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DIMENSIONS OF TRUST IN THE ACCEPTANCE OF INTER-ORGANIZATIONAL INFORMATION SYSTEMS IN NETWORKS: TOWARDS A SOCIO-TECHNICAL PERSPECTIVE

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Abstract

In the context of collaborative networks, networked inter-organizational information systems (IOIS) play a major role by providing a shared virtual space for the informal exchange of semi-structured or unstructured knowledge. Since IT support is seen as crucial for the whole network endeavor, the perspective of system acceptance becomes important. However, discussing IS adoption at the inter-organizational level brings trust into the story. Building upon socio-technical theory, this study seeks to understand the role of two dimensions of trust in the acceptance of networked IOIS. A theoretical model is developed and subsequently tested with a sample of 121 German network organizations. Network trust reveals to be important for the perceived usefulness of the system, as the main benefit comes from members' participation. Trust in technology shows to be an even more relevant determinant for the attitude towards the system. We suggest that future adoption studies should pay more attention on the interplay of both the social- as well as the technical-relations.

Keywords: Networked IOS, technology acceptance, trust, socio-technical theory.

1 INTRODUCTION

As a reaction to increased competition, pressure for innovation, and higher customer expectations, organizations engage in collaborative networks. This kind of cross-organizational collaboration heavily relies on IT support, which is crucial for the entire network endeavor (Camarinha-Matos and Afsarmanesh, 2005). In the context of collaborative networks, so-called networked inter-organizational information systems (IOIS) play a major role by supporting reciprocal interdependencies (Chi and Holsapple, 2005, Kumar and van Dissel, 1996). Such inter-organizational collaborative technologies provide a shared virtual space for the informal exchange of semi-structured or unstructured, knowledge, where network members collaborate for emerging relationships and learning (Nonaka and Konno, 1998). Networked IOIS include inter-organizational collaboration tools such as data conferencing, groupware solutions, or electronic meeting systems (Chi and Holsapple, 2005).

Discussing IS adoption at the inter-organizational level brings trust directly into the story. Trust is generally seen as an important issue in inter-organizational relationships (Gulati and Singh, 1998, Hagen and Choe, 1998). It is crucial to almost any type of situation in which uncertainty is a thread and undesirable outcomes are possible (McKnight et al., 2011). This also holds in the context of IOIS (Karahannas and Jones, 1999); IS research has found trust to be central to understanding adoption behavior and as an influential factor in IOIS success (e.g., Nicolaou et al., 2013, Ibrahim and Ribbers, 2009). However, the ever-growing body of literature on trust, adoption, and use of IOIS mainly focuses on dyadic relationships, particularly those involving electronic data interchange. Moreover, trust is often regarded to financial dependencies, e.g., when it comes to supply chain management implementation (Weiling Ke a, 2009). However, when focusing on post-adoption and considering networked IOIS as socio-technical systems, in which success relies on mutual information sharing as well as the reliability and functionality of the technical system, two other perspectives of trust become important. Trust can be referred to both the people contributing to the system and the underlying technology

Networked IOIS are, to the best of our knowledge, only marginally considered in current adoption literature. A related stream can be found on acceptance of collaboration technologies in intra-organizational or non-organizational settings (Brown et al., 2010, Bajwa et al., 2008, Dennis et al., 2003, Bullinger et al., 2011, Olschewski et al., 2013). In a cross national study, Bajwa et al. (2008) examine factors which influence adoption of collaborative software at the organizational level. They include decision-making patterns, functional integration, promotion of collaboration, and organization size as organizational predictors for adoption. Brown et al. (2010) focus on the individual adoption and integrate the Unified Theory of Acceptance and Use of Technology (UTAUT) with theories from collaboration research. Technological, individual, group, task, and situational characteristics are found to effect adoption intention mediated through UTAUT construct. Although they explicitly address familiarity as a variable within the group characteristics, this concept only captures if co-workers know each other rather than if they trust each other. Bullinger et al. (2011) study online collaboration technology adoption by researchers. In the tradition of the theory of planed behavior, they include the social influence of peers; nevertheless, they do not recognize the value of trust in the contribution of other network members.

In this paper, we take a socio-technical perspective in order to examine the acceptance, i.e., the post-adoption use, of networked IOIS in inter-organizational settings. Therefore, we integrate two distinct perspectives of trust in the well-known technology acceptance model and empirically show that its worth to consider both.

