

Team-Level Antecedents of Shared Leadership in Dispersed Innovation Teams

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Summary

Dispersed innovation teams rely upon team members who share leadership responsibilities to attain high levels of team performance. Although this concept of team shared leadership is receiving increasing attention, this dissertation shows that especially research on team-level antecedents of shared leadership has major deficits regarding a basic framework for analyzing antecedents, depth of theory, context-specific arguments, and empirical validation. This dissertation tries to fill these research gaps, thus shedding light on the question: How can we foster the important process of shared leadership in dispersed innovation teams?

This dissertation introduces a theoretical framework into shared leadership literature to structure the antecedents of shared leadership according to their mode of functioning. As such, this dissertation argues for the first time that to establish high levels of team shared leadership the basic dimensions of motivation, opportunity, and ability for shared leadership should be addressed (motivation-opportunity-ability framework or MOA framework). Based on this notion team-level antecedents providing motivation, opportunity, and ability for shared leadership are operationalized and hypothesized as antecedents of shared leadership in dispersed innovation teams using acknowledged theories. Moreover, all discussed hypotheses are verified in a sample of 96 dispersed real work teams with innovative software tasks. Thereby, empirical results are drawn from 96 team leader responses (used to assess team-level antecedents of team shared leadership) and 337 team member responses (used to assess team shared leadership).

Motivation for Team Shared Leadership. Based on the perspective of shared leadership as a risk-taking behavior for team members in dispersed innovation teams, trustworthiness is argued as a facilitator of the willingness, thus motivation to engage in risky shared leadership actions with others. This argumentation based on trust theory was supported by empirical results showing that team member trustworthiness in terms of benevolence and integrity was positively related to team shared leadership. Surprisingly, the proposed positive relationship between ability-based trustworthiness and shared leadership could not be confirmed, thus ability-based trustworthiness could not be validated as a facilitator of shared leadership in dispersed innovation teams.

Opportunity for Team Shared Leadership. Opportunity for team shared leadership is addressed by discussing team reflexivity as an antecedent of shared leadership in dispersed innovation teams. Team reflexivity is argued as opportunity providing antecedent of shared leadership as it gives team members a clear information basis in the complex and constantly changing environment of dispersed innovation teams, thus making leadership needs identifiable. In support of this argumentation based on goal setting theory and shared mental model theory team reflexivity was positively related to team shared leadership. Thereby, the relationship between team reflexivity and shared leadership could be shown as even stronger under conditions of high team role breadth self-efficacy and high team empowerment.

Ability for Team Shared Leadership. Ability for shared leadership is addressed in terms of social and project management skills. These two skills are argued as basic and complementary skills needed for shared leadership in dispersed innovation teams based on socio-technical systems theory. Underscoring the importance of interpersonal competence the empirical analysis showed that social skills were strongly positively related to team shared leadership. Contrary to the hypothesis of this study project management skills were not related to team shared leadership.

Structural Team Properties and Team Shared Leadership. Moreover, several structural team properties are discussed as team-level antecedents of shared leadership, namely female ratio, mean age, age diversity, and national diversity. Thereby, structural team properties are argued as potentially affecting team shared leadership through several MOA dimensions. In the empirical analyses female ratio was positively related to shared leadership in dispersed innovation teams, while mean age was negatively related. Age diversity showed no significant relationship and national diversity was marginally positively related to shared leadership in dispersed innovation teams.

Based on these findings, important implications for practice, related to the three stages of a project team (establishment, forming, and performing stage), are provided. As such, team leaders of dispersed innovation teams is given a check-list of how to foster shared leadership in dispersed innovation teams based on the results of this dissertation. Future research is especially suggested regarding the “non-findings” of this dissertation, interaction effects, additional team-level antecedents, the vertical team leader’s role within shared leadership evolvment, antecedents of shared leadership in other contexts, and other levels of antecedents (e.g., organizational-level antecedents).

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Acronyms

β	Beta-coefficient
e.g.	Exempli gratia (for example)
Email	Electronic mail
etc.	Et cetera (and so forth)
HRM	Human resource management
i.e.	Id est (that is)
ICC	Intra-class correlation
LMX	Leader-member exchange (theory)
MOA	Motivation-opportunity-ability (theory)
N	Number of observations in the sample at the respective level of analysis
n.a.	Not applicable
P	Probability value
R^2	Correlation coefficient squared
TMX	Team-member exchange (theory)

1 Team-Level Antecedents of Shared Leadership in Dispersed Innovation Teams

1.1 Thematic Introduction: Definitions and Relevance

Over the past few years, teams have become increasingly prevalent in today's corporate world (Avolio, Sivasubramaniam, Murry, Jung, & Garger, 2003; Kirkman, Tesluk, & Rosen, 2001; Salas, Stagl, Burke, & Goodwin, 2007). Moreover, globalization and moves toward innovation-based market leadership have led to more and more companies making use of knowledge residing at different locations to create innovative outputs (Love & Roper, 2009; Majchrzak, Malhotra, & John, 2005). Thus, companies increasingly rely on so-called dispersed innovation teams that work together on demanding innovative tasks across physical distance (Gassmann & Zedtwitz, 2003; McDonough, Kahn, & Barczak, 2001; Zigungs, 2003). Dispersed innovation teams face tremendous challenges though as tasks are complex, the environment is uncertain, communication is dependent upon electronic means, and team members often share little common ground (Cramton, 2002; Gibson & Gibbs, 2006). In fact, surveys demonstrate that 50% of all dispersed innovation teams fail to meet their objectives due to the inability to manage their distributed workforce pointing to the need to address questions of adequate leadership in such teams (Kanawattanachai & Yoo, 2002).

Extant research suggests that a shared leadership approach is especially beneficial in such highly challenging team environments, thus highlighting the need for further investigations into how such shared leadership processes can be achieved (Bligh, Pearce, & Kohles, 2006; Klein, Ziegert, Knight, & Yan, 2006; Pearce, 2004; Pearce & Manz, 2005). Shared leadership is defined as "a dynamic, interactive influence process among individuals of a group, for which the objective is to lead one another to the achievement of group or organizational goals or both" (Pearce & Conger, 2003, p. 1). Hence, shared leadership in teams (i.e., team shared leadership) is an emergent team property that results from the distribution of leadership influence across multiple team members (Carson, Tesluk, & Marrone, 2007). Shared leadership is a process in which individual team members accept responsibility for team outcomes by performing leadership behaviors, such as team monitoring or team problem solving, that guide other single team members or the team as a

whole toward the attainment of team goals (Hoegl & Muethel, 2007, 2008; Houghton, Neck, & Manz, 2003).

Taking a closer look, the increasing relevance of shared leadership in dispersed innovation teams and the importance of respective antecedents is rooted in the following reasons.

