

Same Same But Different? A Two-Foci Perspective on Trust in Information Systems

Matthias Söllner
University of Kassel
soellner@uni-kassel.de

Abstract

Trust is one of the most important factors driving the adoption and use of information systems. The goal of this paper is to provide a first evaluation of a conceptual piece claiming a) that users distinguish between their trust in an IS and the provider of this IS and b) that both kinds of trust are important for the success sustainable success of IS providers. To evaluate the claims, a research model is developed and evaluated using data of 234 students during the introduction of a new IS at an European university. The results provide support for both claims, since the correlation between the two trust constructs is low, and the nomological networks differ. Regarding the importance of both constructs, trust in the IS is found to have an important impact of the use of the IS, whereas trust in the provider is a major driver of the users' loyalty.

1. Introduction

Today, it is undisputed that IT provides value for almost every company. One cornerstone of leveraging the potential business value of IT are information systems (IS). To add value, these IS must be adopted and used by their intended users, no matter whether a company focuses on selling IS on the market (external users) or whether IS are used to keep the business going (internal users). Research and practice have shown that designing IS in a way that they are readily adopted and used by their intended users is not trivial. For example, a stream of literature focuses on user resistance, exploring reasons why users reject to adopt and use new IS [see, e.g., 33]. To support designers in their challenge to design IS that encounter no resistance but are readily adopted and used, researchers have identified numerous factors driving IS adoption and use [see, e.g., 7, 13].

One of the most important factors driving the adoption and use is trust [see, e.g., 13, 29, 43]. 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 [23, p. 712]. The importance of trust is manifold – ranging from a “key to understanding the relationship development process” [26, p. 32] to being “a glue that holds the relationship together” [35, p. 156]. Additionally, the concept of trust is widely used in many different research disciplines, such as marketing, psychology, information systems and strategic management [10]. Thus, even within the IS discipline, multifarious research approaches to study trust and trust relationships exist [37].

When referring to trust relationships, IS researchers usually mean relationships among human beings that are mediated by IT [38]. Jarvenpaa and Leidner [17], e.g., have focused on communication behaviors that build trust between global virtual team members. However, due to developments such as increasing automation [21], recent IS trust research argued that IS can take another role in a trust relationship [24, 39]. In addition to mediating trust relationships between human beings, IS can become part of the trust relationship itself.

Recommendation agents [43], for example, are not used to mediate a trust relationship between human beings, but to support their users in achieving a specific goal. Thus, they become trustees in a trust relationship between the human user and the IS [39]. However, multiple authors argue that an IS cannot be completely separated from the human entity that provides the IS [11, 41]. This co-existence of different trust relationships is unique phenomenon to our context. Instead, prior research in IS [see, e.g., 25], as well as management [see, e.g., 12]. In such situation, both trust relationships or more precisely the different trustees – in this study the system as well as the provider from the user's point of view – should be studied simultaneously with a special focus on their interplay as well as their distinct effects. The resulting insights would very likely contribute to a better

understanding of the distinct effects in this context, and would support IS providers in building both, users' trust in their IS as well as in them as providers of high quality IS.

Nevertheless, these thoughts have their roots in conceptual works [11, 41]. Therefore, in this paper, an empirical study is conducted to provide a first evaluation. The focus lies on the question whether empirical evidence can be found that supports the claims a) that the users distinguish between their trust in an IS and the provider of this IS and b) that both constructs are important for the sustainable success of IS providers, and thus should be studied simultaneously.

The remainder of the paper is structured as follows. The next section provides theoretical background on trust in IS. Afterwards, the research model and the hypotheses are developed. The fourth section describes the research method used in this study, before the results are presented in section 5. After a discussion of the results including limitations and future research areas in section 6, the paper closes with a conclusion.

2. Theoretical Background

2.1. People Trust People not Technology versus Computers are Social Actors

When reviewing the literature, contributions on trust in technology artifacts – such as information systems – often relate to the discussion in the field about the suitability of the concept of trust when studying relationships between humans and technology. Usually, the following two contradictory views are presented and discussed [24, 39, 43].

Friedman et al. [11] argue that the ability to trust requires consciousness and agency, and that these characteristics cannot be attributed to a technological artifact. Based on this argumentation, they concluded that trust is not a suitable concept to study relationships between users and technology, and posit: “people trust people, not technology” [11, p. 36].

The second view is based on the view that computers are social actors [27]. This paradigm is based on experimental findings that humans treat IT artifacts as if they were human beings, rather than simple tools [43]. Nass et al. [27], e.g., showed that participants in a computer tutoring session provided more positive feedback when they had to provide feedback after the tutoring session directly on the same computer compared to an evaluation on another computer or a paper-based evaluation. This effect is comparable to the effect that humans tend to be more polite when they are directly asked for feedback compared to being

indirectly asked. For example, students tend to provide more positive feedback towards a lecturer if the lecturer asks them directly versus an indirect online or paper-based evaluation. However, researchers emphasized that this behavior does not mean that users think that technological artifacts are really human. It should sooner be interpreted that people interact with technology in a way comparable to their interaction with other human beings and apply social rules to them [27].