In doing so, this article addresses gaps in the current literature that are inherent to the acceptance of networked IOIS. Literature on IOIS adoption, especially those including inter-organizational trust, mainly draw on theoretical frameworks at the organizational level such as diffusion of innovation

(Rogers, 2003) or technology-organizational-environment model (Tornatzky and Fleischer, 1990). We contribute to the stream on post-adoption usage of IOIS and include socio-technical systems theory, by examining the role of both trust in the network members and trust in the technology. We acknowledge the fact that especially in collaborative networks, where system usage is relatively voluntary, the relation of the organization to the contributors as well as the relation to the technology becomes important.

For the purpose of this study, we extend the understanding of collaboration technologies of Ellis et al. (1991) with an inter-organizational aspect: networked IOIS are computer-based systems that support different organizations engaged in a common task (or goal) and that provide an interface to a shared environment.

For the empirical investigation we study the acceptance of networked IOIS in German networks. We mainly use structural equation modeling with partial least squares estimation (PLS) for our statistical analysis.

The remainder is structured as follows. In the next section, we present the theoretical framework and derive the hypothesis. The design and procedure of an empirical investigation by means of the structural equation modeling technique is outlined in the section that follows. Findings of the study are then presented. The study closes with a discussion on limitations and further research.

2 THEORETICAL FRAMEWORK AND HYPOTHESES

Research on technology adoption has a long tradition in the IS discipline and is one of the most mature streams. For this study, we build upon technology acceptance research and, therefore, intend to examine actual system usage at the individual level. This is in contrast to adoption research at the firm level, such as Diffusion of Innovations or the TOE-Framework. We study acceptance at the individual level; thus the trustor is a single person. The Technology Acceptance Model (TAM) by Davis (1989) serves as the foundation for our model.

Building upon the Theory of Reasoned Action (TRA), TAM proposes that the individual inclination to use a technology is dependent upon beliefs, attitude, and behavioral intention. More specifically, TAM introduces two new concepts, perceived usefulness (PU) and perceived ease of use (PEOU), and argues that these two beliefs influence attitudes towards a technology. PU is a measure of the individual's subjective assessment of the utility offered by the new IT in a specific task-related context. PEOU is an indicator of the cognitive effort needed to learn and utilize the new IT. In turn, attitude, mediated by the intention to use the technology, determines the actual system usage. Although TAM has also been used to explain technology acceptance in non-organizational settings, its origin lies in the organizational context.

TAM has proven to be a robust and parsimonious model. It is one of the most influential research models and has been successfully applied in a variety of studies on different technologies in diverse contexts. Furthermore, the basic structure found application in a number of other acceptance models such as TAM 2, Unified Theory of Acceptance and Use of Technology (UTAUT), and UTAUT 2. Although these newer models are suggested to have higher explanatory power, they are criticized for being based on empirical rather than theoretical considerations (Kim, 2009). Because we intended to focus explicitly on two aspects of trust, we decided to initially build upon the basic structure of the TAM.

So far, there is nothing in TAM that differentiates between the characteristics of the specific context, i.e., inter-organizational collaboration and the use of networked IOIS. As discussed earlier, trust can play an important role in the acceptance of information systems. The collaboration of distributed organizations transferring data to spatially distributed entities via communication networks, obviously involve trust in both the collaborating organizations and the reliability of the underlying technology.

Socio-technical theory posits dependencies between actors of the social system and the technical system (Bostrom and Heinen, 1977). Actors of the social system are structures and people, and components of the technical system are the technology and the task, where all are interrelated. This perspective can be translated to networked IOIS, whereby the relations of the user as part of the socio-technical system are factors influencing the acceptance. We argue that the human users attitude towards the technology, which in this case are networked IOIS, is influenced by both the surrounding network of contributors to the technology as well as his personal beliefs towards the technology. From this we derive network trust and trust in technology as a relevant extension to TAM.