- 1) First, shared leadership is needed in dispersed innovation teams because such teams deal with innovative tasks, i.e., tasks that are new, complex, and uncertain (Hoegl, Parboteeah, & Gemuenden, 2003). Thus, it is almost impossible for a single team leader to be an expert on all aspects of work and solely give direction on all task-related issues (Burke, Fiore, & Salas, 2003; Pearce, 2004; Pearce & Conger, 2003; Pearce & Manz, 2005). Instead, the team leader has to rely upon highly skilled team members that bring their expertise to bear (Pearce, 2004; Pearce & Manz, 2005). Therefore, the person in charge at any moment should be the one with the key knowledge, skills, and abilities for the project task at hand (Pearce, 2008). Sharing leadership responsibilities helps the team to adequately address internal and external team demands as there are more resources to attend to the team's needs (Burke et al., 2003; Solansky, 2008). Because their work requires the intellectual capital of all team members to attain high quality outputs, dispersed innovation teams therefore rely on sharing leadership responsibilities (Bligh et al., 2006). Accordingly, various empirical studies have validated the importance of shared leadership for positive team behaviors and team performance in challenging task contexts. Such positive relationships have been shown for top management teams (Eisenhardt & Bourgeois, 1988; Katzenbach, 1997), change management teams (Pearce, 1997; Pearce & Sims, 2002), military teams (Shamir & Lapidot, 2003), new venture top management teams (Ensley, Hmieleski, & Pearce, 2006), extreme action teams (Klein et al., 2006), and consulting teams (Carson et al., 2007).

Moreover, shared leadership ameliorates negative impacts that geographical distance can have on dispersed innovation teams (Orlikowski, Hertel, & Konradt, 2004; Pearce & Sims, 2000; Perry, Pearce, & Sims, 1999). Team processes critical for performance, such as communication, task coordination, cohesion, and trust tend to suffer as teams become increasingly virtual (Duarte & Snyder, 1999; Hoegl & Proserpio, 2004; Jarvenpaa, Knoll, & Leidner, 1998). At the same time, dispersion

makes it more difficult for a single team leader to possess all the necessary information and to exert necessary social influence across distance (DeRosa, Hantula, Kock, & D'Arcy, 2004; Hoch, Andreßen, & Konradt, 2007; Hoch & Wegge, 2008). Leadership functions, such as controlling work processes (Hoegl & Muethel, 2007), dealing with conflicts (Hoch & Wegge, 2008), and coaching (Furst, Reeves, Rosen, & Blackburn, 2004), become more difficult to perform for the vertical leader and limit his or her effectiveness (Hertel & Konradt, 2001). Shared leadership, in turn, can provide a day-to-day mechanism for team interaction that a single vertical leader cannot provide (Perry et al., 1999). Shared leadership helps to coordinate, control, and focus teamwork due to mutual social influence among team members across distance (Cox, Pearce, & Perry, 2003; Orlikowski et al., 2004). Accordingly, empirical studies found a positive relationship between shared leadership and dispersed team performance (Carte, Chidambaram, & Becker, 2006; Hoch, 2007; Pearce, Yoo, & Alavi, 2004). In sum, shared leadership is needed in dispersed innovation teams as it brings the expertise of all team members to bear and ameliorates the negative impacts of geographical distance.

- 2) Second, despite the need for shared leadership in dispersed innovation teams, the emergence of shared leadership is challenged as shared leadership is a voluntary team process into which team members cannot be forced (Conger & Pearce, 2003; Pearce & Manz, 2005). Instead, for leadership to be shared, there have to be volunteers willing to accept leadership responsibilities (Carson et al., 2007; Conger & Pearce, 2003). Accepting leadership responsibility involves risk though as team members become accountable for decisions that potentially have negative consequences for other team members or the team as a whole (Bligh et al., 2006; Eckert & Drath, 2009). Moreover, team members might hesitate to take an active leadership role because they are used to traditional hierarchical structures (Pearce & Manz, 2005). Some may have been exposed to controlling bosses or centralized work systems for years, decreasing their confidence for shared leadership (Pearce & Manz, 2005). Others may have simply developed a habitual focus of considering only their individual knowledge work and thinking little about the nature of influence in their work system (Pearce & Manz, 2005). Moreover, team members might hesitate not only to take over responsibility by influencing others, but also to follow their peer team members by putting into practice their leadership initiatives, thus threatening

shared leadership implementation (Carson et al., 2007). This last aspect is especially prevalent as, being hierarchically at the same level, team members cannot be forced into compliance within shared leadership processes the same way they can in situations with superior assigned team leaders (Eckert & Drath, 2009).

- 3) Third, the emergence of shared leadership in dispersed innovation teams is not only especially needed, but also especially difficult to achieve because of the two context variables of dispersed innovation teams, task innovativeness and geographical dispersion. Task innovativeness makes it not only necessary that all team members bring their expertise to bear, but also makes it more difficult for team members to identify adequate leadership initiatives. Thus, team members need extraordinary abilities to give reasonable guidance (Pearce, 2008). Team members need above-average analytical and technical expertise as well as expertise in leading others on complicated matters, which might not be naturally given in all dispersed innovation teams (Pearce & Manz, 2005).

Moreover, geographical dispersion is rather likely to challenge the emergence of shared leadership (Conger & Pearce, 2003; Cox et al., 2003; Pearce & Sims, 2000; Perry et al., 1999). In other words, even if leadership functions like monitoring team processes can be better enacted in a dispersed context if the team leader and all team members do so, physical distance might keep team members from monitoring each other. Geographical distance hinders communication, cohesion, and trust among team members, thus rather decreasing team members' willingness for mutual influence processes toward a common goal (Cox et al., 2003; Cramton, 2002; Gibson & Gibbs, 2006; Hoegl & Proserpio, 2004; Polzer, Crisp, Jarvenpaa, & Kim, 2006). In sum, a very challenging situation arises as the context variables of task innovativeness and geographical distance that define the need for shared leadership in dispersed innovation teams also challenge its emergence.

For all these reasons, the factors that facilitate or hinder the display of shared leadership in dispersed innovation teams should be investigated. In fact, the antecedents of team shared leadership is one of the most important areas of research surrounding the process of shared leadership (Bligh et al., 2006; Conger & Pearce, 2003; Mayo, Meindl, & Pastor, 2003; Muethel & Hoegl, 2010). Accordingly, the question of how shared leadership

develops and evolves, especially in demanding virtual team environments, has recently been termed one of the most important future issues in leadership research by Avolio, Walumbwa, and Weber (2009). Thus, the aim of this dissertation is to shed light on the important question: How can we foster high levels of shared leadership in dispersed innovation teams?

1.2 Research Overview, Research Gap, and Contribution

Shared leadership antecedents can be conceptualized at various levels. This research focuses on team-level antecedents, i.e., team characteristics that describe a team as a whole. This focus has been chosen based on a literature review, which showed that team-level antecedents are argued as especially relevant for team shared leadership development (e.g., Conger & Pearce, 2003; Pearce & Sims, 2000; Seers, Keller, & Wilkerson, 2003). Moreover, a focus on a specific level of antecedents allows a closer look into those matters. Antecedents on other levels (e.g., company reward structures or organizational culture on an organizational level) are not going to be a subject matter in this dissertation. To understand the existing research gap regarding team-level antecedents of shared leadership, and thus the particular contribution of this dissertation, prior research is critically assessed in the following. Thereby, conceptual research is addressed first, followed by a review of empirical research.

Several researchers have addressed the topic of team-level antecedents of shared leadership by listing a set of possible team-level antecedents and shortly noting why they think that these team characteristics could matter (Conger & Pearce, 2003; Cox et al., 2003; Pearce & Sims, 2000; Perry et al., 1999; Seers et al., 2003). Reviewing research by these authors seven possible antecedents of shared leadership can be identified, namely, team ability, maturity, attraction, dispersion, size, diversity, and personal characteristics.

