# How perceived transparency in information system development processes improves project quality in agile IT enterprises

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## Abstract

**Purpose** – With the increasing agility of IT enterprises, it is crucial to identify suitable managerial strategies for controlling information system development (ISD) projects in the new agile working environments. These environments are characterized by the collaborative nature of work and the recurring nature of communication. This study aims to explore how perceived transparency in ISD processes, controlled by transparency strategies, impacts project quality.

**Design/methodology/approach** – In collaboration with a firm that implemented a customized Scaled Agile Framework, questionnaires were distributed to employees involved in ISD projects. The goal was to understand the influence of perceived transparency in ISD processes on project quality.

**Findings** – Our research demonstrates that perceived transparency in ISD processes enhances project quality through knowledge exchange by strengthening goodwill trust among team members. Additionally, transparency improves project quality through client feedback by strengthening competence trust of clients toward the team. Goodwill trust of clients toward the team and competence trust among team members have less impact on project quality enhancement.

**Originality/value** – This study reveals the nomological network among the perceived transparency, different types of trust among stakeholders, social interactions among stakeholders, and project outcomes in agile ISD environments. This nomological network has been overlooked by previous studies that biased toward top-down, interorganizational communication. It highlights that not all types of trust among stakeholders are involved in the processes through which perceived transparency influences ISD project quality in agile working environments. Additionally, it exposes the limitations of transparency strategies for controlling projects in agile IT enterprises.

**Keywords** Agile ISD environments, Competence trust, Goodwill trust, Transparency, Knowledge exchange, Client feedback

**Paper type** Research paper

## 1. Introduction

In today's fast-paced and unpredictable business environments, information technology enterprises need to quickly adapt. To achieve this, many of them are adopting scaling agile

frameworks. These frameworks help develop strong agility, allowing newly developed information systems to respond to changing conditions in the business world. Since the late 1990s, various agile ISD methodologies have been proposed and studied to enhance agility in organizations' ISD processes (Conboy, 2009; Sarker and Sarker, 2009; Schwaber, 2004; Stapleton, 1997). Compared to traditional approaches, agile ISD approaches have a major advantage in dealing with changing requests as projects progress (Harris *et al.*, 2009). Instead of spending time on detailed planning, people "improvise in reaction to changes" in agile projects (ibid, p. 401). The project outputs are "developed by small teams using the principles of continuous design improvement and testing based on rapid feedback and change" (Nerur *et al.*, 2005, p. 75).

Given the prevalence of agile ISD projects, it is important to have appropriate managerial strategies to control them. Previous researchers examined various managerial strategies that can be used to implement and control an agile project, e.g. outcome control and self-control (Maruping *et al.*, 2009), selection of social agile practices (Hennel and Rosenkranz, 2021; Hummel *et al.*, 2015), and maintenance of team trust and psychological safety (Lee *et al.*, 2021). However, the role of the transparency strategy in agile projects remains largely unexplored.

Transparency strategy is seen as a strategic approach to manage stakeholders' and staff's perception (Hannan *et al.*, 2003; Schnackenberg and Tomlinson, 2016). According to Granados *et al.* (2008, 2010), adoption of transparency strategy are attempts to reveal, conceal or manipulate information disclosed to stakeholders so as to manage the stakeholders' perception and affect their attitude and actions. Brought into the agile ISD contexts, transparency strategy can be defined as managerial control of disclosure of information to project members and stakeholders about work done in local processes and overview of how the local processes fit into an agile ISD project as a whole (Adler and Borys, 1996; Chapman and Kihn, 2009).

Transparency has been found to improve relationships among stakeholders and enhance organizational performance (Bernstein, 2012; Larsson *et al.*, 1998). It improves stakeholders' trust in their firms (Rawlins, 2008; Kramer and Lewicki, 2010; Sheppard and Sherman, 1998). Communication transparency of senior management has been considered as an effective antecedent to strengthen trust, honesty and supportiveness in a firm (Myers and Johnson, 2004; Norman *et al.*, 2010). Although transparency was frequently examined in previous studies, many of these studies pertained to traditional communication that features a top-down, intraorganizational approach from leaders/organizations to their followers/staff.

In contrast, communication in an agile ISD project is rather flat and across different organizations. The impact of transparency on agile ISD projects is therefore different from that on traditional projects. The perceived transparency in agile ISD processes may have a different relationship with trust, social interactions and project outcomes. Specifically, since the types of social interactions in agile ISD projects, i.e. intraorganizational collaboration among project team members and interorganizational communication between vendors and clients, are heterogenous, we advocate that the mechanisms, previously described in traditional ISD project settings, through which the perceived transparency enhances project outcomes via social interactions may be different in agile ISD project settings. The overlooked role of transparency strategies in agile ISD settings is a research gap that this study aims to address.

Collaborating with a listed multinational technology and engineering German firm which adopted a customized Scaled Agile Framework, we delve into the two important social interactions in an ISD project: knowledge exchange among team members and performance feedback from clients to the team. The former social interaction is concerned with internal communication among members within the same organization, and the latter social interaction involves external communication with members from another organization. We demonstrate that perceived transparency in ISD processes fosters project quality via

knowledge exchange with an enhancement of goodwill trust among team members, and that the perceived transparency improves project quality through client feedback by strengthening competence trust of clients toward the team.

Agile ISD environments possess two distinctive features that set them apart from traditional ISD environments (such as projects using the waterfall ISD methodology): the collaborative nature of work and the recurring nature of communication (Fowler and Highsmith, 2001; Hron and Obwegeser, 2022). We propose that competence trust among team members and goodwill trust of clients toward the team are not involved in the mechanisms through which perceived transparency in ISD processes improve project quality in agile working environments with these two features.

Our study has several implications. On theoretical implications, the examination of transparency strategies, a common type of managerial control strategy discussed in previous literature on traditional management, is underexplored in the context of agile ISD. Previous studies focused on top-down, intraorganizational communication transparency, whereas the recent, agile ISD environments features flat collaboration and recurring interorganizational communication. This study aims to shed light on the nomological network among the perceived transparency, different types of trust among stakeholders, social interactions among stakeholders and project outcomes in agile ISD environments.

The study also shows empirical evidence to support the use of different dimensions of trust of different stakeholders in examining the nomological network. Not all types of trust among stakeholders are involved in the processes through which perceived transparency influences ISD project quality in agile working environments. Only goodwill trust among team members and competence trust of clients toward the team are involved in the mechanisms through which the perceived transparency drives project quality. The study demonstrates the importance of considering different dimensions of trust in future relevant studies. Despite the common belief that perceived transparency generates trust and facilitates social interactions, our findings emphasize the need for caution when applying previous findings from organizational studies to agile working environments. The working relationships among stakeholders in agile ISD project environments impact the social mechanisms through which transparency strategies influence project quality. The dynamics of these social mechanisms are more complex, necessitating the use of multi-dimensional trust from different stakeholders.

On managerial implications, the study reveals the limitations of transparency strategies in strengthening competence trust among team members for knowledge exchange among the members and improving goodwill trust of clients toward the team for client feedback in agile working ISD environments. The findings enrich recent discussion of enablers of agility in organizations (Ciriello et al., 2022; Hemon et al., 2020). Managers need to formulate strategies beyond transparency strategies to strengthen competence trust among team members. They should also identify other antecedents of client feedback and improve them through appropriate strategies.