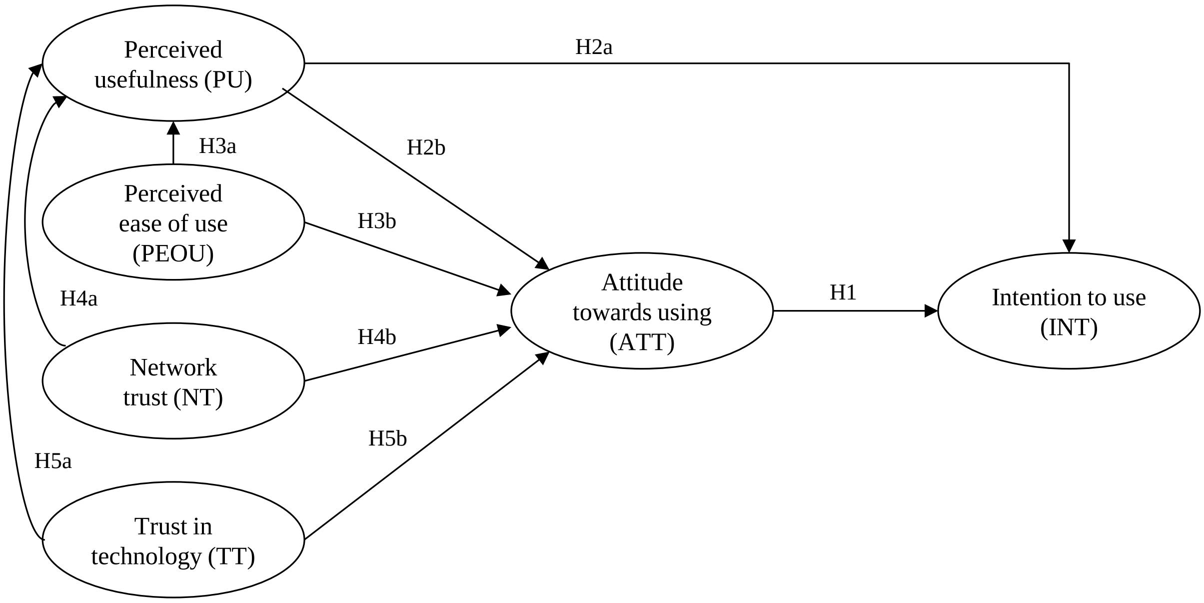

Figure 1. Research model based on TAM, network trust, and trust in technology

2.1 Direct Effects of TAM Constructs

The basic structure of TAM proposes a relationship between intention and actual system usage. Because the long history of TAM research has already found strong empirical evidences for this relationship, we do not consider this last step of TAM. This is not uncommon and is unlikely to cause a bias in either theory or empirical results (e.g., Gefen et al., 2003; Vijayasarathy, 2004).

TAM research produced a discussion regarding the role of the construct attitude. Attitude has a strong theoretical background in Fishbein and Ajzen's (1975) TRA. In the context of TAM, it refers to the "predisposition to respond favorably or unfavorably to a computer system, application, system staff member, or a process related to the use of that system or application" (Melone, 1990). Although Davis (1989) himself argues that the role of affective attitude is an open issue, a meta-analysis by Kim et al. (2009) reveal that the mediating effect of attitude increases with the prior experience of users. Since networked IOIS is not a new phenomenon in the organizational context, we hypothesize the following:

H1: Attitude towards networked IOIS positively influences intention to use (INT).

TAM defines perceived usefulness as the "prospective user's subjective probability that using a specific application system will increase his or her job performance" (Davis, 1989). PEOU has a direct effect on INT and an indirect effect through attitude toward using (ATT). Perceived ease of use is defined as "the degree to which the prospective user expects the system to be free of effort" (Davis, 1989). PEOU has both a direct effect on ATT and an indirect effect through PU. The more effort it takes to use a technology, the more negative the attitude towards using the technologies. In addition, as a technology is perceived to take more effort to use, the technology is perceived to be less useful. In the context of intra-organizational collaboration technologies, both constructs have already been revealed to be the main predictors (total effects) for intention (Brown et al., 2010). We follow the argumentation of the original TAM and propose:

H2a: Perceived usefulness of networked IOIS positively influences intention.

H2b: Perceived usefulness of networked IOIS positively influences attitude.

H3a: Perceived ease of use of networked IOIS positively influences intention.

H3b: Perceived ease of use of networked IOIS positively influences attitude.

2.2 Direct Effects of Network Trust

The role of trust between human beings is generally regarded as a crucial success factor, especially when opportunistic behavior is a major threat. In inter-organizational networks, with collaboration based on the inter-dependency of network members, single actors do not have full control over the situation and are dependent on others. In such settings, trust is essential for effectiveness (e.g., El Khatib et al., 2013). Unfortunately, trust is believed to be facilitated predominantly through personal relationships, membership in common social networks, and even physical touch; this distribution makes the building and maintenance of trust among network members much more difficult (Jarvenpaa and Leidner, 1999).