Ability is noted as being positive for shared leadership (Conger & Pearce, 2003; Cox et al., 2003; Pearce & Sims, 2000; Perry et al., 1999; Seers et al., 2003). The discussion of team ability as an antecedent of shared leadership, however, does not really go beyond listing several abilities or skills (e.g., IT-skills, industry knowledge, technical skills) and presuming their positive effects on shared leadership. Specific arguments for single abilities or discussions of relative importance, answering the question if some abilities are more important for shared leadership than others, are missing. Moreover, no author tries to structure shared leadership relevant abilities based on theory looking for a more basic ability set for shared leadership.

Team maturity is also noted as a facilitator of shared leadership (Conger & Pearce, 2003; Cox et al., 2003; Pearce & Sims, 2000; Perry et al., 1999). Arguments on this relationship propose that shared leadership is a process that takes time to evolve and that, with time, more effective working relationships can be established that foster shared leadership (Conger & Pearce, 2003; Cox et al., 2003; Pearce & Sims, 2000; Perry et al., 1999). In sum, notions on this aspect lack depth as only short, rather intuitive arguments are provided. Moreover, the practical implication seems limited as maturity can hardly be influenced. It thus seems more reasonable to directly analyze those attributes that accompany maturity and can be influenced, such as better working relationships, familiarity, and increased interpersonal attraction (Conger & Pearce, 2003).

In fact, this is what some researchers do by directly pointing to familiarity and interpersonal attraction as facilitators of shared leadership (Conger & Pearce, 2003; Pearce & Sims, 2000; Seers et al., 2003). They do so by referring to the empirical studies of Feldman (1973), which showed a positive relationship between interpersonal attraction and power distribution (Conger & Pearce, 2003; Pearce & Sims, 2000; Seers et al., 2003). Unfortunately, these comments are short and do not provide theoretical reasoning for the relationship between affective team processes and shared leadership, even though affective commitment theory would obviously be helpful (Meyer, Allen, & Smith, 1993). Affective commitment theory suggests that affective relationships among team members lead to the personal desire of team members to remain a part of the team and exert efforts on the team's behalf (Meyer et al., 1993). Hence, based on affective commitment theory, shared leadership could be argued as effort, on behalf of the team, that is fostered by affective commitment (Meyer et al., 1993).

Geographical dispersion or proximity is also argued to affect team shared leadership, pointing to hindered collaboration across increased distance (Conger & Pearce, 2003; Cox et al., 2003; Pearce & Sims, 2000; Perry et al., 1999). However, more specified arguments for those claims, such as references to faultline theory (Lau & Murnighan, 1998), are missing. Pearce and Sims (2000), for example, simply note that "it appears that spatial distance [...] results in, if anything, negative impacts" (p. 128). Faultline theory, though, could be used to explain such a negative effect of dispersion on shared leadership as it points to the instance that geographic dispersion is likely to activate hypothetical dividing lines (i.e., faultlines) that split a group into subgroups, impair team functioning and thus probably also the team process of shared leadership (Polzer et al., 2006).

Moreover, team size is argued as an antecedent of shared leadership. In sum, a curvilinear effect is proposed that, up to a certain point, team size might increase leadership potential in a team (Conger & Pearce, 2003; Cox et al., 2003; Pearce & Sims, 2000; Seers et al., 2003), but beyond a certain size important team processes like communication and cohesion can be hindered (Conger & Pearce, 2003; Cox et al., 2003; Pearce & Sims, 2000; Perry et al., 1999; Seers et al., 2003). Unfortunately, these notions do not draw upon obvious theories, such as social impact theory (Latané, 1981), to further specify the proposed effects. Social impact theory explains negative effects of team size on several team processes, especially on mutual ones like shared leadership, due to a dilution effect that arises if many team members collaborate (based on team members perceiving their contributions as being marginal) (Chidambaram & Lai Lai, 2005; Latané, 1981). In addition, existing research does not indicate how many people constitute a small or large team. As such, the question remains unanswered of up to what team size shared leadership is fostered and beyond what team size rather negative effects are expected. Thus, practical implications can hardly be drawn.

Diversity is argued as a factor negatively influencing shared leadership (Conger & Pearce, 2003; Pearce & Sims, 2000; Perry et al., 1999; Seers et al., 2003). Arguments on this negative relationship stress the existence of interpersonal barriers and conflicts with high diversity levels (Conger & Pearce, 2003; Cox et al., 2003; Perry et al., 1999; Seers et al., 2003). However, obvious theoretical connections to social identity/categorization theory, which explains the reasons behind less interaction, and thus less shared leadership, among individuals of differing social categories due to social categorization processes, are not drawn (Tajfel, 1982; Turner, 1987, 1996). Moreover, the kind of diversity that could make a difference is not specified. Thus, discussions on diversity remain general. Further, positive arguments for diversity are missing, even though information and decision-making theories imply such fruitful and positive effects through the existence of more diverse skills sets with increasing diversity (Ely, 2004; Kearney, Gebert, & Voelpel, 2009).

Finally, various personal traits and attitudes of team members are argued to affect shared leadership, such as the need for status and power (Conger & Pearce, 2003; Pearce & Sims, 2000; Seers et al., 2003) and leadership prototypes (Conger & Pearce, 2003; Seers et al., 2003). Even though they point to interesting aspects within shared leadership development, notions on these aspects remain superficial. Moreover, such aspects might be less important if looking for ways to establish shared leadership as personality traits are stable and can hardly be changed (Spreitzer, 1995). In sum, this prior research lacks depth of

analysis and theory. Moreover, it should be noted that, even though appearing to give a basic overview by listing several antecedents, none of these discussions explains why exactly those team characteristics are identified. Instead, antecedents seem to be put together at random, accompanied by only short intuitive notions concerning shared leadership development.

Contrary to the just described research, some authors decided to take a closer look into shared leadership development by focusing on certain antecedents and elaborating in detail on their mode of functioning. As such, Burke, Fiore, and Salas (2003) argue that knowledge structures and attitudinal factors are antecedents of shared leadership. Knowledge structures are shared mental models (Klimoski & Mohammed, 1994) that are shaped by a shared situation assessment and meta-cognition. Shared mental models are argued to build a team's common understanding of the situation, which enables shared leadership by providing insight on when and to whom shared leadership should be provided. Moreover, attitudinal factors are argued to influence team members' "final decision" to share leadership. These attitudinal factors are collective efficacy (i.e., potency), shared goals, and organizational climate (an organizational-level, not team-level, characteristic). Burke et al. (2003) go into detail with their argumentation on the development of shared leadership, also using an adequate theory basis by relying on shared mental model theory (Klimoski & Mohammed, 1994). This provides valuable insights into shared leadership development. Even though not explicitly stated by Burke et al. (2003), their research points to the instance that, for shared leadership to occur, an adequate information basis (provided by shared mental models) as well as motivation for shared leadership (provided by attitudinal factors) must be existent. Nevertheless, it should be noted that Burke et al. (2003) do not give any indication how shared mental models could be operationalized. Shared mental models are highly complex, internal, and tacit though, hence leading to the question of how those mind structures could be assessed for empirical validation and fostered (Cannon-Bowers, Salas, & Converse, 1993).

Houghton, Neck, and Manz (2003) also focus their analysis on shared leadership by solely discussing self-leadership of team members as an important antecedent. Houghton et al. (2003) suggest that self-leadership strategies are ideally suited for developing the self-efficacy and, ultimately, the positive attitudes toward shared leadership needed for team members to successfully implement shared leadership behaviors (Houghton et al., 2003). Self-leadership, in terms of behavior-focused strategies, natural-reward strategies, and

constructive thought strategies, is thus argued to be crucial for team shared leadership based on self-regulation theory (Kanfer, 1970) and social cognitive theory (Bandura, 1988). Using a sound theoretical basis, Houghton et al. (2003) point to the potential importance to a team of having high levels of individual self-leadership and self-efficacy, stressing that the individual team members must be willing to initiate team shared leadership.