## 2. Literature review
### 2.1 Scaling agile frameworks
To ensure agile practices are well harmonized together in large organizations, scaling agile frameworks were developed for multiple teams to work in a coordinated way and to stay competitive by responding efficiently and effectively to clients' needs. Some examples of leading frameworks are Scaled Agile Framework (SAFe), Scrum of Scrums, Large-Scale Scrum (LeSS), Disciplined Agile Delivery (DAD) and Nexus (Alqudah and Razali, 2016; Bittner et al., 2017). Successful adoption of these scaling agile frameworks can ensure agility of working environments in organizations (Dingsøyr et al., 2019; Ebert and Paasivaara, 2017; Kalenda et al., 2018).

One common feature of agile working environments is collaborative nature of work. Scrum is one of the main methods adopted in these frameworks. According to the Scrum Guide (Schwaber and Sutherland, 2011), requirements are iteratively collected from the stakeholders which are prioritized by the product owner in the form of user stories. The whole team has a chance to walk through the stories together and provide feedback in iteration planning meetings. In daily meetings, the team can inspect progress toward the sprint goal. Team members support each other if there are any impediments. These indicate that the leading scaling agile frameworks feature collaboration among team members.

Another common feature of agile working environments is the recurring nature of communication. A project that adopts the scaling agile frameworks is developed in a series of relatively small tasks and is executed by delivering an incremental product for clients which is demonstrated in the iteration review meeting. The team communicates directly with the clients and gets direct feedback from them. At the end of each sprint, an iteration retrospective meeting is held for the team to identify the most helpful changes to improve its effectiveness. The project involves intense and recurring communication between development teams and clients (Schwaber and Sutherland, 2011).

### 2.2 Transparency

Transparency was defined as "the perceived quality of intentionally shared information from a sender" (Schnackenberg and Tomlinson, 2016, p. 1788). It was concerned with the perception rather than the actual information shared to stakeholders, although organizations can control the availability and quality of the information (Bushman *et al.*, 2004; Schnackenberg and Tomlinson, 2016). Ample evidence suggested a positive relationship between perceived transparency and trust in organizational settings (Rawlins, 2008). For example, Akkermans *et al.* (2004) showed a set of reinforcing feedback loops between perceived transparency and trust in the context of supply chain collaboration. Bennis *et al.* (2008) discussed in detail how a business leader should cultivate a transparent environment to foster trust. On social interactions, previous studies also indicated that transparency fosters teamwork (Hackman, 2002) and facilitates discussion and negotiation among project stakeholders (Ross and Stillinger, 1991).

Transparency was also shown to foster relationships among stakeholders via enhancement of trust. Focusing on internal relationships between managers and workers, Norman *et al.* (2010) conducted a field study to demonstrate the influence of an organizational leader's transparency on its followers' trust in the leader. Concerning relationships with external stakeholders, Fleishmann and Wallace (2005) advocated that transparency can foster trust that can help maintain professional relationship between clients and business modelers. Jahansoozi's (2006) qualitative study showed how an oil and gas operator rebuilt trust and maintained relationships with community stakeholders after a crisis with the use of transparency strategy.

Transparency in work processes refers to understanding of work done in local processes and overview of how the local processes fit into the organization as a whole (Adler and Borys, 1996; Chapman and Kihn, 2009). Managers can adopt strategies to adjust the transparency to control work progress. According to Granados *et al.* (2008, 2010), adoption of transparency strategies is an attempt to reveal, conceal or manipulate information disclosed to stakeholders so as to manage the stakeholders' perception and affect their attitude and actions. Scholars commonly agreed that transparency in work processes leads to positive outcomes. Franke *et al.* (2013) indicated that transparency in work processes results in contributors' stronger willingness to work on crowdsourcing platforms. Also, customers were found to purchase and spend more if retailers disclose

more information about their processes of handling customer purchases in respect of online privacy (Tsai *et al.*, 2011).

### 2.3 Trust

Trust, according to Robbins and Langton (2003), is a positive expectation that a target person will not act opportunistically with the use of words, actions, or decisions. It is "a willingness to be vulnerable to another party" (Schoorman *et al.*, 2007, p. 347). In organizational contexts, Das and Teng (2001) proposed two distinctive facets of trust: goodwill trust and competence trust. Goodwill trust is concerned with an individual's faith, intentions and integrity. Competence trust focuses on beliefs in capabilities and resources an individual has.

Trust is necessary for an effective social exchange through which one party conducts a voluntary action in view of expected and actual returns (Blau, 1964; Staples and Webster, 2008). It has been widely considered as a key determinant of team performance (Dirks, 1999) and information sharing (Butler, 1991). It was also shown to effectively prevent task conflicts (Peterson and Behfar, 2003) and enhance reciprocity (Croson and Buchan, 1999). Specifically, trust was empirically shown to be conducive to knowledge sharing (Dirk and Ferrin, 2001; McEvily *et al.*, 2003) and collaboration (Gaertner *et al.*, 1999; Kramer, 1991) which are focal social interactions in our study.

The nature of working relationships among stakeholders may affect the impacts of trust on the social exchange. Currall and Judge's (1995) study focused on trusting behavior between organizational boundary role persons who interact with external business environments for construct development. Sheppard and Sherman (1998) classified relationship among parties into shallow dependence, shallow interdependence, deep dependence and deep interdependence, and examined the impacts of trust on these four different types of relationships.

Transparency helps overcome barriers to the development of trust. With more information, much suspicion can be proven wrong (Kramer, 1999). A more transparent project environment gives "employees no reason to distrust" (Prusak and Cohen, 2001, p. 90). Disclosure of more information can eliminate unnecessary suspicion among team members. It takes a longer time and more interactions before both parties trust each other in a less complete information environment (Anderhub *et al.*, 2002; Brandts and Figuearas, 2003).

### 2.4 Knowledge exchange

Knowledge exchange, in an economics-oriented framework, refers to "an exchange where one party gives some knowledge that he/she has (explicit or tacit) to another party (a person or a repository)" (Staples and Webster, 2008, p. 620). It is one important social interaction in agile working environments. The agile ISD methodologies, for example, Scrum which is commonly adopted in scaling agile frameworks (see Table 1), replace substantial documentation in the traditional approaches with continuous communication and collaboration (Agile Alliance, 2001; Nakayama *et al.*, 2021). The methodologies also encourage role interchangeability and cooperative social actions (Conboy *et al.*, 2011). Thus, project knowledge is not documented in detail to save efforts for prompt communication. The project's success relies on good exchange of tacit knowledge, which is stored "in the head of the development team members" (Conboy *et al.*, 2011; Nerur *et al.*, 2005, p. 76).

Knowledge exchange behavior has been commonly explained by social exchange theory (Blau, 1964; Cropanzano and Mitchell, 2005). Based on this theory, individuals conduct cost–benefit analysis during interaction with others, and they aim at maximizing their expected profits from the interaction (Molm, 2001). People share knowledge with others because they believe that the expected or real benefits from knowledge sharing are larger than the cost. The benefits can be future reciprocity and status (Davenport and Prusak, 1998).

| Constructs | Literature | Relevant definitions/Ideas/Concepts |
| --- | --- | --- |
| Perceived transparency in ISD processes | Adler and Borys (1996) | Internal transparency refers to internal processes executed by employees, and global transparency means the intelligibility for employees of the overall system where they are working |
| | Chapman and Kihn (2009) | Internal transparency is concerned with "understanding of the working of local processes, and global transparency refers to "understanding of where and how the local processes fit into the organization as a whole" (p. 152) |
| | Wiener et al. (2016) | Transparency is one core distinguishing feature of managerial control style, and it refers to "the visibility of control activities and the overall project context" (p. 29) |
| | Grandos et al. (2008, 2010) | Transparency strategy refers to information disclosure policy to other parties |
| Trust | Das and Teng (2001) | Goodwill trust is concerned with intention, faith and integrity, whereas competence trust is relevant to ability. The two dimensions of trust show clear distinction from each other theoretically, and they were developed for studies related to strategically collaboration between different organizations |
| Knowledge exchange | Highsmith and Cockburn (2001) | The goal of agile methodologies is "working jointly to improve the knowledge and skill of individuals" (p. 132) |
| | Staples and Webster (2008) | Knowledge sharing is concerned with "the movement of knowledge from one team member to another" (p. 618) |
| Client feedback | Nerur et al. (2005) | Deliverables in each development cycle are jointly decided by the team and the clients. Clients need to actively participate in the development process and collaborate with the team for project success |
| | Highsmith and Cockburn (2001) | Managers of agile projects should set up "a collaborative relationship with the customers" (p. 132) |
| | Zaheer et al. (1998) | Communication with members from external organizations is different from internal communication. People may develop a collectively-held trust orientation toward an organization, i.e. interorganizational trust. Interorganization communication relies more on interorganizational trust than interpersonal trust with a specific team member |