While the concept of trust found broad consideration in acceptance research, most studies focus on trust between two individuals. Trust in a group of organizations, which is our understanding of network trust, has only been studied infrequently (Pavlou and Gefen, 2004). This conceptualization differs from dyadic trust, since the trust object is more generalized. However, it also differs from generalized trust since we have a well-defined collective, i.e., the members of the network. Taking this stance of a trust object, it can be argued that trust in a specific group influences the assessments, beliefs, and behavior of the trustor and his willingness to be vulnerable to their actions (Fukuyama, 1995). Similar to the understanding of Gefen et al. (2003), we define trust in the network as the subjective belief that interactions with the network members will occur in a manner consistent with the expectations of trustworthy behavior. We argue our stance, with specifics of networked IOIS, that there is a well-defined group of contributors with uncertainties of contribution where we may be at the mercy of opportunistic behavior.

When speaking about applicable trust concepts, most research refers to three interconnected levels (McKnight et al., 2002). First, trusting beliefs is the rational expectation that the trust object has attributes that are favorable to the trustor. Second, trusting intentions is understood as the willingness to depend upon the trust object. Third, trusting behavior describes the assured action which shows that the trustor in fact relies upon the trust object. We take the first stance, which means that instead of controlling the network members, the trustor relies on the network.

Trust in an inter-organizational setting has been found to increase cooperation and to lead to open communication and information sharing (Ring and van de Ven, 1994, Doney and Cannon, 1997). IT-adoption research on IOIS also widely recognizes the importance of trust. Since networked IOIS involves an increasing degree of human interaction, this holds especially in this context. The nature of networked IOIS lies in the unstructured form, direction, and content of reciprocal relationships among users (Kumar and van Dissel, 1996). Furthermore, unlike other types of IOIS, networked IOIS generally lacks formalized protocols, rules, and standards. Informal collaboration is the basis for collaboration, and trust must outweigh the necessity to control (Chi and Holsapple, 2005).

Therefore, from a user perspective, perceived usefulness of such a system is determined by the trust in the network. If the individual user perceives that the network members will behave opportunistically and not participate in that reciprocal relation (e.g., knowledge sharing), then, from individual’s point of view, the performance expectancy of the IOIS will be low. This relation is also consistent with research by (Gefen et al., 2005) and Nicolaou and McKnight (2006). Hence, we posit that:

H4a: Network trust positively influences Perceived usefulness of networked IOIS.

Moreover, research on trust found that high levels of trust directly stimulate favorable attitudes (Anderson and Narus, 1990), and people who are socially connected have highly favorable attitudes towards each other (John, 1984). Research on e-commerce also shows this connection in the IS context (Macintosh and Lockshin, 1997; Jarvenpaa et al., 2000). We follow this argumentation in saying that a high level of trust in the network members also influences the attitude towards the collaborative system. Consequently, we offer the following hypothesis:

H4b: Network trust positively influences attitude towards networked IOIS.

2.3 Direct Effects of Trust in Technology

Besides trust in human beings, Hertel (2004) proposed the consideration of trust in technology (TT) in inter-organizational settings. Trust in technology describes the functionality and reliability of the technical system.

Again, we specify the stance we take regarding the applicable trust concept. When speaking about trust in technology, IS research often refers to trusting beliefs (McKnight et al., 1998, McKnight et al., 2002). The trustor is willing to be vulnerable to the behavior of the trustee, irrespective of possibilities of controlling the other part. More precisely, McKnight (2005) stresses the importance of the trusting belief in competence. First, belief in the functional capabilities describes whether the system supports the task the trustor wants to do. Second, belief in reliability, which means the system does what it is designed to do without interruption, delays, or unexpected results.

Translating this to networked IOIS, if the systems used do not work reliably, the user may believe that the outcome is not determined by their efforts but mostly by the system. Furthermore, if the user does not trust the system's functionality, the user believes he is not supported in doing his task. Both then reduce the perceived usefulness of the system (also proposed by McKnight (2005) and Gefen et al. (2005)). Accordingly, we hypothesize:

H5a: Trust in technology positively influences perceived usefulness of networked IOIS.

Moreover, McKnight (2005) proposes that trust in technology is not fully mediated through perceived usefulness, which is also consistent with Vance et al. (2008). He argues that trust in IT is a general assessment, and unless the user trusts IT to be reliable in filling his needs, there is little reason to adopt it. Thus, it influences attitude towards the technology. Hence, we propose:

H5b: Trust in technology positively influences attitude towards networked IOIS.