Similarly, Bligh, Pearce, and Kohles (2006) suggest self-leadership to be an important process in the facilitation of shared leadership. In contrast to Houghton et al. (2003), Bligh et al. (2006) argue that the individual self-leadership of team members fosters shared leadership as it leads to higher team trust, team potency, and team commitment. Thereby, Bligh et al. (2006) expect individual self-leadership to initially influence an individual team member's trust in the team, self-efficacy in his/her abilities, and commitment to the team, which over time evolve into similar, collectively held beliefs represented in the concepts of team trust, team potency, and team commitment. Thus, Bligh et al. (2006) extend research by Houghton et al. (2003) by specifying effects of self-leadership on the team level and proposing that team trust, team potency, and team commitment may be possible antecedents of shared leadership. Overall, it should be noted that neither Bligh et al. (2006) nor Houghton et al. (2003) discuss the difficulty to operationalize self-leadership strategies of individuals for empirical research. Self-leadership can hardly be measured though, especially on a team-level, as it is a very personal, internal psychological process (Manz & Neck, 1998). Hence, it is suggested that empirical team-level research (like this dissertation) should focus on the proposed direct consequences of self-leadership strategies (e.g., self-efficacy and team commitment) as antecedents of shared leadership.

In addition to this research, several scattered notions on team-level antecedents of shared leadership exist. These notions are mostly made through single sentences in wider discussions of shared leadership or through references to future research. As such, Pearce and Conger (2003) differentiate the concept of shared leadership from the concepts of structural team empowerment (which equals team autonomy) (Conger & Kanungo, 1988), and shared mental models (Klimoski & Mohammed, 1994), noting that, even though these concepts are far from being shared leadership, they are conditions that might facilitate shared leadership development. Mayo et al. (2003) mention diversity as a potential inhibitor of shared leadership and ability, familiarity, and trust as potential facilitators of shared leadership. Fletcher and Kaeufer (2003) note the ability to move into "dialogue" as a

prerequisite of shared leadership. “Dialogue” is a type of learning conversation that can be defined as the “art of thinking together” (p. 35) and is characterized by the skill to understand the other person’s perspective. Pearce (2004), as well as Pearce and Manz (2005), do not directly address the topic of team-level antecedents of shared leadership. Nevertheless, by pointing to organizational training systems that could facilitate shared leadership, they indicate that a certain skill level in teams is crucial for shared leadership. Furthermore, Muethel and Hoegl (2010) briefly note that future research on team shared leadership might look at shared mental models, shared goals, team member self-leadership, and ability to identify positive antecedents of team shared leadership. Carson et al. (2007) briefly distinguish shared leadership from psychological team empowerment, which equals intrinsic team task motivation (Kirkman & Rosen, 1999), and shared mental models (Klimoski & Mohammed, 1994), mentioning that these constructs could serve as potential facilitators of shared leadership. Moreover, in their comments on future research, Carson et al. (2007) name team size, skills, personality, and diversity as possibly related to shared leadership.

Besides these conceptual discussions, only a few empirical analyses exist, especially in terms of quantitative studies (Carson et al., 2007; Shamir & Lapidot, 2003; Ziegert, 2005). Shamir and Lapidot (2003) investigated shared leadership through a qualitative analysis of military teams. Their analysis focused on the single issue of how a team decided on a team members’ expulsion from training courses. Shamir and Lapidot (2003) identify shared identity as team-level condition of shared leadership. Based on this finding, Shamir and Lapidot (2003) argue that shared identity provides a common basis, and thus willingness, for influence exertion. They argue that, whenever a team shares an identity, they feel obliged to apply common values of mutual care and participate in the leadership process. As such, Shamir and Lapidot (2003) introduce, for the first time, team identity aspects as facilitators of shared leadership, thus clearly extending previous research. However, obvious relations to social identity/categorization theory are not drawn (Tajfel, 1982; Turner, 1987, 1996). Moreover, it should be noted that the context of military teams is very specific. Therefore, a transfer of the results to business teams might not be possible. Furthermore, it can be questioned whether true shared leadership processes were investigated. Shamir and Lapidot (2003) observed under which conditions cadets got involved in expulsion decisions of commanders. Thus, rather participative decision making, which discusses the question of

how team members get involved in a vertical leader's decision making, was investigated (Yukl, 2006).

Ziegert (2005) investigated three team characteristics as potential antecedents of shared leadership. Similar to prior research, he proposed that team size has an inverted u-shaped relationship with shared leadership so that small and large teams display less shared leadership than medium-sized teams. Team maturity and task ability were assumed as facilitators of shared leadership. To test his hypotheses, Ziegert (2005) conducted a cross-functional study of 39 fast-food restaurant teams. Ziegert (2005) used three different models to assess shared leadership: a referent shift consensus model (using items referring to the collective shared leadership behaviors of all team members), an additive model (using items asking each individual for his or her leadership behaviors), and a percentage model (for which team members indicated a percentage of "leaders" in the team). Within his empirical validation, Ziegert's (2005) hypothesis regarding team size was rejected, instead demonstrating results opposite to the hypothesized inverted u-shape direction. His hypothesis regarding maturity also did not receive support, whereas his hypothesis regarding ability received partial support (depending on the chosen measure of shared leadership). Ziegert (2005) does not try to explain those contradictory findings, however. Moreover, Ziegert (2005) backs his hypotheses up with only a few sentences and does not refer adequately to theory and previous conceptual research. It also remains unclear how using three measures advances shared leadership research, as Ziegert (2005) does not reflect and critically discuss these three measures. Instead, he states that outcomes are surprisingly inconsistent concerning the three measures, which "may reflect poor design of the measures" (p. 58). Also, Ziegert's (2005) sample is not ideal for an empirical analysis of shared leadership. The sample size of 39 fast-food restaurant teams is rather small and might not provide an adequate shared leadership context. Instead, shared work routines are likely to exist in such a context. Those might have substituted "real" mutual leadership processes (based on proactive, individual influence initiatives). Therefore, it can be questioned whether work routines or shared leadership processes were measured.