**Table 1.**
Important definitions and descriptions related to the major constructs adopted in this study

Trust is required in the process of knowledge exchange (Blau, 1964). It acts as "an informational resource that directly reduces the perceived threat of informational asymmetry and performance ambiguity" (Singh and Sirdeshmukh, 2000, p. 157). Team members take the risk of sharing knowledge when they have confidence in their information receivers (Dirks and Ferrin, 2001). Although the relationship between trust and knowledge exchange behavior sounds convincing, empirical studies of the relationship have shown some inconsistencies. Liang et al.'s (2008) meta-analysis paper showed that a positive relationship between trust and knowledge sharing behavior was not always shown. They suspected that the use of one-dimensional trust may be a reason for the inconsistency.

*2.5 Client feedback*
In agile ISD projects, clients are not only committed to provision of capital but also expected to contribute to the projects by giving feedback. Clients and team members should meet regularly to clarify previous requirements and propose additional ones (Agile Alliance, 2001; Jørgensen, 2016). Defining the project scope is therefore an ongoing process in agile projects (Larson and Chang, 2016). During regular meetings with the team, clients will be informed of

the project's status. They will also evaluate prototypes and other project deliverables in the midst of a project.

The success of agile ISD relies on clients' active participation in the development processes (Nerur *et al.*, 2005; Ramesh *et al.*, 2010). Communication between the ISD teams and their clients generates useful information that determines a project's success (Salaway, 1987). The communication helps the team clarify their clients' requirements (Newman and Sabherwal, 1996). High-quality feedback from clients strengthens the team's business domain knowledge, which is critical for project success (Hahn *et al.*, 2012; Lee *et al.*, 1995). Ramesh *et al.* (2010) found that customers' attitude toward the project processes largely influences the project's results. If the customers are skeptical of the processes, they may not spend extra efforts and provide the team with clear design specifications and detailed system requirements.

Client feedback can be considered as an interorganizational exchange of information. Trust was shown to positively influence such an exchange by reducing negotiation and transaction costs (Dyer and Chu, 2003; Zaheer *et al.*, 1998), especially when the information is tacit rather than explicit (Becerra *et al.*, 2008; Li *et al.*, 2010). Chen *et al.* (2014) suggested that interorganizational collaboration and information sharing are enhanced by trust which can be strengthened with the use of influence strategy. Brinkhoff *et al.* (2015) also found that trust drives project success via an improvement of communication in interorganizational supply chain projects. Differentiating interorganizational trust from interpersonal trust, Zaheer *et al.* (1998) found that interorganizational trust, compared to interpersonal trust, plays a more important role in driving performance of information-exchange activities among members from different organizations. Thus, trust that is developed on the basis of evaluation of an organization overall is more critical to facilitation of interorganizational communication.

*2.6 Managerial strategies in agile ISD environments*
Various managerial strategies have been proposed to control an agile ISD project. Recent discussions have focused on social interactions among stakeholders and how different agile practices can facilitate these interactions. Hennel and Rosenkranz (2021) emphasized the importance of open discussion in agile ISD projects and proposed how psychological safety can positively influence team performance when social agile practices are adopted. They conducted three case studies, involving two large insurance companies and one software development company, to support their propositions. Hummel *et al.* (2015) shed light on the agile ISD processes and recommended a set of social agile practices that can facilitate direct communication among team members. They conducted case studies with two medium-scale software development firms and concluded that practices, such as daily stand-up meetings, iteration planning meetings and pair programming, contribute to project success. Similarly, Recker *et al.* (2017) conducted a field study and found further evidence supporting the positive effects of these practices on team response efficiency, extensiveness and the overall project success.

Scholars have also called for more detailed examination of the dynamics of interorganizational communication in agile ISD projects. Without a top-down communication hierarchy and detailed documentation, the quality of client feedback can vary substantially in agile ISD projects. Kudaravalli *et al.* (2017) argued that agile practices are beneficial for knowledge exchange related to design, but not for technical matters. Maruping *et al.* (2019) showed that risk mitigation strategies, including requirement documentation with clients, can enhance IT project performance. Maruping and Matook (2020) presented six possible roles that customer representatives can play in an agile ISD project. Discrepancies between the actual behavior of a customer representative and the behavior expected by project team members are often unavoidable. Recognizing the variety

of interorganizational communication between clients and project teams is important for managers to choose the appropriate control strategies.

## 3. Hypothesis development

### 3.1 Overview

This study examines how perceived transparency in ISD processes improves project quality in agile working environments. The role of transparency in ISD processes has been rarely examined. Table 1 summarizes some important definitions and descriptions related to the major constructs adopted in this study. We refer to transparency in ISD processes as the extent of continuous disclosure of updated information about work done in local processes of the ISD and how the local processes fit into the project as a whole (Adler and Borys, 1996; Chapman and Kihn, 2009). Managers can strategically adjust the disclosure of such project-level information to project stakeholders, such as project team members and clients, in order to manipulate the stakeholders' perception and to control a project as it proceeds.

Two important social interactions in agile working environments are examined in our study: knowledge exchange among team members and client feedback. The former is of internal communication with members within the same organization, and the latter is of external communication with members from another organization. The two contrasting social interactions in an agile project, namely intraorganization communication and interorganization communication, encompass a wide range of communication types. Previous studies have emphasized the significance of comprehending the various forms of organizational communication (Conboy and Morgan, 2011; Lee *et al.*, 2023). Additionally, research has demonstrated the distinct impact of interpersonal communication and interorganizational communication (Zaheer *et al.*, 1998). In agile working environments, iteration planning, daily standup and iteration retrospective among team members are some agile practices of knowledge exchange, whereas iteration review is an example which enables clients to continuously communicate with the teams and provide feedback.

Das and Teng's (2001) multidimensional trust is adopted in this study, since it was developed specifically for studies of strategic alliances of which nature is similar to an agile team that is composed of members from vendors and clients. By goodwill trust, it refers to trust that is "about one's good faith, good intentions, and integrity" (Das and Teng, 2001, p. 256). Competence trust, on the other hand, is developed based on one's capabilities and resources (Das and Tang, 2001).

With the use of Das and Teng's (2001) multi-dimensional trust, we propose that the perceived transparency in ISD processes foster project quality via two mechanisms. First, the transparency fosters project quality via knowledge exchange with a strengthening of goodwill trust among team members. Second, the transparency improves project quality through client feedback by strengthening competence trust of clients toward the team. We argue that working relationships among stakeholders in agile ISD project environments are different from the relationships in traditional ISD project environments. Team members cannot easily determine their counterparts' competence on the basis of information about work done in ISD processes, since agile projects involve much collaborative work among team members. In contrast, members in traditional project teams are responsible for their own well-defined tasks. The team members' competence can be more easily gauged on the basis of their performance in the specific tasks.