3 RESEARCH METHODOLOGY

3.1 Sample and Data Collection Procedure

For this study, an online survey method was chosen. The link to the survey was distributed among managers in German networks. The underlying database builds upon Cluster Observatory - a database for regional networks managed by the Center for Strategy and Competitiveness at the Stockholm School of Economics. Randomly 1953 participants were selected and personalized survey invitations were sent out. Of the participants, 180 passed the two filter questions that were asked to determine whether the participant works in a computer-supported network. That gives a return rate of just below 10%. From these 180 cases, 59 were excluded due to quality criteria such as missing values, the implausibility of demographics, and network characteristic answers. Overall, 121 complete cases that fulfilled all quality criteria were collected. Small- and medium-sized organizations accounted for the largest share: 36% had fewer than 10 employees and 38% had fewer than 50. The average network had 59 members and ranged from 3 to 400 organizations.

3.2 Measurement of Constructs

The theoretical constructs that are the subjects of this study need operationalization. All scales were adopted from previous research. All constructs in the survey were measured using multi-item scales with seven-point Likert rating systems. Measurement items for network trust and trust in technology are borrowed from network research by Möller et al. (2006), respective research by Büssing and Broome (1999), and Hertel et al. (2004). Measures for TAM constructs are derived from Davis et al. (1989). The translation into German and rephrasing for the study's context was done by the authors and was checked afterwards for both comprehensiveness and clarity. Thus, two academics and three experts from the field revised the questionnaire. The interviews did not yield any major changes for the scales; however, following some remarks, minor improvements have been implemented.

4 DATA ANALYSIS AND RESULTS

In order to test the theoretical model, a SEM approach was used. We decided on the partial least squares method (PLS) because it has fewer demands for sample size and excels at prediction (Ringle et al., 2012). Moreover, it makes no normal distribution assumption. Our analysis was supported primarily using the software SmartPLS 2.0. We used SPSS Statistics for tests that are not available in the SmartPLS packages.

The data analysis follows the widely adopted two-step approach to structural equation modelling (Anderson and Gerbing, 1988). In order to ensure validity and reliability of the instruments, we first assess the quality of the measurement model. We then analyze the structural model.

4.1 Non-responses, Common Method Bias, and Measurement Validation

According to Chin (1998), when using PLS, the sample size should exceed two measures. First, the sample size must be higher than 10 times the number of indicators for the scale with the largest number of indicators. Second, the sample size must be higher than 10 times the largest number of paths directed to any construct in the model. Our sample size, which includes 121 cases, meets both criteria.

Especially low response rates bear the risk of non-responses. In order to account for the threat, i.e., if the answers of respondents differ from the potential answers of those who did not answer, we checked for mean differences of the construct items of the first third and last third of the sample (Armstrong and Overton, 1977). The results of a t-test revealed no significant differences ($p<.10$) between both time periods, which indicates that non-response is not a concern for this study.

A single informant assessed both independent and dependent variables in our model; hence, common method variance (CMV) poses a potential threat to the validity of the results (Podsakoff et al., 2003). In order to antagonize CMV ex ante, we randomized items within the questionnaire and guaranteed participants full anonymity. Furthermore, we checked for CMV ex post. Following Podsakoff et al.'s suggestion (2003), we ran an exploratory factor analysis. Not a single factor emerges from the data, and a general factor does not account for the majority of the covariance among the measures. The result suggests that common method bias is not a major concern in this study.

Construct	CA	CR	AVE	PU	EU	IT	TT	INa	INb
PU	.95	.96	.86	**.93**					
EU	.94	.96	.85	.69	**.92**				
NT	.90	.92	.71	.34	.30	**.84**			
TT	.86	.90	.70	.50	.65	.29	**.83**		
ATT	.96	.98	.96	.59	.61	.24	.64	**.98**	
INT	.89	.95	.90	.66	.56	.24	.64	.81	**.95**

Table 1. CA, CR, AVE, and inter-construct correlations
CA: Cronbach's alpha; CR: composite reliability; AVE: average variance extracted; bolded numbers: square root of AVE