Söllner et al. [41] argue that both views are not as conflictive as often perceived. According to them, both views can be integrated into a single integrative view. They agree with Friedman et al.'s [11] argumentation that both consciousness and agency cannot be attributed to technology. However, they disagree with the resulting conclusion that the concept of trust is therefore generally unsuitable when studying relationships between human beings and technology, since there are two roles a party can take in a trust relationship: the trustor – the party who judges the trustworthiness of the trustee and decides whether or not to give trust and accept vulnerability – and the trustee – who receives trust from the trustor. Based on these two roles, Söllner et al. [41] argue that all three assessments need to be made by the trustor when deciding whether or not to trust the trustee. Consequently, an IS cannot take the role of a trustor in a trust-relationship between a human being and an IS, since it cannot make the assessments to judge whether trusting is a good idea or not. However, the whole argumentation does not address the suitability of an IS to take the trustee's role. As a result, they disagree with Friedman et al.'s [11] conclusion that the trust concept in general is unsuitable for relationships between human beings and IS. Instead, they argue that a suitable conclusion would be that trust is a suitable concept for studying such relationships, as long as a human being takes the role of a trustor and the IS takes the trustee's role.

Whereas Friedman et al. [11] discussed the characteristics of a trustor in a trust relationship between a human being and technology, the computers are social actors paradigm focuses on how a human trustor perceives technology taking the trustee's role. Considering a word-elicitation study by Jian et al. [19], who examined how a human trustor perceives an computer taking the trustee's role. The results show that humans do not consider technological artifacts as being human. Nevertheless, they respond socially to these artifacts, e.g., by being polite, and viewing them as teammates [43], indicating that people attribute human characteristics to technological artifacts, such as IS.

In sum, the argumentations found in the literature support the view that trust is in general a suitable concept for studying relationship between human beings and artifacts – such as IS. However, the IS can only take the role of a trustee in such a relationship.

2.2. The Suitability of Interpersonal Trust Theory when Studying Trust in Information Systems

Another discussion in the literature is which theoretical foundations should be used to study trust relationships between human beings and IS.

One approach followed by IS researchers is to adopt interpersonal trust theory for studying trust in IS. Based on the computers are social actors paradigm, Wang and Benbasat [43] were among the first to argue that trust in IS – in their case, recommendation agents – is an extension of interpersonal trust, since human beings show social responses, such as attributing human characteristics to IS. As their main argument, they used the word-elicitation study [19] who showed that people use words, such as integrity, honesty, cruelty, and harm to characterize trust-related behavior of IT artifacts. As a result, they adopt foundations from interpersonal and interorganizational trust research for studying the importance of trust in the context of recommendation agents. This approach has also been used by subsequent studies addressing trust in IT artifacts. Komiak and Benbasat [20] used interpersonal trust theory for investigating the impact of personalization and familiarity on trust in recommendation agents. Vance et al. [42] and Lowry et al. [22] also used interpersonal trust theory to study trust in websites.

During the last years, the use of interpersonal trust theory for assessing trust in IS has encountered criticism, and alternative approaches have been presented. Both McKnight et al. [24] and Söllner et al. [38] offered argumentations and empirical evidence to support their view that interpersonal trust theory is not suitable to study trust relationships between humans and IS. McKnight et al. [24] argue that interpersonal trust theory is not suitable to studying trust in IS because the trustee is different. Whereas a human trustee in an interpersonal trust relationship has characteristics such as consciousness and moral agency, an IS lacks these characteristics and should be interpreted as a “human-centered artifact with a limited range of capabilities that lacks violation (i.e., will) and moral agency” (p. 12:15).

Söllner et al. [38] used a related argumentation focusing on the fact that the interpersonal trust dimension of benevolence implicitly assumes that the trustee is able to make a decision whether or not to be

benevolent. The authors argue that an IS cannot make such a decision since it follows a predefined logic or algorithm; these cannot be compared with human decision making. Furthermore, Söllner et al. [38] cite two NeuroIS studies providing empirical evidence for their view. The first study compares people’s trust in humans and human like avatars, and shows that different regions of the brain are active during the decision whether or not to trust another human being, compared to a human-like avatar [32]. Since the second study points out that activities on brain regions are related to cognitive processes, this provides support for the view that people do not follow the same assessment when deciding to trust an IT artifact, as compared to deciding to trust a human being [9].

The two presented views resemble extreme positions on the suitability of using interpersonal trust theory to assess trust in IT artifacts. Whereas one view [20, 22, 42, 43] completely relied on interpersonal trust theory without any noticeable adaptations, the second view [24, 38] completely denied that this is appropriate and developed new approaches.

Söllner et al. [41] aim at finding a way in between, arguing that interpersonal trust theory cannot be adopted for studying trust in IS without adaptation, since McKnight et al. [24] and Söllner et al. [38] both provide good argumentations, and the studies by Riedl et al. [32] and Dimoka et al. [9] provide empirical evidence that people rely on different assessments to judge whether or not to trust an IS compared to trust in a human being. However, Söllner et al. [41] argue that an IS can hardly be judged without keeping the responsible human counterpart in mind – the provider of the IS. As a result, they suggest that trust in an IS should not be studied without examining the trust in the provider of the IS. Therefore, two different constructs should be used to study trust in IS:

- trust in the IS itself, focusing on characteristics of the IS, and
- trust in the provider of the IS, focusing on characteristics of the provider.

2.3. Trust in the Information System versus Trust in the Provider

The relationship between a user and the provider of the IS is a normal interpersonal trust relationship. Consequently, it is suitable to rely on the theoretical foundations of interpersonal trust, such as those created by psychologists, sociologists, as well as management and IS scholars. One of the most common works on interpersonal trust is Mayer et al. [23], conceptualizing that trust is driven by three different dimensions:

- ability,

- benevolence, and
- predictability.

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 follows not only 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 [23].