Carson, Tesluk, and Marrone (2007) analyzed internal team environment, consisting of shared purpose, social support, and voice, as a team-level antecedent of shared leadership. Shared purpose is defined as team members having a similar understanding of the teams' objectives and of the tasks important to reaching the collective goal. Social support includes all efforts of team members that provide emotional and psychological strength. Voice refers

to the degree to which team members have a say on how the teamwork is done and is therefore close to the concept of team autonomy (Carson et al., 2007). Carson et al. (2007) argue that internal team environment (as a whole and measured as one construct) enables shared leadership by producing the kind of team context that encourages team members' willingness to both offer leadership influence and rely on the leadership of other team members (Carson et al., 2007). Furthermore, Carson et al. (2007) argue that external coaching (as an individual-level antecedent) is positively related to shared leadership and that it moderates the relationship between internal team environment and shared leadership. All hypotheses were supported in a cross-functional study based on data collected from 59 student consulting teams (Carson et al., 2007). Thus, Carson et al. (2007) discuss interaction effects within shared leadership development for the first time, enhancing shared leadership theory not only conceptually, but also empirically. In particular, the interaction between internal team environment and external coaching points to interesting relationships between different levels of antecedents. Nevertheless, the analysis of Carson et al. (2007) has some limitations. First, it remains unclear on which theoretical basis shared purpose, social support, and voice are examined as antecedents and on which basis the three constructs are combined into one single measure. Second, shared leadership was measured with an additive model using only one question, "To what degree does your team rely on this individual for leadership?" (p. 1225). Thus, Carson et al. (2007) define shared leadership close to emergent leadership concepts (that investigate the emergence of perceived leaders among formally equal team members), thereby relying completely on individuals' interpretations of what a "leader" or "leadership" is (Hoegl & Muethel, 2008). This is problematic, however, as such leadership perceptions can be easily biased through various individual definitions of leadership. Third, like Ziegert (2005), Carson et al. (2007) do not draw their conclusions from an adequate sample. A sample size of 59 is still relatively small. In addition, a student sample was used. Thus, antecedents of shared leadership were not empirically validated in an adequate, real work environment. Table 1-1 and table 1-2 give an overview of the team-level antecedents mentioned and empirically investigated in prior research.

Antecedent (alphabetical Order)	Author (alphabetical Order)	Proposed Effect on Shared Leadership
Ability	Carson et al. (2007); Conger & Pearce (2003); Cox et al. (2003); Fletcher & Kaeufer (2003); Mayo et al. (2003); Muethel & Hoegl (2010); Pearce (2004); Pearce & Manz (2005); Pearce & Sims (2000); Perry et al. (1999); Seers et al. (2003)	Positive
Attraction/Cohesion	Conger & Pearce (2003); Mayo et al. (2003); Pearce & Sims (2000); Seers et al. (2003)	Positive
Dispersion	Conger & Pearce (2003); Cox et al. (2003); Pearce & Sims (2000); Perry et al. (1999)	Negative
Diversity	Carson et al. (2007); Conger & Pearce (2003); Cox et al. (2003); Mayo et al. (2003); Pearce & Sims (2000); Perry et al. (1999); Seers et al. (2003)	Negative
Empowerment (struct. and psych.)	Carson et al. (2007); Pearce & Conger (2003)	Positive
Maturity	Conger & Pearce (2003); Cox et al. (2003); Pearce & Sims (2000); Perry et al. (1999)	Positive
Personality	Carson et al. (2007); Conger & Pearce (2003); Pearce & Sims (2000); Seers et al. (2003)	Not specified
Potency	Bligh et al. (2006); Burke et al. (2003)	Positive
Self-Efficacy	Bligh et al. (2006); Houghton et al. (2003)	Positive
Self-Leadership	Bligh et al. (2006); Houghton et al. (2003); Muethel & Hoegl (2010)	Positive
Shared Goals	Bligh et al. (2006); Burke et al. (2003); Muethel & Hoegl (2010)	Positive
Shared Mental Models	Burke et al. (2003); Carson et al. (2007); Muethel & Hoegl (2010); Pearce & Conger (2003)	Positive
Size	Carson et al. (2007); Conger & Pearce (2003); Cox et al. (2003); Pearce & Sims (2000); Perry et al. (1999); Seers et al. (2003);	Curvilinear (inv.-U)
Trust	Bligh et al. (2006); Mayo et al. (2003)	Positive

Table 1-1: Overview of the Team-Level Antecedents Mentioned in Prior Research

Antecedent (alphabetical Order)	Author	Proposed Effect on Shared Leadership; Empirical Result
Identity	Shamir & Lapidot (2003)	Positive; Qualitative Study
Internal Team Environment	Carson et al. (2007)	Positive; Supported
Maturity	Ziegert (2005)	Positive; Not Supported
Size	Ziegert (2005)	Curvilinear (inv.-U); Not Supported
Task Ability	Ziegert (2005)	Positive; Part. Supported

Table 1-2: Overview of Team-Level Antecedents Empirically Investigated in Prior Research

Analyzing this prior work, the following research gaps can be identified:

- a) Even though there are reviews on the concept of shared leadership (Carson et al., 2007), no comprehensive overview of the topic of team-level antecedents of shared leadership exists. In fact, some researchers do not even adequately refer to their colleagues not knowing or ignoring prior research regarding antecedents (see e.g. Cox et al., 2003; Ziegert, 2005).
- b) So far, no attempts have been made to structure possible team-level antecedents into basic categories according to some underlying theoretical structure or mode of functioning. Instead, discussions on antecedents seem rather random and eclectic in terms of which antecedents are addressed.
- c) Existing research lacks depth and detail. Theoretical reasoning is especially scarce. Many authors do not draw upon particular theories to justify their antecedents. Instead, they tend to refer to intuitive or empirical arguments. Accordingly, Seers et

- al. (2003) note that researchers need more theoretical guidance when elaborating on the emergence of shared leadership.
- d) Conceptual research partly relies on complex concepts, such as shared mental models and self-leadership, without discussing if and how these antecedents could be operationalized to empirically validate the proposed relationships. Moreover, it remains unclear how such factors can be shaped and attained in practice.
 - e) Team-level antecedents of shared leadership are not discussed against the background of relevant context characteristics that might influence relevance and effectiveness. Accordingly, current calls for more context-related leadership research are not addressed (Porter & Laughlin, 2006).
 - f) Finally, but perhaps most importantly, empirical research on team shared leadership antecedents is scarce. Only three empirical studies discussing five team-level antecedents exist. Furthermore, not only can the samples of these studies be criticized regarding size and practical relevance, it can also be noted that all three studies seem to define and measure shared leadership slightly differently, thus making it difficult to interpret empirical results. While Shamir and Lapidot (2003) look at shared leadership as a participative decision making process, Ziegert (2005) focuses on certain leadership behaviors, while Carson et al. (2007) measure it as a phenomenon of perceived leader emergence. Thus, there still seems to be some confusion about the exact definition and according measurement of shared leadership.

The aim of this dissertation is to address these research gaps and provide the following contributions:

- a) A critical overview of previously mentioned and empirically examined team-level antecedents of shared leadership was provided in this chapter.
- b) A theoretical framework providing a basic structuring of team-level antecedents is introduced into team shared leadership research in chapter 1.3.
- c) Team-level antecedents of shared leadership are not only hypothesized based on intuitive arguments, but also in relation to acknowledged theories in chapter 4, 5, and 6. Thus, all hypothesized relationships in this research are developed based on a strong theoretical foundation.

- d) Relationships among antecedents and shared leadership are not only proposed, but also empirically validated in chapter 4, 5, and 6, thereby putting focus on variables that are operationalizable and useful for managerial implications.
- e) Team-level antecedents of shared leadership are discussed against the relevant context of dispersed innovation teams (chapter 4, 5, and 6).
- f) Empirical analyses in chapter 4, 5, and 6 evaluate data collected from 96 real work teams in the software industry. Moreover, chapter 2 discusses, in detail, the concept of team shared leadership and its various measures. It also defines the concept of shared leadership used in this research, thus enabling an adequate interpretation of the results of this dissertation.