Item \ Construct	PU	EU	IT	TT	ATT	INT
PU1	.91	.66	.24	.50	.56	.59
PU2	.94	.65	.31	.41	.56	.59
PU3	.92	.64	.39	.47	.53	.62
PU4	.95	.64	.32	.49	.52	.64
EU1	.65	.91	.32	.57	.58	.52
EU2	.65	.94	.24	.54	.54	.49
EU3	.61	.93	.24	.64	.56	.50
EU4	.66	.91	.31	.66	.56	.55
IT1	.32	.31	.83	.24	.23	.15
IT2	.22	.19	.83	.25	.15	.14
IT3	.28	.22	.87	.26	.31	.32
IT4	.27	.28	.86	.19	.14	.16
IT5	.31	.26	.83	.25	.13	.20
TT1	.55	.65	.29	.86	.58	.54
TT2	.37	.49	.28	.86	.52	.55
TT3	.27	.42	.14	.77	.48	.43
TT4	.44	.58	.22	.85	.55	.61
ATT1	.60	.59	.25	.63	.98	.72
ATT2	.55	.60	.22	.63	.98	.76
INT1	.57	.49	.24	.64	.72	.95
INT2	.60	.58	.21	.59	.76	.95

Table 2. Item loadings and cross loadings (shaded cell: item loadings; other cells: cross loadings

In order to assess the fit of the hypothesis and empirical data, the measurement model was tested for three criteria: content, convergent, and discriminant validity. Content validity refers to the degree to which a construct measures all facets of the underlying social construct. We assured content validity by using existing scales from IS, network, and socio-psychological research. Moreover, we pre-tested our constructs by interviewing senior practitioners. Convergent validity refers to whether items measuring a construct correspond with one another. Three measures for convergent validity were evaluated for each reflective measure: individual item reliability, composite construct reliability (CR), and average variance extracted (AVE). As depicted in Table 2, each item loaded on its own construct at .70 or above, which indicates individual item reliability (Gefen and Straub, 2005). The CR varies between .90 and .98, i.e., above the acceptable limit of .70 (Hulland, 1999). All AVE also exceeded the lower bound of .50 (Bhattacherjee and Premkumar, 2004). Discriminant validity refers to whether theoretically distinct concepts are empirically distinct from one another. We used the criterion of Fornell and Larcker (1981) to assess discriminant validity. The AVE for each construct is greater than the variance shared with other constructs (see square root AVEs on the diagonal in Table 1), confirming discriminant validity. Lastly, we checked cross-loadings and, as expected, all items have higher loadings on their assigned construct than on the other constructs in the model (Chin, 1998). Our analyses suggest that our measurement model is both acceptable and reliable.

4.2 PLS Structural Model

In order to evaluate the structural model, we applied the bootstrapping resampling procedure (1000 samples). This is recommended for sample sizes greater than 100 (Kock, 2011). Figure 2 presents the estimates of the PLS analysis and the significance levels of the bootstrapping.

Chin (1998) regards R^2 above .33 as average and R^2 above .67 as substantial. The variance explained quality criteria is met by all three dependent variables. According to Lohmöller (1983), path coefficients should exceed .10 in order to indicate support for a hypothesis. First, the basic structure of TAM can be partly supported. INT is significantly influenced by ATT (H1, b=.65, p<.01) and PU (H2a, b=.26, p<.01). In addition, PU impacts ATT (H2a, b=.29, p<.01) and PEOU significantly influences PU (H3a, b=.61, p<.01). However, the direct effect of PEOU on ATT in our sample is not significant. Second, our data only supports one influence of NT. While the coefficient between NT and PU was revealed to be significant (H4a, b=.14, p<.05), the relation between NT and ATT (H4b) could not be shown empirically. Third, the impact of TT on PU is not significant in our sample (H4a); however, the impact on attitude can be supported (H4b, b=.40, p<.01). In our model, EU, NT, and TT can explain 51% of the variation in perceived usefulness. In total, the variance explained for ATT by the TAM predictors, NT, and TT is 52%. ATT and PU together account for 71% of the variance in INT.