In the process of client feedback of an agile project, clients are less concerned with the team's goodwill trust, since the frequent meetings with the team enable clients to provide piece-meal, private business information that is "just enough" for software development before next meetings. In contrast, in traditional projects, clients have to provide bulky information at the

beginning of a project, and they face huge difficulty in determining whether some private, sensitive information is necessary for the project team.

### 3.2 Hypotheses of knowledge exchange

We predict that perceived transparency in ISD processes would allow team members to foster goodwill trust in each other. The same requests for knowledge and help may incur different levels of suspicion at different points of time. With updated information about work done in ISD processes, team members can more easily determine their colleagues' intentions behind asking for their help and knowledge. We predict that perceived transparency in ISD processes would allow team members to foster goodwill trust in each other.

*H1a.* Perceived transparency in ISD processes enhances goodwill trust among team members in agile working environments.

To team members, project-level information about agile ISD processes cannot be easily associated with the individual competence of their colleagues. Unlike traditional working environments, an ISD project is usually a collaborative work among a number of team members in agile working environments (Conboy *et al.*, 2011). The culprits of underperformance work are relatively difficult to be identified. Thus, we did not expect that the perceived transparency fosters the competence trust among team members to facilitate knowledge exchange among them.

Among all the barriers to knowledge sharing identified by Ghobadi and Mathiassen (2016), one factor that negatively impacts communication among team members is the lack of trust among them. Trust, in general, presumes no opportunistic actions among a social group (Bradach and Eccles, 1989). Team members share knowledge with their colleagues in view of the expected profits from the social exchange processes, according to the social exchange theory (Blau, 1964). A trustworthy relationship strengthens the likelihood of future reciprocation (Coleman, 1990). Team members are more likely to seek help when they have high-level trust in their colleagues (Jones and George, 1998).

*H1b.* Goodwill trust among team members fosters knowledge exchange in agile working environments [1].

### 3.3 Hypotheses of client feedback

In contrast to team members, clients use overall project-level information to appraise the performance of a project team. They evaluate the team as a whole instead of each member individually, and they develop a collectively-held trust orientation toward the team (Zaheer *et al.*, 1998). In agile working environments, clients are regularly informed about how the team is handling their feedback. Transparency in ISD processes allows clients to verify whether the feedback they provided has been utilized during regular meetings. In comparison to traditional projects, clients can more quickly and easily determine if their investment of effort into preparing feedback has paid off. Even if some clients' project requirements are not met well, they may be able to infer the underlying reasons from the disclosed information of project processes. Clients are therefore more satisfied, and their trust toward the team, such as competence trust, is strengthened.

*H2a.* Perceived transparency in ISD processes enhances the competence trust of clients toward the team in agile working environments [2].

We also propose that competence trust, compared to goodwill trust, has a stronger role in enhancing communication with clients in an agile project. In a typical agile project, clients need to continuously clarify their requirements and propose new ones. We predict that clients tend to put efforts on giving high-quality feedback when they believe that the team is capable of

handling their comments and new requirements. If clients believe that their additional efforts on feedback will lead to more rewards, namely better project quality, they are more likely to be engaged in giving feedback. Also, when clients have confidence in the team's capability, clients are more likely to accept influence of and communicate more openly with the team (Smith and Barclay, 1997). Project communication with clients can therefore be more effective.

*H2b.* Competence trust of clients toward the team fosters client feedback in agile working environments.

Goodwill trust is more concerned with the misuse of sensitive business information. Communication between clients and project teams in agile ISD projects is a recurring process. In contrast to traditional ISD projects, clients in agile ISD projects need not provide the team with excessive information that includes sensitive but unnecessary business information in the requirement collection stage of a project. Clients in agile ISD projects can consecutively provide "just enough" private business information in each encounter of communication with the team until they believe that the expected cost of misuse of the information is higher than the potential benefits delivered by the team. The importance of goodwill trust is rather downplayed in agile working environments.

Agile ISD projects are people-centric (Whitworth and Biddle, 2007). Frequent social interaction among stakeholders in agile ISD projects is common (Nerur *et al.*, 2005). Among different types of social interaction, knowledge exchange among team members has been considered to be conducive to agile ISD projects (Ghobadi and Mathiassen, 2016; Santos *et al.*, 2015; Zahedi *et al.*, 2016). Karlsen and Gottschalk (2004) conducted a survey of over 1,000 IT firms and concluded that trust and openness within a company are essential for effective knowledge management, which in turn determines the success of IT projects. Similarly, Heeager and Nielsen (2018) argued that trust plays a crucial role in facilitating intraorganizational knowledge sharing, leading to project success. To evaluate the success of agile ISD project outputs, we focus on quality in this study. Project quality is an important outcome of ISD projects (Henderson and Lee, 1992). Therefore, we hypothesize that:

*H3.* Knowledge exchange improves project quality in agile ISD environments.

Client feedback is also an important social interaction to agile project success (Jørgensen, 2016). Karlsen *et al.* (2011) conducted a case study with an IT vendor in Oslo, where the employees expressed their strong belief in knowledge transfer through client consultation and feedback. Some scholars have even argued that client involvement is one of the major challenges faced in agile ISD projects (Hoda *et al.*, 2011). Tam *et al.* (2020) demonstrated that the success of agile ISD projects is determined by customer involvement, which is influenced by personal characteristics, such as the honesty and responsibility of team members.

Therefore, we posed the following hypothesis:

*H4.* Client feedback improves project quality in agile ISD environments.

Figure 1 shows our proposed structural model to be explored in the analysis. The solid lines are the research model in focus.

## 4. Methods
We collaborated with a listed multinational technology and engineering firm in Germany. The firm adopted a customized Scaled Agile Framework to guide employees in scaling agile practices throughout the whole enterprise. As shown in Figure 2, the practice of iteration planning and daily stand-up at the team level indicates the collaborative nature of work, and the practice of iteration review at the team level and product increment (PI) planning at the solution level features recurring nature of communication with clients. Thus, the use of the
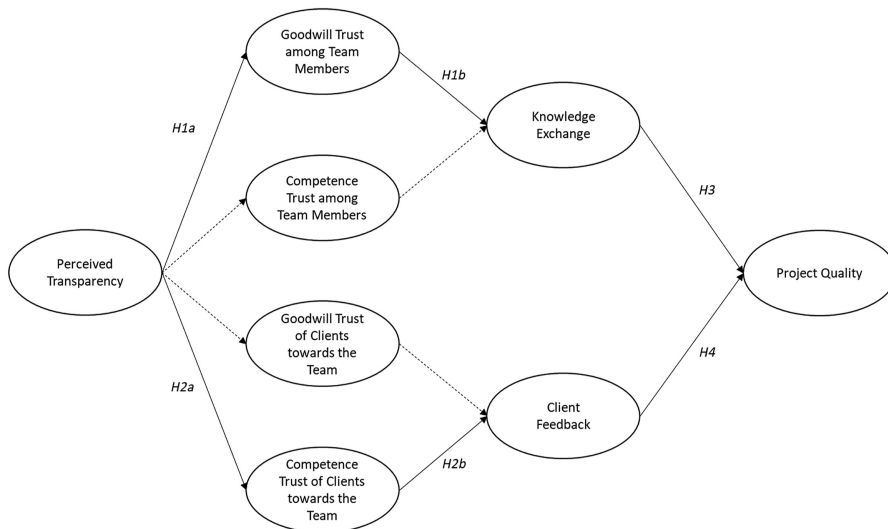
**Note(s):** * Solid lines are the research model in focus
**Source(s):** Authors own work
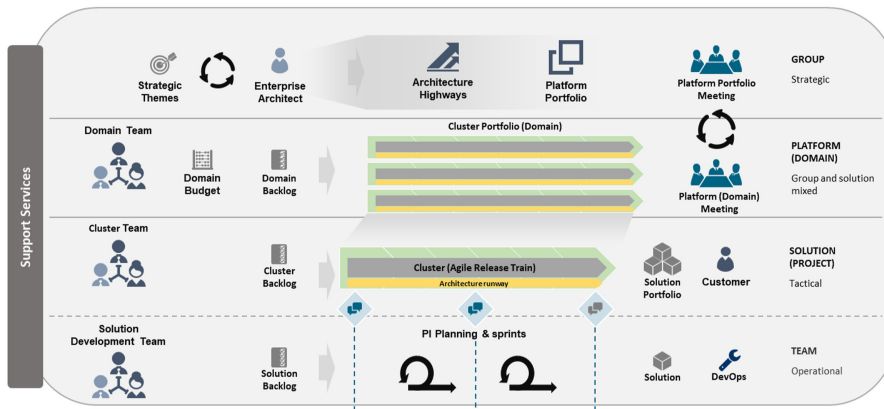
**Source(s):** Authors own work