1.3 Motivation-Opportunity-Ability Framework and Outline

Several shared leadership researchers have noted that there are two basic conditions that must be met for team shared leadership to occur: team members must have both the motivation and the ability to effectively share leadership roles (Houghton et al., 2003; Pearce & Manz, 2005; Perry et al., 1999). Moreover, Burke et al. (2003) point to motivation and an adequate information basis as basic prerequisites of shared leadership. Surprisingly, researchers have not yet linked these notions of motivation, information basis, and ability to motivation-opportunity-ability (MOA) theory (Blumberg & Pringle, 1982). This dissertation does so by explicitly linking shared leadership to all three dimensions of MOA theory and arguing that, for shared leadership to evolve, three basic conditions must exist: motivation, opportunity (which, according to MOA theory, can be provided in the form of an adequate information basis), and ability for shared leadership (Blumberg & Pringle, 1982).

As such, this dissertation proposes a basic structure for the development of shared leadership by making two specific arguments. First, team-level antecedents of shared leadership must address motivation for shared leadership behaviors, basic opportunities to share leadership, and shared leadership relevant abilities. Second, team-level antecedents of shared leadership can be categorized into factors that primarily affect motivation, opportunity, or ability for shared leadership. As a fourth antecedent category, structural team properties can also be added. Structural team properties create an additional category of antecedents because they often do not have one obvious overriding mode of functioning (i.e.,

they do not obviously affect motivation, opportunity, or ability). Instead, they often appear to affect shared leadership through multiple MOA dimensions to a comparable extent.

The MOA framework has been applied in various management disciplines and is well established as a theoretical basis for the explanation of manifold work behaviors like, for instance, knowledge sharing, information processing, social issue behaviors, and customer-to-customer exchanges (Binney, Hall, & Oppenheim, 2006; Gruen & Osmonbekov, 2001; Gruen, Osmonbekov, & Czaplewski, 2006; Poiesz & Robben, 1996; Rothschild, 1999; Siemsen, Roth, & Balasubramanian, 2008). Within this framework research suggests that any kind of behavior can only occur when people have the motivation, opportunity, and ability to perform this behavior (Solansky, 2008; Sprott, Brumbaugh, & Miyazaki, 2001; Stajkovic, 2006). Motivation captures the individual's willingness to act (Blumberg & Pringle, 1982; Gruen et al., 2006; Siemsen et al., 2008). Opportunity represents the environmental and contextual mechanisms that enable behaviors, like for instance decision autonomy or an adequate information basis (Baierl & Grichnik, 2008; Blumberg & Pringle, 1982; Siemsen et al., 2008). Ability represents the individual's skills or knowledge base related to a behavior (Blumberg & Pringle, 1982; Siemsen et al., 2008). While motivation is viewed as a directing force (Gruen et al., 2006), opportunity is defined in terms of external conditions that are conducive to a behavior, and ability is related to personal capabilities and proficiency (Gruen et al., 2006; Poiesz & Robben, 1996). Within this framework opportunity provides potential room and thus the basic possibility for behavior, ability provides the raw materials or capacity required for behavior, and motivation provides the reason to deploy those raw materials in the given room (Sprott et al., 2001).

Thereby, the origins of MOA theory lie in the theoretical discourse between industrial psychologists, who have traditionally viewed performance as a function of training and employee selection that sharpen employees' abilities to perform, and research conducted by social psychologists, who have emphasized the motivational component of performance (Siemsen et al., 2008). Blumberg and Pringle (1982) added opportunity to this framework to capture all those exogenous factors that can prevent skilled and motivated people from performing specific behaviors (Blumberg & Pringle, 1982). Moreover, it should be noted that there is some discussion about how the three dimensions of MOA add to each other (Siemsen et al., 2008). Nevertheless, researchers agree on two main things. First, if one factor is not present at all, changes in the other factors have no impact on the development of behavior (Siemsen et al., 2008). Second, besides this multiplicative connection that requires

a minimum of motivation, opportunity, and ability (which can be assumed for most business environments), a simple additive approach will predict behaviors almost as well as more complicated functions (Siemsen et al., 2008). Accordingly, Poiesz and Robben (1996) found motivation, opportunity, and ability to have rather independent, additive effects on various outcome variables.

Based on this discussion of MOA theory, it is posited that shared leadership behaviors are enabled through the motivation, opportunity, and ability of team members to share leadership responsibility. Thereby, increasing one of these factors fosters team shared leadership in an additive way. According to this basic notion, team-level antecedents of shared leadership (along with the previously investigated team-level antecedents of shared leadership shown in table 1-1 and table 1-2) can be categorized into factors that primarily affect motivation for shared leadership, opportunity for shared leadership, ability for shared leadership, and into structural team properties that potentially affect shared leadership through multiple MOA dimensions.

Antecedents that relate to motivation provide team members with the willingness to influence others on behalf of the team. Several team-level antecedents mentioned in previous research directly stem from motivational theories that explain an individual's willingness to act and can thus be categorized as antecedents most likely to foster a willingness for shared leadership (e.g. Bligh et al., 2006; Burke et al., 2003; Carson et al., 2007; Conger & Pearce, 2003; Seers et al., 2003). Those antecedents are¹: attraction stemming from affective commitment theory (Meyer et al., 1993), psychological empowerment stemming from intrinsic motivation theory (Hackman & Oldham, 1980; Herzberg, 1968, 2003), potency stemming from social cognitive theory (Bandura, 1982, 1988, 1989), self-efficacy stemming from social cognitive theory (Bandura, 1982, 1988, 1989), self-leadership stemming from self-regulation theory (Kanfer, 1970), shared goals stemming from goal setting theory (Locke & Latham, 2002), trust stemming from trust theory (Mayer, Davis, & Schoorman, 1995), identity stemming from social identity/categorization theory (Tajfel, 1982; Turner, 1987, 1996), and internal team environment stemming from goal setting theory and affective commitment theory (Locke & Latham, 2002; Meyer et al., 1993).

Antecedents that relate to opportunity provide team members with basic room for sharing leadership responsibilities. Such antecedents are structural team empowerment,

¹ Compare construct to table 1-1 and table 1-2 to see author that mentioned this variable as team-level antecedent of shared leadership.

which provides the necessary decision autonomy for team members (Conger & Pearce, 2003), and antecedents providing an adequate information basis for shared leadership, such as shared mental models (Burke et al., 2003; Carson et al., 2007; Conger & Pearce, 2003; Muethel & Hoegl, 2010).

Antecedents related to ability provide team members with the raw materials, and thus capacity, to influence each other. As such, all kinds of abilities, skills, and knowledge previously mentioned by shared leadership research, from IT-Skills to industry knowledge, can be subsumed as ability-related antecedents of team shared leadership (e.g. Fletcher & Kaeufer, 2003; Perry et al., 1999; Seers et al., 2003).

In addition to these three antecedent categories, structural team properties can be added as a fourth category. This fourth category does not want to imply that there is a fourth mode of functioning in addition to MOA, but rather that certain antecedents can hardly be subsumed under only one MOA antecedent category. While a motivational variable like psychological empowerment clearly relates primarily to motivation and a skill like IT-skills clearly relates primarily to ability, structural team properties often appear to influence several MOA aspects to a comparable extent. The structural team properties mentioned by previous research, like team dispersion, diversity, maturity, personality, and size, have such multiform effects. Team size, for instance, can have negative motivational effects on members due to social loafing tendencies in larger teams (Chidambaram & Lai Lai, 2005). On the other hand, larger teams are expected to have greater leadership potential due to a broader and more diverse skill base (Conger & Pearce, 2003; Pearce & Sims, 2000; Seers et al., 2003). Thus, motivation and ability for shared leadership are affected by team size. Diversity, as another example, can influence motivation for shared leadership through negative social categorization processes according to social identity/categorization theory (Tajfel, 1982; Turner, 1987, 1996), but, according to information and decision-making theories it can also have positive effects due to a broader experience and knowledge base within highly diverse teams (Ely, 2004; Kearney et al., 2009). An example of a structural team property potentially influencing opportunity and motivation would be the existence of an assigned team leader, even though this variable has not been mentioned by prior research. In absence of an assigned team leader, more room, and thus opportunity, for shared leadership is likely to arise (Carson et al., 2007). In addition, motivation might also increase as team members feel that management believes in their capabilities. In sum, the framework depicted in figure 1-1 is proposed for analyzing team-level antecedents of shared leadership.