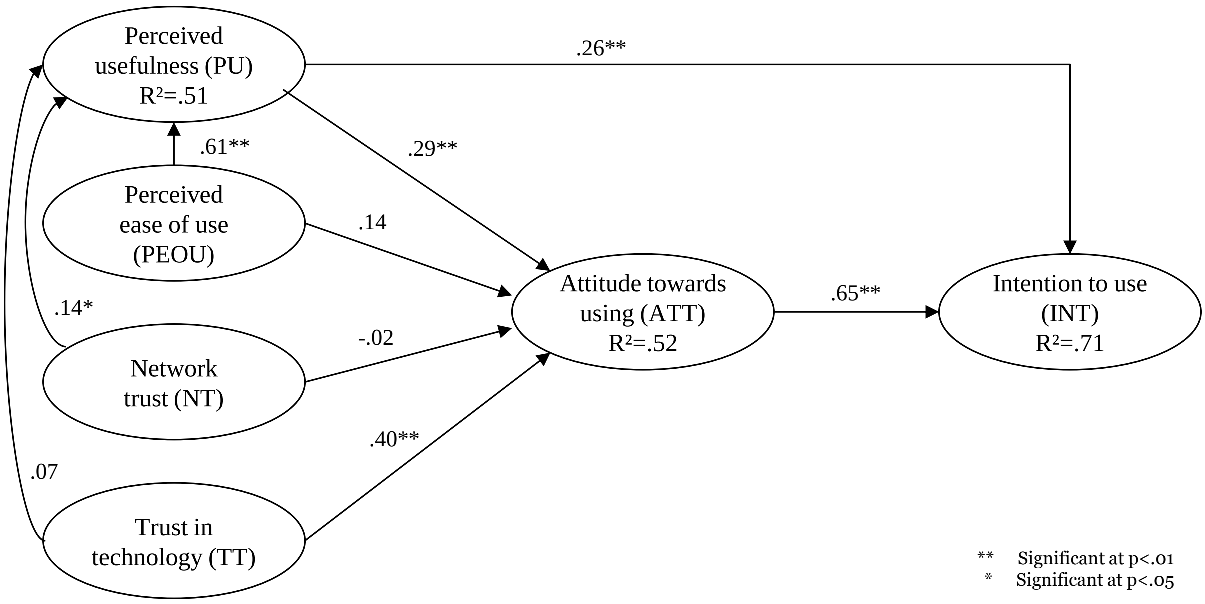

Figure 2. PLS and bootstrapping results of structural model

In order to examine total effects, we also calculated total effects and effect sizes. Finally, we checked for Stone-Geisser Q^2 coefficients (see Table 3 for both). The effect size is a measure for the total influence of an exogenous latent variable on an endogenous variable and indicates the relevance of the relation. Chin (1998) regards effect sizes below .02 as too weak to be considered, below .15 as small, bellow .35 as medium, and above .35 as large.

Construct	PU	EU	NT	TT	ATT	Q^2
PU	-	.61** (.43)	.14* (.03)	.06 (.00)	-	.41
ATT	.29** (.10)	.32* (.06)	.05 (.02)	.42** (.19)	-	.46
INT	.46** (.23)	.37** (.22)	.02 (.02)	.29** (.17)	.65** (.90)	.62

Table 3. Total effects, effect sizes, Stone-Geisser Q-squared coefficients
$^{**}p<.01$; $^{*}p<.05$; Q^2: Stone-Geisser coefficients;
bolded numbers: total effects; parentheses: Cohens f^2 (effect size) for total effects

All effect sizes exceed the minimum threshold, which underlines the practical relevance of this model. All total effects on INT, except that of NT, are highly positive and significant. In addition, all effect sizes on INT, except of NT, are above the threshold for a medium classification. This strengthens the assumption of following TRA and including attitude as a mediator between the predictors and INT. In order to measure the ability of the path model to predict the manifest measures from the latent measures, we computed cross-validity communality through blindfolding. The communality-Q^2 for the measurement model as well as the redundancy-Q^2 for the path model is above 0 for all constructs. The construct cross-validated redundancy (Stone-Geisser criterion, Q^2) for all latent constructs is also above 0. We interpret this as an indicator of the global fit of our measurement model (Fornell and Cha, 1994; Chin, 1998).

5 DISCUSSION

This study has several findings that are validated in an empirical study. Based on a socio-technical perspective and TAM, we built a theoretical model predicting the intention to use networked IOIS in collaborative settings and integrating two perspectives of trust: network trust and trust in technology. The empirical results reveal a good fit of the general model.

Our results suggest that the general structure of TAM is only partly applicable in the context of networked IOIS. Although we can demonstrate that ATT influences INT, PU influences ATT and INT, and PEOU influences PU, the impact of PEOU on ATT is not significant. This is in line with findings from Brown et al. (2010), who studied the acceptance of collaboration technologies in two studies. Similarly, their results showed that PEOU has no direct impact and is mainly mediated through PU. Moreover, in our case the relation (as indicated by the value of the path coefficient with b=.14) is only just above the threshold of the 5 percent significance level. Accordingly, our results do not contradict the general applicability of TAM as a foundation for networked IOIS.