framework ensures that ISD projects of the firm feature the two distinctive characteristics of agile working environments: collaborative nature of work and recurring nature of communication.

We adopted the judgment sampling approach, given that we look for information that only people who had been involved in ISD projects can provide (Forza, 2002). The firm assisted in distributing questionnaires to its employees whom the firm deemed suitable for the study. Specifically, we outlined the following selection criteria for our target participants: (1) the employees had been a team member in at least one ISD project within the past year, (2) the employees had engaged in communication with clients in those projects, (3) the participants did not work in the same team before, and (4) the project had ended at least four months before we

sent out the survey. The first criterion ensures that respondents possess knowledge and experience in ISD projects. The second criterion basically follows one of our research foci, namely project communication with clients. The participants were well informed of the amount of information about project processes disclosed to their clients. The third criterion aims to strength the variety of projects under consideration. Following Rai *et al.* (2009), the last criterion allows sufficient time for clients' evaluation of the end product, if any, to be reflected to the employee. The firm then reviewed their employees' project involvement records and identified suitable respondents. We aimed to collect responses from 100 employees, and the firm eventually shortlisted 97 suitable respondents. Subsequently, a coordinator at the company sent 97 invitation messages to the selected employees via private messages on the firm's internal social networking website. These messages included a hyperlink to our electronic survey. Ninety-five individuals responded to our invitations, and 88 of them successfully completed the survey. Respondents were informed that their participation was voluntary, their responses would remain anonymous, and the data would be used for academic research purposes. No financial incentives were provided to the respondents.

The survey used a user-reported self-assessment approach. In the survey, we asked the respondents to recall the last ISD project in which they had participated. The items in the survey were on a 7-point Likert scale (from strongly disagree to strongly agree) and were developed on the basis of literature including Chapman and Kihn (2009), Staples and Webster (2008), Rai *et al.* (2009), McKnight *et al.* (2002) and Lee and Xia (2010), with modifications and additions (see Appendix). The items were translated into German, and the translation was checked by the back translation approach with a group of native Germans to ensure their accuracy and clarity.

## 5. Data analysis and results

### 5.1 Analysis

We used the PLS-SEM (partial least squares structural equation modeling) approach to analyze the data collected (Hair *et al.*, 2017; Nitzl *et al.*, 2016). The PLS-SEM approach was chosen because (1) our sample size was not large and (2) our research focus was to examine the interplay among the constructs but not to identify the best model of the constructs. Our study is perdition-oriented. These reasons are in line with Wong's (2013) and Hair *et al.* (2019) conditions for the use of PLS-SEM.

Before the analysis of the structural model, the sample size requirement, convergent validity and discriminant validity were checked to justify the use of PLS-SEM. According to Wong's (2013) calculation based on Marcoulides and Saunders's (2006) guidelines, for a typical research study with a significance level of 5%, statistical power of 80% and $R^2$ larger than 0.25, the minimum sample size is 52 when the maximum number of arrows pointing at a latent variable in the research model is 2. To achieve a regression heuristic of 10 cases for each predictor, Chin (1998) suggested that the sample size should be at least 10 times more than the largest number of formative indicators of one construct in the model and at least 10 times more than the largest number of structural paths pointing at a particular construct. Thus, Chin's suggested sample size for our study is 40. Our sample size is larger than the minimum sample sizes suggested by both Marcoulides and Saunders (2006) and Chin (1998).

To determine the convergent and discriminant validity, average variance extracted (AVE) and composite reliability (CR) were used. The AVE for any construct should be more than 0.5, and the square root of the AVE of one construct should be higher than the correlation between that particular construct and other constructs in the model (Fornell and Larcker, 1981). The comparison aims to show that measures of one construct are more correlated with the corresponding construct than with other constructs. Our data fulfill Fornell and Larcker's (1981) requirements (see Table 2).

|  | AVE | Sqrt (AVE) | T | CTT | GTT | CTC | GTC | KE | CF | PQ |
|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  |  |  |  | Correlation among constructs |  |  |  |  |
| Perceived transparency (T) | 0.6569 | 0.8105 | 1.0000 |  |  |  |  |  |  |  |
| Competence trust among team members (CTT) | 0.8285 | 0.9102 | −0.0176 | 1.0000 |  |  |  |  |  |  |
| Goodwill trust among team members (GTT) | 0.6704 | 0.8188 | 0.2896 | 0.6637 | 1.0000 |  |  |  |  |  |
| Competence trust of clients toward the team (CTC) | 0.9252 | 0.9619 | 0.5561 | 0.2596 | 0.4274 | 1.0000 |  |  |  |  |
| Goodwill trust of clients toward the team (GTC) | 0.7301 | 0.8545 | 0.4215 | 0.3363 | 0.5053 | 0.8067 | 1.0000 |  |  |  |
| Knowledge exchange (KE) | 0.7880 | 0.8877 | 0.0633 | 0.5927 | 0.6359 | 0.3674 | 0.4680 | 1.0000 |  |  |
| Client feedback (CF) | 0.6338 | 0.7961 | 0.4927 | 0.0944 | 0.1523 | 0.5562 | 0.5130 | 0.2283 | 1.0000 |  |
| Project quality (PQ) | 0.7657 | 0.8750 | 0.1348 | 0.5571 | 0.4000 | 0.4456 | 0.4443 | 0.3806 | 0.4442 | 1.0000 |

**Table 2.**
Details of the AVE, square of the AVE and correlation among the constructs

Composite reliability was used to measure the internal consistency of the constructs (Werts *et al.*, 1974). The CR of all constructs in a structural model should be at least 0.7 (Bagozzi and Yi, 1988; Wong, 2013). Our data fulfill the requirement (see Table 3).

Also, we followed Chin's (2010) recommendation and compared the loadings for each item with the cross-loadings. An item's loadings should be higher than its cross-loadings, as items should be more associated with their intended constructs than with other constructs. The recommended requirement is satisfied (see Table 4).