Since research on trust relationships between people and IS is still comparably scarce, there is no widely accepted conceptualization of the different dimensions of trust which reflect characteristics of IS, yet. Söllner et al. [41] rely on the works by McKnight et al. [24] and Söllner et al. [38] to conceptualize three dimensions of trust in an IS:

- performance,
- helpfulness, and
- predictability.

Performance refers to the user's perception of the IS competence as demonstrated by its ability to help the user to achieve his or her goals. This is important, because if the user does not think that the IT artifact can help to achieve the desired goal, he or she will not trust the IS. *Helpfulness* refers to the user's perception that he or she can get support if necessary. This is important, because the user wants to have the feeling that the IS adapts to his needs, purporting that supporting the user in the best way possible is really the main goal of the IS. *Predictability* refers to the user's perception that he or she can predict the behavior of the IS to a certain degree. This is important, since the user knows he or she will in most cases not be able to understand how the IS works in detail. But this is not necessary as long as the behavior of the IS does not confuse the user. Consequently, if the user has the perception that he or she can predict the behavior of the IS to a certain extent, he or she will be more willing to trust the IS [41].

3. Hypotheses Development

As pointed out in the introduction, the main purpose of the paper is to contribute to the empirical evaluation of the conceptual work by Söllner et al. [41]. Since their main point is that research on trust in IS should focus on two instead of one trust constructs, the main question is whether the users really do perceive the IS and the provider as two different, and important trustees. This question can be answered by analyzing the discriminant validity of both constructs, as well as their nomological networks. A high discriminant validity, and differences in the nomological network

would indicate that the users do differentiate between the two trustees. Regarding the importance of both constructs, relevant impact on core dependent variables of technology acceptance research would indicate that both constructs are important in this context. If the evaluation would show a comparably low discriminant validity, and that the nomological networks are hardly different, this would indicate that the users might not differentiate between these two trustees and thus the inclusion of both constructs could create redundant effects. Furthermore, even if a high discriminant validity, and different nomological networks are existent, no or low effects on core dependent variable would indicate a low importance of a construct. These thoughts guide the development of the hypotheses presented in the subsequent paragraphs. Regarding dependent variables vital for the sustainable success of IS providers, two major constructs can be found in the literature: use and loyalty.

Especially in the era of cloud computing and pay-per-use business models, IS providers are more dependent that their IS are actually used compared to license-based business models. IS use (USE in Figure 1) might be the most extensively studied variable in IS research, and understanding why people use IS is still one key research area of the IS discipline [28]. Prior research has shown that trust is an important antecedents of IS use in different contexts [see, e.g., 13, 25, 29]. A key argument for the influence of users' trust in an IS on the use of the IS is that trust is a mechanism helping to overcome uncertainty [23]. In the context of IS, the uncertainty perceived by the users is grounded in the fact that most users are not able to completely understand how an IS works. The existence of trust in the IS – e.g., based descriptions of the IS or reviews – will help overcoming this uncertainty. Furthermore, the existence of trust in the provider of the IS – e.g., based on prior experiences with other IS of the provider – will also help overcoming this uncertainty. However, the effect of trust in the provider is supposed to be smaller than the effect of trust in the IS, since the IS will only be used if it is perceived as contributing to the solution of a particular problem of the user. These arguments lead to two hypotheses:

- H1a: The users' trust in an IS will positively affect their use of the IS.
- H1b: The users' trust in the provider of an IS will positively affect their use of a particular IS, however, this effect is expected to be weaker than the effect posited in H1a.

Keeping the lifecycle of products and services in mind, having one heavily used IS is in most cases not enough to ensure a sustainable success on the market. Consequently, IS providers need loyal users that will