As hypothesized, NT positively influences PU. It is clear that if the user of a networked IOIS does not trust in the other network organizations that participate in the system, the perceived performance of the whole system decreases. This is in line with argumentation and findings from Gefen et al. (2003). In a similar setting on eVoting, they argued that users are forced to trust other stakeholders of the system since they have no warranty that they will provide the expected benefits. However, we could not show the direct effect of NT on ATT. In addition, the inclusion of the indirect effect on ATT, i.e., the effect mediated through PU, exhibits insignificant total effects (b=.05, p>.05) and only a small effect size (.02). An explanation for the weak effect of NT might be our assumption that trust only flows in one direction. Other research indicates that there may be also a relation in the other direction (e.g., Hu et al., 2011, Ratnasingam, 2005). It is argued that technology integration contributes to consistent behavioral patterns among the partners. However, we do not take this process-oriented thinking of trust building and instead focus on the one-directional perspective in our study.

A rather interesting result is that in the case of TT, the sample indicates an inverse relationship. On the one hand, TT has a strong positive correlation with ATT. Both direct effect and effect size (effect size without the mediation over PU is .19) have the highest impact on ATT among all constructs. On the other hand, our sample did not show a significant effect of TT on PU, which is not in line with suggestions by McKnight (2005) and Gefen et al.(2005). This is surprising as the trusting belief in the competence (functionality and reliability) is expected to be related the perceived performance gains (Gefen et al., 2005). However, the high total relevance of TT on INT could be shown (effect size on INT is .17).

Examining the relative importance of the two trust measures on INT revealed that TT outstrips NT. While TT shows a relevant impact in both total effect (.29, $p<.01$) and effect size (.17), NT reveals only a small effect. The effect size (.02) is just above the threshold for small relevance. However, the results underline that a socio-technical perspective of networked IOIS contributes to the understanding of the corresponding acceptance.

Overall, the model as a whole has a high level of explanatory power. Compared to other studies using TAM as foundation for their work, the explained variance of the dependent variables are high (e.g., Gefen et al., 2005, Gefen et al., 2003). In the context of inter-organizational collaborations, trust in network members as well as trust in the underlying technology is an essential ingredient for IS post-adoption.

As with all research, the analysis needs to be set in the right light considering the limitations of this study. The sample consists of organizations from a public database of business networks where networks are listed on their own initiative. Therefore, we could not guarantee representativeness. Moreover, a single informant approach has been used to gather the data. Although we agree that an endogen measure of actual system usage would be preferable, we go with this long tradition in TAM research and rely on self-reported data on usage intention. The test for common method variance did not yield any problematic results. Lastly, cultural differences have proven to also influence trust (Vance et al., 2008, Gefen et al., 2005). Our sample consists of only German participants. As a consequence, findings derived from the empirical survey should be subject to further investigation considering different contexts.

6 CONCLUSION

The goal of this study was to evaluate the multiple roles of trust in acceptance of networked IOIS in inter-organizational collaborations. A socio-technical perspective helped us to identify two relevant trust objects, i.e., trust in the network and trust in technology. Based on TAM, we suggested including both dimensions in the context of networked IOIS and inter-organizational collaboration. Data was collected with a web survey covering networks in Germany. Overall, we gained 121 full data sets from professionals in this survey. Using structural equation modeling with PLS, we tested our theoretical model.

It was determined that both trust in the network and trust in the underlying technology influence the acceptance of networked IOIS. Our data support the hypothesis that if a user has a high level of trust in his network partners, it is more likely that he will find the system useful. Furthermore, support is found for the hypothesis that if a user highly trusts the networked IOIS itself, his attitude towards the networked IOIS will be influenced, which in turn influences intention to use the system.

This research contributes to the body of knowledge by concluding from socio-technical theory that it is worthwhile to consider two perspectives of trust, namely trust in network members and trust in technology. To our surprise, IS adoption studies are often vague when it comes to the definition of the trust object and they only seldom include more than one trust perspective. Furthermore, in contrast to other adoption studies on IOIS, we do not adapt a dyadic view of trustor and trustee. We argue that in the case of networked IOIS, the trust of an organization to the network members as a whole is the relevant dimension. Hence, this study is a first step into a more differentiated integration of trust in IOIS acceptance research. Future research on the role of trust in networked IOIS should take a broader view and incorporate findings from other theories (e.g., Brown et al., 2010).

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