After verification of the sample size requirements, the convergent validity, and the discriminant validity, we analyzed the data. The analysis was divided into two parts. In the first

|  | Composite reliability (CR) |
|---|---|
| Perceived transparency (T) | 0.8830 |
| Competence trust among team members (CTT) | 0.9354 |
| Goodwill trust among team members (GTT) | 0.8897 |
| Competence trust of clients toward the team (CTC) | 0.9611 |
| Goodwill trust of clients toward the team (GTC) | 0.8439 |
| Knowledge exchange (KE) | 0.9177 |
| Client feedback (CF) | 0.8725 |
| Project quality (PQ) | 0.9286 |

**Table 3.** Details of the composite reliability of the constructs

|  | T | CTT | GTT | CTC | GTC | KE | CF | PQ |
|---|---|---|---|---|---|---|---|---|
| T1 | 0.8520 | −0.0077 | 0.3561 | 0.4406 | 0.3995 | 0.1299 | 0.3382 | 0.1668 |
| T2 | 0.8730 | −0.0503 | 0.1966 | 0.4606 | 0.4165 | −0.0552 | 0.2622 | 0.0000 |
| T3 | 0.8588 | 0.0150 | 0.2709 | 0.4534 | 0.2641 | 0.1328 | 0.5413 | 0.1861 |
| T4 | 0.6340 | −0.0112 | 0.0838 | 0.4555 | 0.2639 | −0.0109 | 0.4979 | 0.0846 |
| CTT1 | −0.0064 | 0.9266 | 0.6123 | 0.2583 | 0.3419 | 0.5699 | 0.1308 | 0.6095 |
| CTT2 | 0.0128 | 0.9382 | 0.5968 | 0.2757 | 0.3203 | 0.5031 | 0.0804 | 0.4875 |
| CTT3 | −0.0530 | 0.8642 | 0.6003 | 0.1757 | 0.3639 | 0.5395 | 0.0436 | 0.4157 |
| GTT1 | 0.2314 | 0.6351 | 0.8817 | 0.4053 | 0.5067 | 0.6455 | 0.1502 | 0.3635 |
| GTT2 | 0.3657 | 0.4561 | 0.8293 | 0.4777 | 0.5134 | 0.4961 | 0.1277 | 0.2093 |
| GTT3 | 0.1536 | 0.6563 | 0.8604 | 0.1220 | 0.2486 | 0.5083 | 0.0446 | 0.3483 |
| GTT4 | 0.1787 | 0.4069 | 0.6901 | 0.3767 | 0.3470 | 0.3959 | 0.1827 | 0.4238 |
| CTC1 | 0.5175 | 0.2088 | 0.4016 | 0.9609 | 0.7404 | 0.3313 | 0.5393 | 0.3707 |
| CTC2 | 0.5519 | 0.2896 | 0.4203 | 0.9628 | 0.8106 | 0.3749 | 0.2309 | 0.4851 |
| GTC1 | 0.4042 | 0.3474 | 0.4021 | 0.8050 | 0.8800 | 0.4352 | 0.4590 | 0.4121 |
| GTC2 | 0.3098 | 0.2737 | 0.4686 | 0.5559 | 0.8282 | 0.3602 | 0.4160 | 0.3430 |
| KE1 | 0.1375 | 0.5491 | 0.5744 | 0.3932 | 0.4695 | 0.8947 | 0.2848 | 0.4377 |
| KE2 | −0.0030 | 0.5076 | 0.5585 | 0.2865 | 0.4400 | 0.9081 | 0.2401 | 0.2304 |
| KE3 | 0.0202 | 0.5168 | 0.5582 | 0.2876 | 0.3320 | 0.8596 | 0.0762 | 0.3256 |
| CF1 | 0.4370 | 0.1564 | 0.2835 | 0.4828 | 0.4144 | 0.2597 | 0.8123 | 0.4062 |
| CF2 | 0.5795 | 0.0881 | 0.2112 | 0.6740 | 0.5954 | 0.1891 | 0.9109 | 0.3594 |
| CF3 | 0.2201 | 0.0121 | −0.0505 | 0.2658 | 0.3191 | 0.1568 | 0.7637 | 0.3594 |
| CF4 | 0.0474 | −0.0368 | −0.2240 | 0.0749 | 0.0927 | 0.0540 | 0.6800 | 0.2873 |
| PQ1 | −0.0331 | 0.5203 | 0.3007 | 0.3795 | 0.4529 | 0.2938 | 0.1788 | 0.8010 |
| PQ2 | 0.1771 | 0.5267 | 0.3698 | 0.4630 | 0.4257 | 0.4141 | 0.5208 | 0.9516 |
| PQ3 | 0.1021 | 0.3754 | 0.2330 | 0.3532 | 0.2742 | 0.2515 | 0.4989 | 0.9151 |
| PQ4 | 0.1724 | 0.5893 | 0.5459 | 0.3587 | 0.4646 | 0.3688 | 0.2181 | 0.8236 |

**Table 4.** Details of the loadings and cross-loadings for the items

part, we used the structural model shown in Figure 3 to explore the interplay among the proposed constructs. The significance of the relationships between the constructs was assessed with the use of bootstrapping procedures, in which the number of bootstrap samples was set at 3,000, with no missing values. In the second part, we examined a revised model whose focus was merely on how transparency leads to better project quality. Insignificant paths from transparency to project quality in the previous exploratory structural model were removed.

*5.2 Results*
We first used the structural model in Figure 2 to explore the relevant relationships among the constructs with the use of Das and Teng's (2001) two-dimensional trust. The *t*-value of the path from competence trust of clients toward the team to client feedback is larger than 1.96, showing that the path is significant at $p = 0.05$. Thus, H2b is supported. The *t*-values of all paths in our research model other than the aforementioned one are larger than 2.58. These paths are significant at $p = 0.01$. Thus, H1a, H1b, H2a, H3 and H4 are also supported. The *t*-values of the path from perceived transparency to competence trust among team members and the path from goodwill trust of clients toward the team and client feedback are lower than 1.645. This concurs with our expectation. Perceived transparency in ISD processes fosters project quality via strengthened trust of different types in the two social interactions respectively. The $R^2$ of the structural model is 0.277. Figure 3 shows the results of path analysis. In addition, all the *t*-statistics of the outer loadings are larger than 2.58. The outer model loadings are significant at $p = 0.01$.

In the second part, we focused on the specific types of trust through which perceived transparency in ISD processes fosters project social interactions and thereby enhances project quality. Figure 4 shows the results of the revised structural model with a focus on the mechanisms through which perceived transparency leads to better project quality. Insignificant paths from perceived transparency to project quality in the exploratory
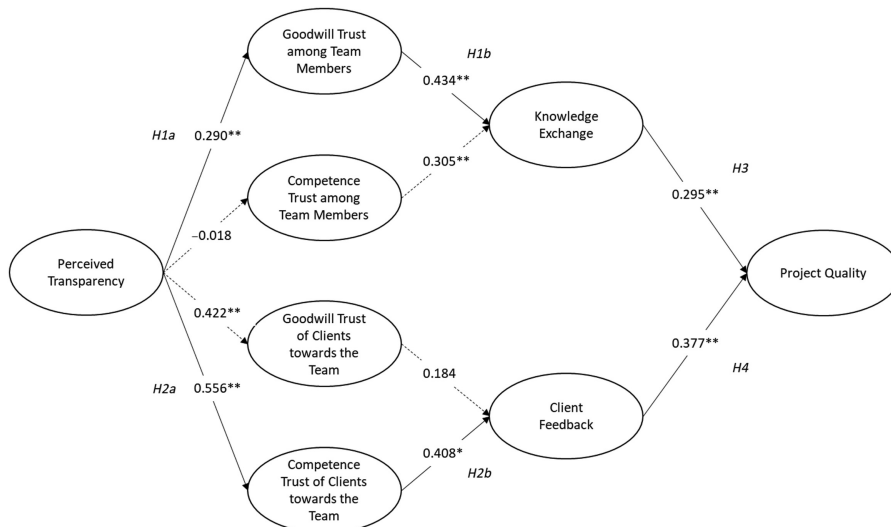