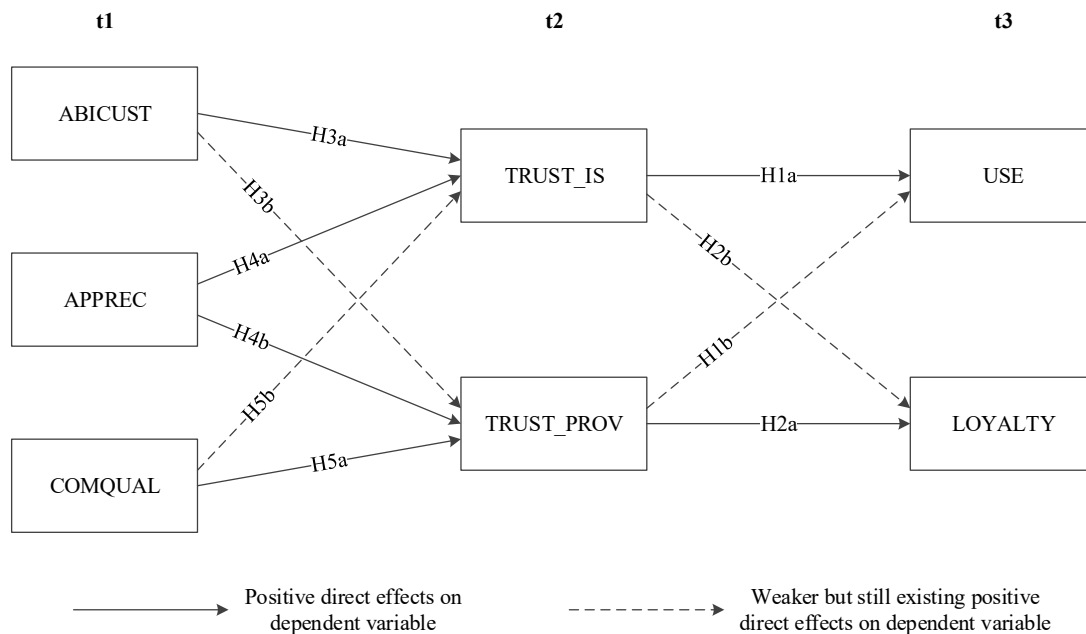


Figure 1. Research model

also new or other IS of the same provider. As a result, loyalty (LOYALTY) is incorporated as the second core dependent variable in our research model. For the impact of trust on loyalty, the arguments are quite similar. Trust is built when the seller of a product or provider of a service or IS is able to meet the expectations of the users [23]. Consequently, when it comes to the decision whether to recommend the provider or to use another IS of the same provider, the users are more likely to behave in a provider's interest when they trust the provider. Furthermore, users who trust a particular IS are more likely to recommend the provider of the IS to other people or to also use other IS of the same provider. This behavior can, e.g., be observed in the context of smartphones or tablets, where most people decide for a particular provider instead of, e.g., using a smartphone provided by Apple and an Android tablet. These arguments also lead to two hypotheses:

H2a: The users' trust in the provider of an IS will positively affect their loyalty.

H2b: The users' trust in an IS will positively affect their loyalty, however, this effect is expected to be weaker than the effect posited in H2a.

Regarding the antecedents, the aim was to find a total of three antecedents. One antecedent is supposed to have a comparable effect on both trust constructs, whereas the other two should have the primary effect (stronger effect) on one of the trust constructs and a secondary effect (still existent but weaker) on the other construct. This accounts for the idea of Söllner et al. [41] that the constructs are distinct but the users are

not able to completely separate them cognitively. This led to the inclusion of three antecedents that fulfil the requirements: ability to customize (ABICUST), appreciation of feedback (APPREC), communication quality of the provider (COMQUAL).

Today, users expect to be able to customize the products and services they use to fit their preferences the best way possible. This observation led to the mass customization of products [see, e.g., 30], e.g., using product configurators having the customers choose the color of their shoes or the design of the t-shirts. Even though services and IS cannot that easily be customized, certain related design feature, such as the starting page of IBM's Lotus or Google Chrome, empowering the users to customize there IS can be observed. Since users use an IS to achieve a certain goal, the ability to customize the IS should help a user to better achieve his or her goal. Thus, the ability to customize should increase his or her trust in the IS. Furthermore, the users will recognize that the provider of the IS is benevolent, since he provides this opportunity – reflecting that he has the interests of the users in mind. Thus, the ability to customize should also increase a user's trust in the provider of the IS. However, the effect on the provider is supposed to be smaller than the effect on the particular IS that can actually be customized. These arguments lead to two further hypotheses:

H3a: The users' ability to customize an IS will positively affect their trust in the IS.

H3b: The users' ability to customize an IS will positively affect their trust in the provider of

the IS, however, this effect is expected to be weaker than the effect posited in H3a.

By the advent of the Web 2.0 at latest, users no longer want to just consume products, services or IS, but many users want to actively contribute to the improvement of existing or the development of new products, services and IS. This trend has, e.g., led to the uprise of idea communities trying to systematically capture and exploit the ideas of users [3]. However, for building the trust of users, it is important that the users have the feeling that their feedback is appreciated. This is sometimes problematic, when, e.g., administration departments or the cafeteria of a university implement feedback mechanisms, but nothing happens. As a consequence, the customers feel that their feedback is not appreciated, but just collected because some authority ordered that a feedback mechanism needs to be implemented. Consequently, the feedback gathered, e.g., by the users of an IS should be appreciated and this appreciation should be communicated back to the users. If the users perceive their feedback to be appreciated, e.g., by the implementation of related features, this has a positive impact on their trust in the particular IS, since improving an IS based on the ideas of the users should result in the IS being better able to help the users achieve their goals. Furthermore, the party that actually appreciates the feedback is the provider of the IS. Consequently, the appreciation of the users' feedback will also have an effect on the users' trust in the provider. Here, the effects are expected to be comparably strong, since the provider is the party that requests feedback and handles the process of capturing and exploiting the ideas, whereas new features will be implemented in the particular IS resulting in the IS being better suited to support the users. These arguments lead to another set of two hypotheses:

H4a: The appreciation of the users' feedback on an IS will positively affect their trust in the IS.

H4b: The appreciation of the users' feedback on an IS will positively affect their trust in the provider of the IS.

Regarding communication quality, Iacovou et al. [16] showed that the quality of an executive's communication, as perceived by the receivers of the information, is a major driver of the receivers' trust in the executive. The same argument seems true for the communication quality of the provider of an IS. When the users perceive the provider to distribute information in the right quality, e.g., timely when a problem occurred including information when the problem will probably solved or when the provider can keep up to promises regarding the down-time of an IS for maintenance, this has a positive effect on the users' trust in the provider, because it provides a feeling of

dealing with a competent provider that sticks to his announcement (addressing the interpersonal trust dimensions ability and integrity). Furthermore, the communication quality of the provider should also affect the users' trust in the system, since at least some of the communication will be related to the specific IS in use. Now, assuming that the provider is, e.g., able to always handle the maintenance of the IS as communicated, this would indicate that there are no problems with the IS, and it works as expected (addressing the performance dimension). However, since the communication of the provider will only partly be related to the specific IS a user uses, the effect on the trust in the provider is expected to be stronger than the effect on users' trust in the IS. These arguments lead to the final two hypotheses (Figure 1 provides a graphical illustration of the research model including all hypotheses):

H5a: The communication quality of the provider will positively affect the users' trust in the provider.

