflective	No, should be formative	Items address different characteristics
Wang and Benbasat (2005)	Second-order – reflective + reflective	No, should be second-order- formative + reflective	Reflective measurement of different formative dimensions
Wang and Benbasat (2008)	Reflective	No, should be formative	Items address different characteristics
Zahedi and Song (2008)	Reflective	?, items not reported	

The results of our analysis of the quality of the measurement model specification in IS trust research show that measurement model mis-specification might be a serious issue in IS trust research. In the majority of the reviewed papers, formative indicators were used for a reflective measurement of the respective trust constructs. Despite this negative observation, we also found several measurement models that are correctly specified based on the decision rules provided by Jarvis et al. (2003). According to measurement theory, these measurement models should ensure a valid and reliable measurement of trust in related studies.

DISCUSSION

The goal of this chapter was to systemize and condense the results from different research areas by conducting a systematic literature review, to create a consistent knowledge base of the various insights on different antecedents of trust valuable for designing information systems. In particular we aimed at answering the two following research questions:

1. What different antecedents of trust have been identified in the IS literature?
2. How reliable are the reported results in terms of measurement model specification?

Based on our results presented in the previous section, we can on the one hand conclude that a plethora of different antecedents of trust across the different trust relationships has been identified. On the other hand, we found that measurement model mis-specification – especially using formative indicators for a reflective measurement – is prevalent in many IS trust studies. According to Diamantopoulos and Siguaw (2006), using formative indicators – according to trust theory – for a reflective measurement can result in Type I errors. As a result the observed significant structural relationships in the respective studies might be found significant because of measurement model mis-specification.

We cannot answer the question, which structural relationships really are insignificant due to the Type I error. Furthermore, we think it is not appropriate to criticize IS trust research in general, since the issue of measurement model mis-specification has not been highlighted before the end of 2007. Taking a publication lag of about two years into account, we could only expect that studies from 2010 on systematically tried to avoid measurement model mis-specification. Taking a look in our results, we can indeed observe that IS trust researchers did not ignore this problem. Lowry et al. (2008) and Vance et al. (2008), e.g., explicitly address measurement model mis-specification and thus use second-order measurement models to avoid this issue. This development could also be observed in other IS trust studies in subsequent years (Klein & Rai, 2009; Venkatesh & Bala, 2012).

Nevertheless, we also found several studies from 2010 on that did not account for measurement model mis-specification. This observation shows that the issue of measurement model mis-specification has not reached all the reviewers of top journals and IS trust researchers. As a result we want to again highlight that measurement model mis-specification still is prevalent in IS trust research, and is weakening the reliability of our knowledge base.

We think it is reasonable to claim that IS trust research has created a respectable knowledge base and that this knowledge base will help overcoming future challenges, e.g., regarding the design of increasingly automated IT artifacts. Nevertheless, IS trust research

should not lean back, since, e.g., Luhmann (1979) pointed out that the technological development will make trust even more important. Thus, further trust research will be necessary to overcome the trust-related challenges created, e.g., by the current trend towards increasingly automated, opaque and ubiquitous information systems.

LIMITATIONS

Our review is not without limitations, which we shortly want to highlight in this section. First, our assessment of the quality of the measurement models is only based on the decision rules provided by Jarvis et al. (2003). We are aware of argumentation, e.g., by Gefen (2004) that a reflective approach is appropriate since the respondents can hardly differentiate between the ability, benevolence and integrity of a vendor. Nevertheless, we decided to stick to a given evaluation instrument and presented the results we observed when reviewing whether the measurement model fulfilled these guidelines.

Second, we did not rely on any quantitative quality criteria for assessing the measurement models. Papers such as Cenfetelli and Bassellier (2009), Gefen, Ridgon and Straub (2011) and Ringle, Sarstedt and Straub (2012) provide insights on the most recent quality criteria for both, formative as well as reflective measurement models.

CONCLUSION

In this chapter, our goal was to systemize and condense the results from different research areas by conducting a systematic literature review, to create a consistent knowledge base of the various insights on different antecedents of trust valuable for designing information systems. In particular, we aimed to answer two research questions:

1. What different antecedents of trust have been identified in the IS literature?
2. How reliable are the reported results in terms of measurement model specification?

To achieve this goal, we conducted a systematic literature review among the papers published in the eight journals of the senior scholars' basket of journals between 1995 and 2012. Based on a keyword search, we identified 167 possibly relevant articles of which 77 were included in our review after an initial screening of the articles.

The results of the literature indicate that IS trust research investigates four kinds of trust relationships: trust between human beings and a) other human beings, b) organizations, c) institutions and d) IT artifacts. Regarding the identified antecedents of trust, we observed that a plethora of antecedents has been identified, and that most of these antecdents are related to the trust relationship between human beings and organizations, whereas comparably few antecedents for the trust relationships between human beings and institutions were identified. Furthermore, our analysis of the quality of measurement model specification showed that measurement model mis-specification is existent in IS trust research and weakens the reliability of the knowledge base. Despite the fact that some recent papers addressed this issue and used correctly specified measurement models, other recent papers still suffer from

measurement model mis-specification. We thus again highlight the importance of specifying measurement models correctly to increase the reliability of the IS knowledge base on trust for supporting IS trust research to overcome the upcoming challenges created, e.g., by the advent of increasingly automated and ubiquitous information systems.

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