**Note(s):** *$p < 0.05$; **$p < 0.01$
\* Solid lines are the research model in focus
**Source(s):** Authors own work
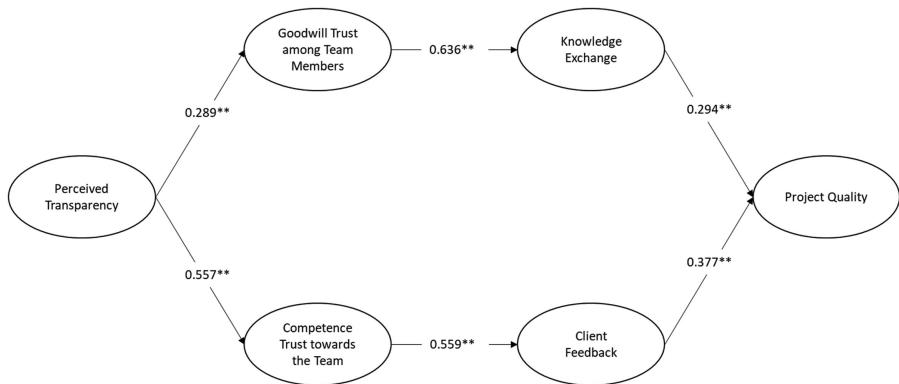
**Figure 4.**
Results of the revised structural model

**Note(s):** *$p < 0.05$; **$p < 0.01$
**Source(s):** Authors own work

model in Figure 3 were removed. All remaining paths in the model are significant with $p < 0.01$. The total effect of perceived transparency on project quality is 0.311 and is significant with $p < 0.01$ and $t$-value = 3.452. The $R^2$ of the structural model is 0.278.

### 5.3 Assessment of common method variance

Self-reporting in the measurement can create threats to validity through common method bias (Donaldson and Grant-Vallone, 2002). Two methods were used to assess the threat of the common method bias: Harman's single-factor test (Harman, 1976) and partial correlation procedure (Lindell and Whitney, 2001).

In Harman's (1976) single-factor test, if common method bias exists in this study, the majority of the variance (i.e. >50% variance) can be explained by one general factor. The result of the test with our dataset indicated that the 26 measured items of constructs in Figure 4 do not substantially load on one single factor with the first factor contributing 34.5% of the total variance. The common method bias in this study is not serious.

The second test to examine the common method bias (Lindell and Whitney, 2001) involves partialling out a marker variable that has no theoretical relationships with other variables in a model and determining the correlation between the marker variable and latent variables (Tehseen *et al.*, 2017). Ages of respondents was chosen as the marker variable in our study, since there was no established evidence that the age has systematic influence on trust or social interactions in a project environment. Previous researchers also suggested that trust stays rather constant within different adult age groups (Sutter and Kocher, 2007).

All the constructs in Figure 4 were included in the marker variable test. Table 5 presents the results of the test. As the correlations among the latent variables and the marker variable are all less than 0.3 (Lindell and Whitney, 2001; Tehseen *et al.*, 2017), we conclude that common method bias has no substantive threat to this study. Also, the $R^2$ of the revised

**Table 5.**
Correlations among latent variables and marker variable

| | Perceived transparency | Client feedback | Competence trust of clients toward the team | Goodwill trust among team members | Knowledge exchange | Project quality |
|---|---|---|---|---|---|---|
| Age | 0.036 | −0.163 | −0.053 | 0.11 | 0.064 | −0.023 |

structural model (in Figure 4) with the addition of age is 0.280. The effect size of the model with age in comparison to the revised structural model (in Figure 4) is 0.002. The effect size is negligible (Chin, 2010; Cohen, 2013).

## 6. Discussion
### 6.1 Discussion of findings
The results support our expectation that perceived transparency in ISD processes leads to better project quality through fostering different types of trust in different social interactions. The perceived transparency not only fosters goodwill trust among team members that drives knowledge exchange, but also enhances competence trust of clients toward project teams, which generates high-quality client feedback. Agile working environments feature close collaboration and recurring communication, and both types of project social interactions were demonstrated to have a positive influence on agile project quality.

Team members are concerned with their superior knowledge. They may lose their importance in the team if they share their knowledge with others. They therefore have an individual interest in hoarding their knowledge. However, with more information about work done in their projects, they are more likely to understand their colleagues' intention behind knowledge-sharing requests and believe that the whole team should work together to avoid project failure. Hence, stronger confidence in their colleagues' goodwill is developed. Also, in line with our expectation, the results show that the project-level information about the ISD processes does not have a strong association with individual-level competence trust, since the information is not directly related to individual competence. Project output of an agile project is a collaborative work of which individual contribution cannot be easily distinguished, in comparison to projects which adopt waterfall approaches or alike in traditional working environments.

The results also show that team members prefer to share knowledge with colleagues who are honest of offering help in return in future. Hence, goodwill trust has a significant positive influence on knowledge exchange processes. In addition, competence trust among team members is found to be positively influential on knowledge exchange.

In addition, the results indicate that perceived transparency in ISD processes reduces uncertainty and strengthens not only the competence trust but also the goodwill trust of clients toward the team. Clients tend to evaluate members form their vendors as a team, and therefore project-level information disclosed to clients are useful for them to understand why the team failed to handle requirements proposed before. Thus, the perceived transparency in ISD fosters trust of clients toward the team.

Competence trust is shown to be conducive to client feedback processes. Clients tend not to put extra efforts on giving high-quality feedback if they do not believe that the team is capable of handling their feedback and deliver better project quality. On the other hand, in line with our expectation, goodwill trust is not shown to significantly affect client feedback processes. Piece-meal investment of private business information allowed in recurring communication processes is likely one reason for the downplayed goodwill trust.

The results of the study are complementary to some thoughts of previous scholars in ISD project management. Previous studies suggested that the types of relationships among stakeholders are moderators of the relationships between transparency and trust (Sheppard and Sherman, 1998; Williams, 2005) and also the relationships between trust and social interaction (Currall and Judge, 1995; Sheppard and Sherman, 1998). Our findings lead to similar thought: the ISD working environments are one of the moderators of the relationships. If the ISD environments are agile, then the frequency of meetings between clients and teams shall be higher, as compared to traditional ISD environments, and the relationship between goodwill trust of clients toward the team and client feedback becomes less significant. The

types of ISD environments are boundary conditions for the relationships among the transparency, trust and social interaction.

Some scholars focused on specific agile practices and examined the impacts of these practices on agile ISD projects. Hummel *et al.* (2013) defined a set of social agile practices that serves as a facilitator of direct communication among team members. Hennel and Rosenkraz (2021) further suggested that the social agile practices promote transparency and enhance psychological safety. The sets of agile practices in these studies, however, may not be harmoniously implemented in enterprises in the first place. Unlike these studies, we collaborated with a firm that adopted a scaling agile framework to ensure the harmony among various agile practices. In contrast to single-dimensional psychological safety, we adopt Das and Teng's (2001) two-dimensional trust to advance on more understanding of the complexity of team members' perception. Our findings reveal how the two distinctive types of trust among team members are impacted by the perceived transparency differently in agile ISD environments.

Response extensiveness is a popular concept that was discussed by a number of scholars in the field of agile project management. According to Lee and Xia (2010), response extensiveness refers to the "extent, range, scope or variety of software team responses" (p. 90) for customers' changing requirements. Previous scholars identified various enablers of team response extensiveness, including agile practices (Recker *et al.*, 2017). Response extensiveness seems to be a result of good knowledge exchange and client feedback. Extending our findings, we predict that competence trust of clients toward the team plays a more important role in influencing client feedback and subsequently response extensiveness than goodwill trust of clients toward the team does. Transparency strategies with disclosure of more information are enablers of response extensiveness in agile ISD environments via enhancement of the competence trust to the team.