H5b: The communication quality of the provider will positively affect their trust in an IS of the provider, however, this effect is expected to be weaker than the effect posited in H5a.

4. Research Method

To evaluate the research model, data was collected in the course of the introduction of a new IS at an European university. The IS was rolled out to all students of the university in October 2014, and the goal of the IS was to consolidate all the information the students needed, which were scattered across multiple systems and websites before. However, it needs to be mentioned that the IS was introduced parallel to the existing information, meaning that, e.g., students in the higher semesters, did not have to change their behavior, and would still all find all the necessary information as before. Thus, the use of the new IS was and still is voluntary. The IS is suitable to study the research model presented in the study, since the students are able to customize the system to better fit their individual needs. Furthermore, the students are able to provide feedback on the IS, and news and updates are communicated by the provider of the IS on a regular basis.

In the course of the introduction process of the new IS, the university's internal IT service center – the provider of the IS – visited all the large scale lectures they could, as well as established information points at events, such as the university' career fair. Additionally, an email officially introducing the IS and its features to the students was sent out to all students. Afterwards, about one week later in the

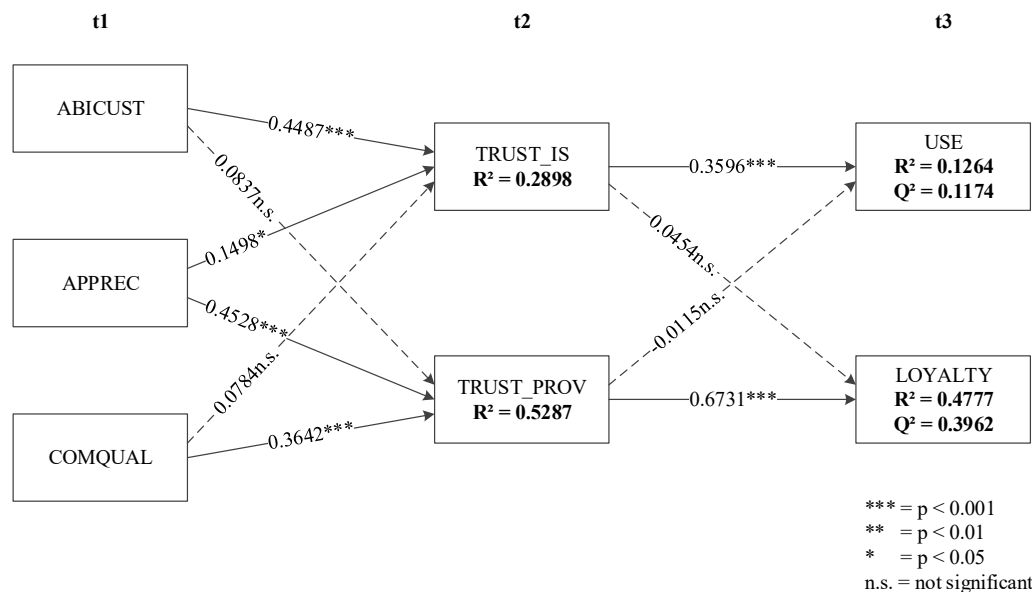


Figure 2. Evaluated research model

beginning of November 2014, another email was sent out to all students introducing a complementary longitudinal study, aiming to understand the acceptance of the new IS among the students and how the perception change over the course of a semester. Furthermore, the students had the possibility to provide recommendations how the IS should be improved in the future. If the students signed up for the study, they receive an email containing a personalized link to a web questionnaire, which takes about 20 minutes to complete, every three weeks. The data used in this paper was gathered in the course of the study mentioned above. In detail, the data used for measuring the antecedents was collected during the third and fourth week of November 2014 (t1, see Figure 1). The data for measuring the subsequent dependent variables was collected during the second and third week of December 2014 (both trust constructs, t2, see Figure 1), and during the last week of December 2014 and the first week of January 2015 (use and loyalty, t3, see Figure 1). The study continued afterwards, but this study relies on the data gathered during this time period. Whenever possible, established scales were used (for details please see https://github.com/thiemowa/OnlineAppendixHICSS2020_Measurmenet_Items). In total, 234 students completed all three web questionnaires, and thus provided the data used in this paper.

This research design allows to rule out possible effects of common method variance, since the data for the dependent and independent variables were collected at different points in time [31]. This is especially important due to the potential impact of common

method variance in technology acceptance research [34], and due to the issue that there is still no valid statistical remedy to control for common method variance once the data is collected [6].

For analyzing the data, the PLS approach [4] was used (SmartPLS 3.0 [36]). This decision is based on the fact that the PLS algorithm is better suited to analyze models including formative constructs [5, 14]. Hair et al. [15] served as guidance for reporting results.

5. Results

5.1. Measurement Models

Since reflective and formative measurement models were used, and that both need to be evaluated using different quality criteria [4]. Beginning with the evaluation of the reflective measurement models, first the composite reliability (ρ_c), the average variance extracted (AVE) and the cross-loadings for the single indicators are assessed.