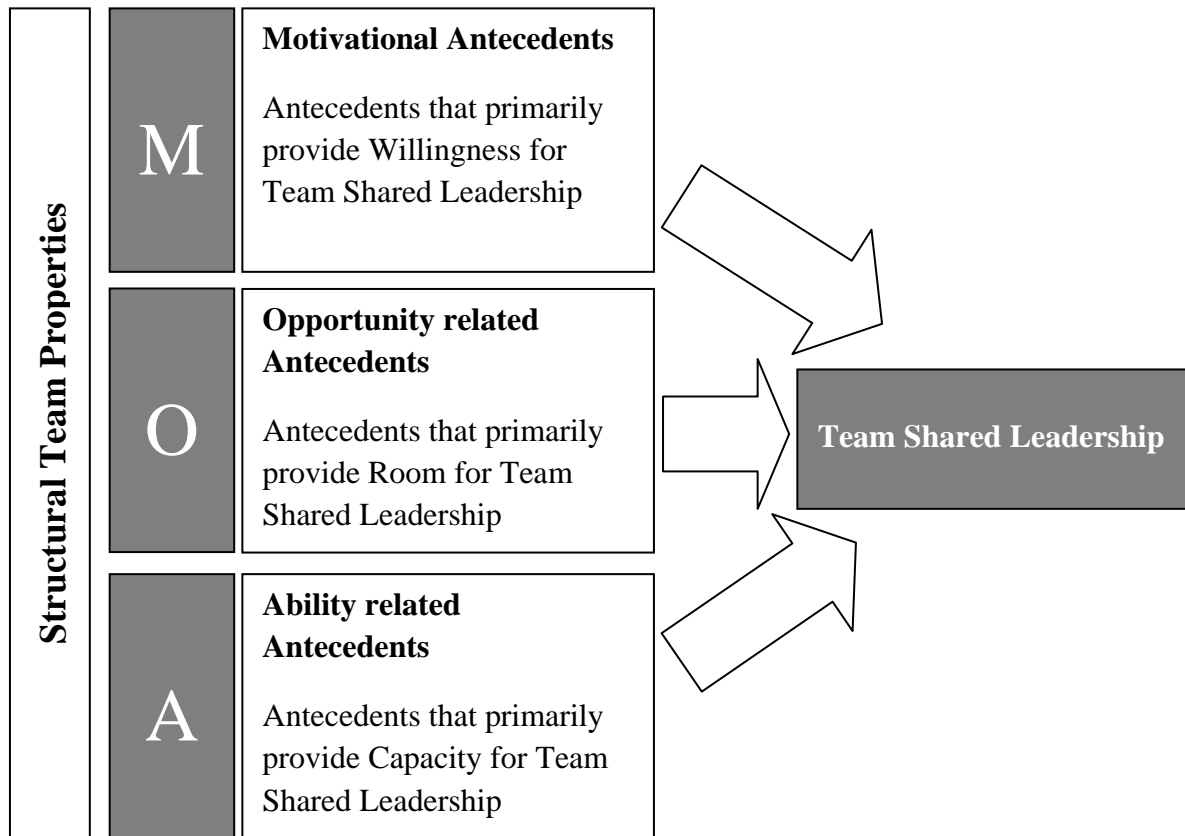


Figure 1-1: MOA-Framework for Team-Level Antecedents of Shared Leadership

In conclusion, it must be noted that motivation, opportunity, and ability are related aspects (Blumberg & Pringle, 1982). From an self-efficacy perspective, for instance, employees who have less shared leadership relevant skills may also be less motivated to share leadership because they perceive sharing leadership to be more difficult and question the likelihood of success (Siemsen et al., 2008). Keeping this in mind, the proposed conceptualization is meant as a guideline to realize antecedents' differing overriding impact on team members' motivation, opportunity, and ability for shared leadership, rather than as a statement that particular antecedents only and exclusively operate in terms of motivation, opportunity, or ability.

On the following pages, this dissertation is structured into six chapters that further investigate team-level antecedents of shared leadership. In a first step, chapter 2 discusses the concept and existing measures of team shared leadership in more detail, thus elaborating

on the dependent variable of this dissertation to set an adequate basis for further in-depth discussions on the antecedents of shared leadership. As the literature review showed, several slightly different definitions and measures of shared leadership exist, thus, it is important to carefully define shared leadership as it is understood in this research. Otherwise, following the subsequent discussions on team-level antecedents and meaningful interpretations of the study's results could be difficult. Chapter 3 describes the design of the empirical study that was used to verify the proposed hypotheses of this dissertation regarding team-level antecedents of shared leadership.

Chapter 4, 5, and 6 carefully investigate, conceptually and empirically, selected team-level antecedents of shared leadership from all four proposed antecedent categories (motivation, opportunity, ability, and structural team properties). In response to calls for more context specific research, all these analyses are made for the context of dispersed innovation teams, which is highly relevant for shared leadership. Chapter 4 focuses on motivation, and thus willingness, for shared leadership. As such, based on trust theory, trustworthiness of team members in terms of ability, benevolence, and integrity is discussed as an antecedent that provides willingness for shared leadership in dispersed innovation teams. This focus on trustworthiness was chosen because trust is an antecedent that has received only little research attention so far, especially empirically, even though sharing leadership within complex and dispersed projects can be assumed to be a highly risk taking, and thus trust-related, behavior. Chapter 5 relies on goal setting theory and shared mental models theory and discusses team reflexivity as a process primarily providing a strong information basis, and thus opportunity, for team shared leadership. Thereby, the concept of team reflexivity is newly introduced into shared leadership literature as a more operationalizable construct as compared to shared mental models, reflecting the need to set an appropriate information basis. Setting an appropriate information basis is especially needed in the complex environment of dispersed innovation teams as common ground is low and uncertainty is high. The relationship between team reflexivity and shared leadership is argued to be strengthened by the processes of team role breadth self-efficacy and psychological team empowerment. In chapter 6, social and project management skills are discussed as basic and complementary abilities needed for shared leadership in dispersed innovation teams. In addition, chapter 6 deals with several structural team properties in terms of gender, age, and nationality as antecedents of team shared leadership. Looking at chapters 4, 5, and 6, it should be noted that several team-level antecedents, such as, for example, team

size and maturity (considered as project length), that were previously noted in research, but not explicitly focused on within the chapters, will be elaborated on as controls.

Finally, chapter 7 concludes this dissertation by commenting on overall findings and their managerial implications as well as recommending future research. Chapters 4, 5, and 6 are each structured as an empirical research paper with its own abstract, introduction, hypotheses derivation, methods, and results section and corresponding discussion. Although effort was taken to avoid such instances, some redundancies in defining team shared leadership and basic notions on its relevance in dispersed innovation teams were inevitable. Figure 1-2 shows the afore mentioned outline of the following chapters at a glance.