### 6.2 Implications

The influence of perceived disclosure of information about the agile ISD processes on social interactions among project stakeholders for better results of agile projects deserves our exploration. The results of the study highlight the importance of understanding the distinctive features of different ISD projects. Agile ISD environments feature collaborative nature of work and recurring nature of communication. These features result in differences in working relationships among project stakeholders, and affect the mechanisms through which the perceived transparency and multi-dimensional trust influence project outcomes. Lessons and experiences gained in previous studies of traditional ISD environments may not apply to agile ISD projects. Whereas the perceived transparency appeared to be a positive factor of trust, social interactions as well as project outcomes in traditional working environments (Akkermans *et al.*, 2004; Williams, 2005), this study presents the rather underexplored interplay among these constructs in an agile ISD environmental setting. Not all types of trusts and social interactions are involved in the mechanisms through which the perceived transparency in ISD processes improves project quality.

Recent studies on managerial control have shed light on the inner workings of agile ISD projects and have revealed the dynamics of social interactions among project stakeholders. Detailed examination of these dynamics has uncovered that the success of a project is determined by various factors, including the types of knowledge exchanged (Kudaravalli *et al.*, 2017), the differing expectations of stakeholder groups (Maruping and Matook, 2020), and the adoption of agile practices (Hennel and Rosenkranz, 2021; Hummel *et al.*, 2015). Building upon these discussions, our studies emphasize the diversity of social interactions among stakeholders, specifically intraorganizational collaboration and interorganizational communication. Furthermore, we demonstrate how different types of trust, facilitated by perceived transparency, can enhance these social interactions in agile ISD environments.

Trust among partnering firms results in better social exchange (Lioukas and Reuer, 2015). The use of multi-dimensional trust helps drill down social interactions in ISD projects. It is only partially true that the transparency fosters trust and thereby improves project communication. As noted by the previous literature, empirical inconsistencies between trust and project communication existed (Liang *et al.*, 2008). Specifically, previous studies have highlighted the importance of distinguishing two forms of exchange: negotiated and reciprocal (Molm *et al.*, 2007). Negotiated exchange refers to a "one-shot" transaction, whereas reciprocal exchange indicates a continuing relationship. It has been shown that the relationships between trust and different types of exchange are different (Molm *et al.*, 2007). We further argue that different types of trusts are affected by different types of exchange. In contrast to the relatively "one-shot" discussions with clients about system requirements in traditional ISD projects, the recurring nature of interorganizational communication in agile ISD features reciprocal exchange. This study demonstrates the mechanisms through which the transparency leads to better project quality via different types of trust in different social interactions, using multidimensional trust. Future research should exercise caution when using one-dimensional trust.

On managerial implications, we suggest that ISD managers should continuously disseminate adequate information about work done in project processes to stakeholders in agile ISD environments. An increase of perceived transparency in the ISD processes fosters goodwill trust among team members for knowledge exchange. The perceived transparency also generates competence trust of clients toward the team, leading to high-quality client feedback. Nevertheless, the managers should be aware of the limitations of transparency strategies. The positive effect of the information disclosure on competence trust among team members is mediocre. The managers should explore alternative managerial strategies to strengthen competence trust for better knowledge exchange. Moreover, they need to identify other antecedents of client feedback to further facilitate social interaction with clients for better project quality.

## 7. Limitations and future directions
The study involves several limitations. First, although the sample size fulfilled the requirements of Chin (1998) and Marcoulides and Saunders (2006), the sample size limits the feasibility of discovering the best model of transparency to project quality. In this study, we can only examine the relationships among the constructs. Thus, because of the objectives of the study and the sample size, we prefer PLS-SEM to CB-SEM approach for data analysis. In addition, it is an assumption that perceived trust between team members and clients is reciprocal. We cannot eliminate the possibility that clients act like strong believers in the team but instead do not trust the team at all, leading to team members' illusion that their clients trust them. However, given the high frequency of interactions in agile projects, this possibility should be rather limited.

Future research can collect a larger sample of data that involves more vendors and clients. The larger sample enables the validation of the best model of perceived transparency in agile ISD processes to project quality. Moreover, whereas the two features, recurring nature of communication and collaborative nature of work, are essential in agile ISD environments, we did not specifically examine the moderating effect of either feature. Our study places strong emphasis on choosing an ISD environment in which implementation of adoption of agile practices is harmonious. Nevertheless, future studies can further our study and specifically examine the moderating effect of the recurring nature of communication on the relationship between the perceived transparency and competence trust among team members, and the moderating effect of the collaborative nature of work on the relationship between goodwill trust of clients toward the team and client feedback without much sacrifice of the harmony among agile practices in local enterprises.

## Notes

1. The hypothesis H1b pertains only to goodwill trust among team members, since we do not expect that the perceived transparency affects competence trust among team members. Therefore, the competence trust is irrelevant to the mechanisms through which the perceived transparency drives project quality.

2. The hypothesis H2a pertains only to competence trust of clients toward the team, since we do not expect that the goodwill trust of clients toward the team will foster client feedback. Therefore, the goodwill trust is irrelevant to the mechanisms through which the perceived transparency drives project quality.

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**Appendix**

| Constructs | Codes | Items | Adapted from |
|---|---|---|---|
| Perceived transparency | T1 | The information system development processes help internal and external project stakeholders to understand the overall context in which they are working | Chapman and Kihn (2009) |
| | T2 | The information system development processes help clients to understand the overall context of the project | |
| | T3 | The information system development processes help to clarify the activities that make up my business unit | |
| | T4 | The information system development processes increase my knowledge of the operations of my business unit | |
| Competence trust among team members | CTT1 | I believe that my teammates do a very good job at work | McKnight *et al.* (2002) |
| | CTT2 | A large majority of my teammates are competent in their area of expertise | |
| | CTT3 | I feel comfortable that my team members have the professional skills to complete the team tasks | |
| Goodwill trust among team members | GTT1 | In general, my teammates really do care about the well-being of others | McKnight *et al.* (2002) |
| | GTT2 | In general, most of my teammates keep their promises | |
| | GTT3 | My teammates are honest in their dealings with others | |
| | GTT4 | I feel that I will not be able to count on my team members to help me if I cannot handle the task. (RC) | |
| Competence trust of clients toward the team | CTC1 | Based on interactions with our clients during the project, the business relationship with our clients is characterized by high levels of trust in our competencies | Rai *et al.* (2009) |
| | CTC2 | Based on interactions with our clients during the project, our clients believe that we are capable of accomplishing the given tasks | |
| Goodwill trust of clients toward the team | GTC1 | Based on interaction with our clients during the project, our clients believe that we will keep our commitment in the mutual contract | Rai *et al.* (2009) |
| | GTC2 | Based on interaction with our clients during the project, we and the clients are generally skeptical of the information provided to each other. (RC) | |
| Knowledge exchange | KE1 | People on this team are willing to share knowledge/ideas with others | Staples and Webster (2008) |
| | KE2 | People on this team share their ideas openly | |
| | KE3 | People on this team with expert knowledge are willing to help others on this team | |
| Client feedback | CF1 | Customers share their ideas with the project team regularly | Staples and Webster (2008) |
| | CF2 | Customers are willing to provide feedback to the project team | |
| | CF3 | The feedback provided by customers is useful | |
| | CF4 | The feedback provided by customers is helpful | |

**Table A1.**
Survey items

| Constructs | Codes | Items | Adapted from |
|---|---|---|---|
| Project quality | PQ1 | Based on project internal evaluation, the project achieved its functional goals | Lee and Xia (2010) |
| | PQ2 | Based on project external evaluation, the project met end-user requirements | |
| | PQ3 | Based on project external evaluation, the capabilities of the software fit end-user needs | |
| | PQ4 | Based on project internal evaluation, the software met technical requirements | |

**Table A1.**    **Source(s):** Authors own work

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