The results show that all loadings despite the loading of COMQUAL1 (0.6152) are higher than 0.8 (should be above 0.707), and every indicator has the highest loading on its desired construct. Additionally, the composite reliability for all constructs is higher than 0.9 (lowest is 0.9070, should be above 0.707) and the AVE is above 0.7 (lowest is 0.7085, should be above 0.5). Since the COMQUAL1 indicator is based on an established scale, above 0.6 and the composite reliability for the COMQUAL construct is above 0.9, there is no need to drop this indicator. Thus, the reflective measurement models fulfil these three

quality criteria [4]. Next, the correlation among all constructs is evaluated. Since square root of the AVE of each construct is higher than any correlation with another construct, the reflective measurement models also fulfil this quality criterion [4].

After having shown that the reflective measurement models fulfil the desired quality criteria, the focus now lies on the evaluation of the formative measurement models. Since both formative constructs were measured by using reflective first-order, formative second-order measurement models [18], a two-step approach [see, e.g., 43], was used to compute the factor scores for the first-order constructs. Afterwards the factor scores were used for a formative measurement of the second-order constructs. The evaluation of these measurement models is guided by the six guidelines for evaluating formative measurement models [for details please see 2].

The results show that the formative measurement models fulfil the guidelines. For all indicators, the variance inflation factor (VIF) is below the limit of 3.33 [lowest is 0.2949, 8]. Furthermore, no non-significant indicators or negative factor weights could be observed. Thus, guidelines two and three are fulfilled, and it is not necessary to review the indicator loadings (guideline four). Since this is the first study to empirically assess the conceptualization by Söllner et al. [41], the factor weights across different studies cannot be compared (guideline five). Regarding the sixth guideline, it needs to be mentioned that the factor weights might be slightly inflated due to the use of the PLS technique [2].

In summary, the evaluation of our reflective and formative measurement models shows that they fulfil the desired quality criteria.

5.2. Structural Model

Figure 2 summarizes the results on the path coefficients, the R² of the endogenous constructs, and the Q² of the reflectively measured endogenous constructs [15]. Since the aim of the study is not to explain a huge amount of variance or to predict certain constructs, but to understand differences and similarities in the nomological networks of the two trust constructs, the R² and Q² values will not be discussed in further detail, since there are no values present that would indicate any problems.

In total, there is support for 6 of the 10 hypotheses in the data. H1a suggests that users' trust in an IS will positively affect their use of the IS. Since the results show a significant relationship (path coefficient = 0.3596, $p < 0.001$), H1a is supported by the data. H1b suggests that users' trust in an IS will positively affect their loyalty towards the provider of the IS. Since the

results do not show a significant relationship (0.0454, n.s.), H1b is not supported by the data. H2a suggests that the users' trust in the provider will positively affect their loyalty towards the provider. Since the results show a significant relationship (0.6731, $p < 0.001$), H2a is supported by the data. H2b suggests that the users' trust in the provider will positively affect their use of the IS under investigation. Since the results do not show a significant relationship (0.0115, n.s.), H2b is not supported by the data. H3a suggests that the users' ability to customize an IS will positively affect their trust in this IS. Since the results show a significant relationship (0.4487, $p < 0.001$), H3a is supported by the data. H3b suggests that users' ability to customize an IS will positively affect their trust in the provider of the IS. Since the results do not show a significant relationship (0.0837, n.s.), H3b is not supported by the data. H4a suggests that the appreciation of the users' feedback will positively affect their trust in the IS. Since the results show a significant relationship (0.1498, $p < 0.05$), H4a is supported by the data. H4b suggests that the appreciation of the users' feedback will positively affect their trust in the provider. Since the results show a significant relationship (0.4528, $p < 0.001$), H4b is supported by the data. H5a suggests that the communication quality of the provider will positively affect the users' trust in the provider. Since the results show a significant relationship (0.3642, $p < 0.001$), H5a is supported by the data. H5b suggests that the communication quality of the provider will positively affect the users' trust in the IS they use. Since the results do not show a significant relationship (0.0784, n.s.), H5b is not supported by the data.

Due to the fact that significance alone is not an indicator of importance [15], the effect size f^2 of each relationship should be assessed next. However, since H1b, H2b, H3b and H5b could not be supported based on the data, a comparison of the effects sizes is not necessary, since there is no significant direct effect between the independent and dependent variables. Only for H3a and H3b a comparison is useful, since the effects of appreciation of the users' feedback on the users' trust in the IS and the users' trust in the provider of the IS were expected to be comparable. However, a comparison of the f^2 values shows that the effect on trust in the provider ($f^2 = 0.3357$, resembling a large effect according to [15]) is stronger than the effect on trust in the IS ($f^2 = 0.0230$, resembling a small effect).

6. Discussion

The goal of this study was to provide a first empirical evaluation of the conceptual work by Söllner

et al. [41]. In particular, the evaluation focused on the claims a) that users distinguish between their trust in an IS and the provider of the IS and b) that both constructs are important for the sustainable success of IS providers, and thus should be studied simultaneously. The results provide empirical support for both claims. Regarding the first claim, the results show a low correlation among the two constructs, as well as a wide difference in the nomological networks of both constructs. The difference is even bigger than expected based on theory, since no empirical support for hypotheses 1b, 2b, 4b and 5b could be found. The second claim is supported since both constructs have distinct impact on two important dependent variables. Trust in the IS was shown to have a significant impact on the use of an IS, but no significant impact on the loyalty of the users. Vice versa, trust in the provider was shown to have a significant impact on the loyalty of the users, but no significant impact on the use of an IS provided by them. Since IS providers are dependent on loyal users that actively use their IS, they need to understand how both kinds of trust can be built.

According to Benbasat and Barki [1], IS research on technology adoption and acceptance should support practitioners with design-oriented advice for IS development and provision. The results presented in this paper are a first step towards achieving this goal. They indicate that IS providers need to focus on establishing two different kinds of trust – users' trust in their IS and in them as a trustworthy IS provider. Regarding the question how IS providers can build each kind of trust, the results show that the ability to customize an IS to their individual needs and the appreciation of the users' feedback are drivers of the users' trust in an IS. Furthermore, IS providers that appreciate the feedback of their users, e.g., by implementing related features, and that have a professional communication, e.g., timely response, are more likely to receive the trust.

However, further research is necessary to better support IS providers in achieving a sustainable success on the market. Despite numerous studies investigating antecedents of interpersonal trust, there are comparably little insights on the antecedents of human trust in an IS (see, e.g., Söllner and Leimeister [40] for an overview on the antecedents of trust studied in IS trust research). Thus, future research should aim at generating insights on important antecedents of trust in an IS and translate these insights into design-oriented advice for IS providers.

7. Conclusion

Today, it is undisputed that IT provides value for almost every company. One cornerstone of leveraging

the potential business value of IT are IS. To add value, these IS must be adopted and used by their intended users, no matter whether a company focuses on selling IS on the market (external users) or whether IS are used to keep the business going (internal users). One of the most important factors driving the adoption and use is trust [see, e.g., 13, 29, 43]

The goal of this paper was to provide a first empirical evaluation of the conceptual piece by Söllner et al. [41]. The results provide support for both major claims, since the correlation between the two trust constructs is low and their nomological networks are different. Furthermore, users' trust in an IS has an important impact on the use of this IS, whereas users' trust in the provider is vital for building loyalty between the users and the provider.

8. References

- [1] Benbasat, I. and H. Barki, "Quo vadis TAM?", *Journal of the Association for Information Systems*, 8(4), 2007.
- [2] Cenfetelli, R. and G. Bassellier, "Interpretation of Formative Measurement in Information Systems Research", *MIS Quarterly*, 33(4), 2009, pp. 689–707.
- [3] Chesbrough, H.W., *Open innovation: The new imperative for creating and profiting from technology*, Harvard Business School Press, Boston, Mass., 2003.
- [4] Chin, W.W., "The Partial Least Squares Approach to Structural Equation Modeling", in *Modern Methods For Business Research*, G.A. Marcoulides, Editor. 1998. LEA: London.
- [5] Chin, W.W. and P.R. Newsted, "Structural Equation Modeling Analysis with Small Samples Using Partial Least Squares", in *Statistical Strategies For Small Sample Research*, R.H. Hoyle, Editor. 1999. Sage: Thousand Oaks.
- [6] Chin, W.W., J.B. Thatcher, and R.T. Wright, "Assessing common method bias: Problems with the ULMC technique", *MIS Quarterly*, 36(3), 2012, pp. 1003–1019.
- [7] Davis, F.D., "Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology", *MIS Quarterly*, 13(3), 1989, pp. 319–340.
- [8] Diamantopoulos, A. and J.A. Siguaw, "Formative Versus Reflective Indicators in Organizational Measure Development: A Comparison and Empirical Illustration", *British Journal of Management*, 17(4), 2006, pp. 263–282.
- [9] Dimoka, A., P.A. Pavlou, and F.D. Davis, "Research Commentary--NeuroIS: The Potential of Cognitive Neuroscience for Information Systems Research", *Information Systems Research*, 22(4), 2011, pp. 687–702.
- [10] Ebert, T., "Facets of Trust in Relationships – A Literature Synthesis of Highly Ranked Trust Articles", *Journal of Business Market Management*, 3(1), 2009, pp. 65–84.
- [11] Friedman, B., Khan, Peter H. Jr., and D.C. Howe, "Trust online", *Commun. ACM*, 43(12), 2000, pp. 34–40.
- [12] Fulmer, C.A. and M.J. Gelfand, "At What Level (and in Whom) We Trust", *Journal of Management*, 38(4), 2012, pp. 1167–1230.

- [13] Gefen, D., E. Karahanna, and D.W. Straub, "Trust and TAM in Online Shopping: An Integrated Model", *MIS Quarterly*, 27(1), 2003, pp. 51–90.
- [14] Gefen, D., E.E. Rigdon, and D.W. Straub, "Editor's Comments: An Update and Extension to SEM Guidelines for Administrative Social Science Research", *MIS Quarterly*, 35(2), 2011, pp. iii–xiv.
- [15] Hair, J.F., G.T., M. Hult, C.M. Ringle, and M. Sarstedt, *A primer on partial least squares structural equations modeling (PLS-SEM)*, Sage, Los Angeles, 2014.
- [16] Iacovou, C.L., R.L. Thompson, and H.J. Smith, "Selective Status Reporting in Information Systems Projects: A Dyadic-Level Investigation", *MIS Quarterly*, 33(4), 2009, p. 785.
- [17] Jarvenpaa, S.L. and D.E. Leidner, "Communication and Trust in Global Virtual Teams", *Organization Science*, 10(6), 1999, pp. 791–815.
- [18] Jarvis, C.B., S.B. Mackenzie, and P.M. Podsakoff, "A Critical Review of Construct Indicators and Measurement Model Misspecification in Marketing and Consumer Research", *Journal of Consumer Research*, 30(2), 2003, pp. 199–218.
- [19] Jian, J.-Y., A.M. Bisantz, and C.G. Drury, "Foundations for an empirically determined scale of trust in automated systems", *International Journal of Cognitive Ergonomics*, 4(1), 2000, pp. 53–71.
- [20] Komiak, S. and I. Benbasat, "The Effects of Personalization and Familiarity on Trust and Adoption of Recommendation Agents", *MIS Quarterly*, 30(4), 2006, pp. 941–960.
- [21] Lee, J.D. and K.A. See, "Trust in Automation: Designing for Appropriate Reliance", *Human Factors*, 46(1), 2004, pp. 50–80.
- [22] Lowry, P.B., A. Vance, G. Moody, B. Beckman, and A. Read, "Explaining and Predicting the Impact of Branding Alliances and Web Site Quality on Initial Consumer Trust of E-Commerce Web Sites", *Journal of Management Information Systems*, 24(4), 2008, pp. 199–224.
- [23] Mayer, R.C., J.H. Davis, and F.D. Schoorman, "An Integrative Model of Organizational Trust", *Academy of Management Review*, 20(3), 1995, pp. 709–734.
- [24] McKnight, D.H., M. Carter, J.B. Thatcher, and P.F. Clay, "Trust in a specific technology: An investigation of its components and measures", *ACM Transaction on Management Information Systems*, 2(2), 2011.
- [25] McKnight, D.H., V. Choudhury, and C. Kacmar, "The impact of initial consumer trust on intentions to transact with a web site: a trust building model", *The Journal of Strategic Information Systems*, 11(3-4), 2002, pp. 297–323.
- [26] Morgan, R.M. and S.D. Hunt, "The Commitment-Trust Theory of Relationship Marketing", *Journal of Marketing*, 58(3), 1994, pp. 20–38.
- [27] Nass, C., J. Steuer, and E.R. Tauber, "Computers are social actors", in *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, B. Adelson, S. Dumais, and J. Olson, Editors, Boston, Massachusetts, United States, 1994.
- [28] Ortiz de Guinea, A. and M.L. Markus, "Why Break the Habit of a Lifetime? Rethinking the Roles of Intention, Habit, and Emotion in Continuing Information Technology Use", *MIS Quarterly*, 33(3), 2009, pp. 433–444.
- [29] Pavlou, P.A. and A. Dimoka, "The Nature and Role of Feedback Text Comments in Online Marketplaces: Implications for Trust Building, Price Premiums, and Seller Differentiation", *Information Systems Research*, 17(4), 2006, pp. 392–414.
- [30] Piller, F.T., "Mass Customization: Reflections on the State of the Concept", *International Journal of Flexible Manufacturing Systems*, 16(4), 2004, pp. 313–334.
- [31] Podsakoff, P.M., S.B. Mackenzie, L. Jeong-Yeon, and N.P. Podsakoff, "Common Method Biases in Behavioral Research: A Critical Review of the Literature and Recommended Remedies", *Journal of Applied Psychology*, 88(5), 2003, p. 879.
- [32] Riedl, R., P. Mohr, P. Kenning, F. Davis, and H. Heekeren, "Trusting Humans and Avatars: Behavioral and Neural Evidence", *International Conference on Information Systems (ICIS) 2011*, Shanghai, China, 2011.
- [33] Rivard, S. and L. Lapointe, "Information Technology Implementers' Response to User Resistance: Nature and Effects", *MIS Quarterly*, 36(3), 2012, pp. 897–920.
- [34] Sharma, R., P. Yetton, and J. Crawford, "Estimating the Effect of Common Method Variance: The Method-Method Pair Technique with an Illustration from TAM Research", *MIS Quarterly*, 33(3), 2009, pp. 473–490.
- [35] Singh, J. and D. Sirdeshmukh, "Agency and trust mechanisms in consumer satisfaction and loyalty judgments", *Journal of the Academy of Marketing Science*, 28(1), 2000, pp. 150–167.
- [36] www.smartpls.de.
- [37] Söllner, M., I. Benbasat, D. Gefen, J.M. Leimeister, and P.A. Pavlou, "Trust", in *MIS Quarterly Research Curations*, Ashley Bush and Arun Rai, Eds., <http://misq.org/research-curations>, Released: October 2016, Last Update: June 2018, 2016.
- [38] Söllner, M., A. Hoffmann, H. Hoffmann, A. Wacker, and J.M. Leimeister, "Understanding the Formation of Trust in IT Artifacts", *International Conference on Information Systems (ICIS) 2012*, Orlando, FL, USA, 2012.
- [39] Söllner, M., A. Hoffmann, and J.M. Leimeister, "Why different trust relationships matter for information systems users", *European Journal of Information Systems*, 25(3), 2016, pp. 274–287.
- [40] Söllner, M. and J.M. Leimeister, "What We Really Know about Antecedents of Trust: A Critical Review of the Empirical Information Systems Literature on Trust", in *Psychology of trust: New research*, D. Gefen, Editor, 2013. Nova Science Publishers: Hauppauge, New York.
- [41] Söllner, M., P.A. Pavlou, and J.M. Leimeister, "Understanding Trust in IT Artifacts - A new Conceptual Approach", *Academy of Management Annual Meeting 2013*, Orlando, FL, USA, 2013.
- [42] Vance, A., C. Elie-Dit-Cosaque, and D.W. Straub, "Examining Trust in Information Technology Artifacts: The Effects of System Quality and Culture", *Journal of Management Information Systems*, 24(4), 2008, pp. 73–100.
- [43] Wang, W. and I. Benbasat, "Trust in and adoption of online recommendation agents", *Journal of the Association for Information Systems*, 6(3), 2005, pp. 72–101.