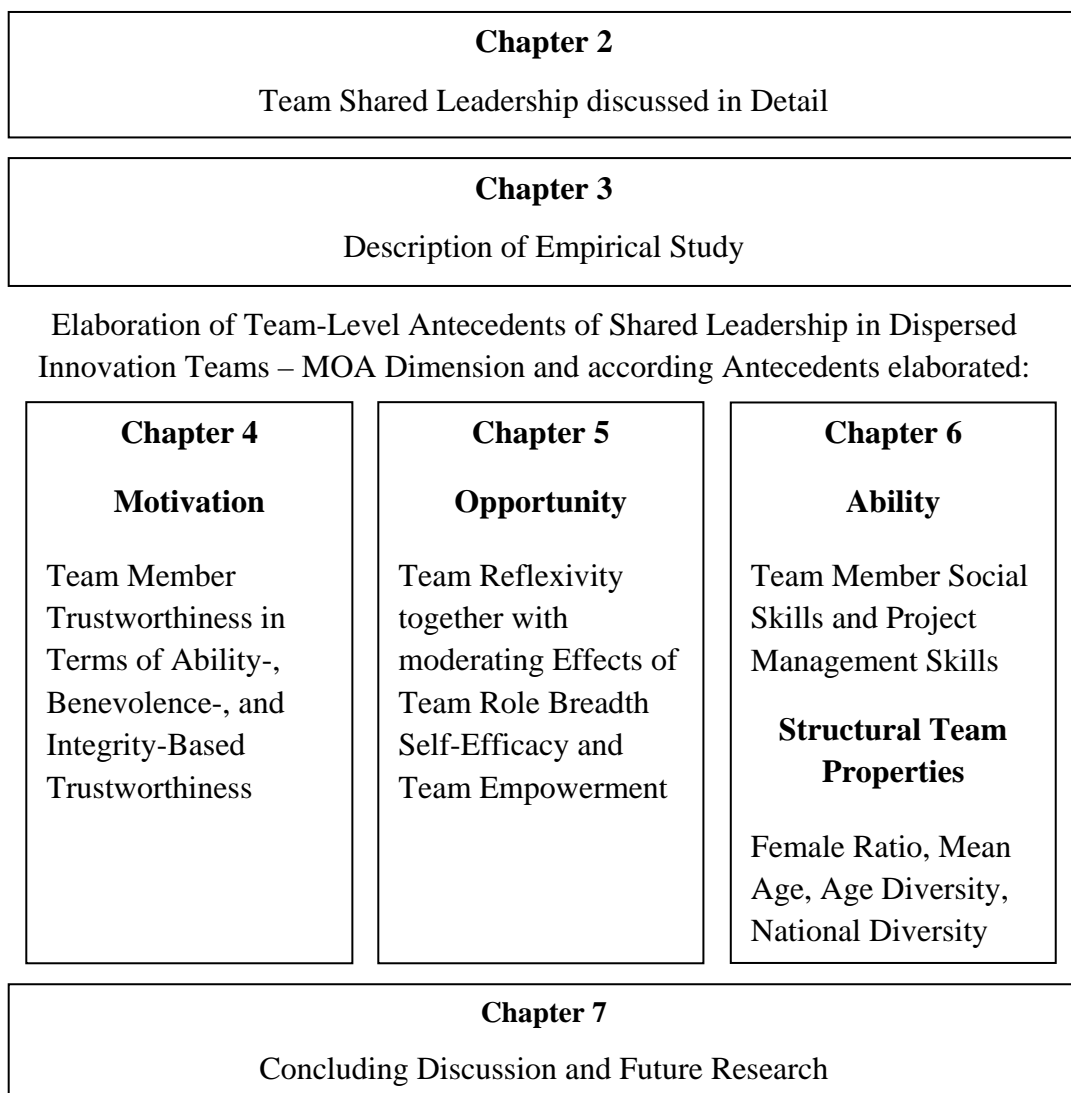


Figure 1-2: Outline of the Following Chapters

2 The Concept of Team Shared Leadership

2.1 Vertical vs. Team Leadership

Team shared leadership is a specific form of team leadership.² Team leadership approaches assume that leadership of a team can be performed by the team itself (Carte et al., 2006). This contrasts with traditional vertical views of leadership, which focus on a single team leader leading his or her team (Yukl, 2006). Within both approaches, leadership is defined as influence exerted over other people towards the accomplishment of goals (Houghton et al., 2003; Locke, 2003; Northouse, 2001; Pearce, Conger, & Locke, 2007; Stogdill, 1974; Yukl, 1989; Ziegert, 2005). Vertical leadership describes the downward influence of a superior, single leader on his or her team to achieve some goal (Ziegert, 2005). Team leadership suggests that influencing behaviors that guide, structure, or facilitate team processes, and thus foster goal attainment, may be performed by several team members or the team as a whole (Carte et al., 2006).

Vertical leadership originates from a higher level in the organizational hierarchy (Houghton et al., 2003). A single superior and appointed leader serves as the primary source of influence, wisdom, and guidance for all team members (Houghton et al., 2003). Thus, vertical leadership is characterized by a single chain of command within a team (House & Aditya, 1997). From a vertical leadership theory perspective, such a clear top-down influence process is beneficial as control and work clarity is increased, role conflict is reduced, and resources are economized (House & Aditya, 1997; Pearce & Conger, 2003; Pearce & Manz, 2005). In fact, the emphasis of most leadership research conducted so far has been to analyze such individual vertical leaders (Ensley, Pearson, & Pearce, 2003). The earliest studies attempted to identify the basic dimensions of leadership traits that are critical to effective leadership (Stogdill, 1948, 1974). The streams of research that followed studied different vertical leadership behaviors or styles (Blake & Mouton, 1975) and identified situational contingencies that moderated the effects of such leadership behaviors (Fiedler, 1967; Hersey & Blanchard, 1977). Vertical leadership research streams that are still often referred to today include leader-member exchange theory (i.e., LMX; Graen & Uhl-Bien, 1995) and transformational and charismatic leadership theory (Bass, 1990; Bass & Riggio,

² Team leadership is also used as general term for leadership of or leadership in teams (e.g. Northouse, 2001). In this dissertation team leadership refers to leadership by the team, specifically, by team members.

2006; House, 1976).³ Common to all these streams of research is the attempt to identify conditions of effective leadership solely within one individual, namely, the vertical leader (Eckert & Drath, 2009). This research aspect is increasingly considered to be problematic, however, as such a view ignores the rest of the team (the followers) (Eckert & Drath, 2009). Within vertical leadership research, team members are mostly solely seen as an entity (though a necessary one) upon which the leaders exercise influence (Eckert & Drath, 2009). Moreover, in recent years, increasing environmental uncertainty and task complexity in companies questioned the possibility of an all-knowing single team leader that acts as the sole guide of all other team members (Pearce, 2008). Accordingly, team leadership approaches have gained more and more attention because they use a more holistic view of leadership as a complex and dynamic system among several parties and integrate team members as important sources of the leadership process (Avolio et al., 2009).

In contrast to vertical leadership research, team leadership research focuses on the behaviors of the whole team rather than only on the behavior of a single leader. Thereby, with team members taking over leadership responsibility, team leadership shifts the focus from a vertical exertion of influence to a lateral exertion of influence among peers (Carte et al., 2006). Thus, some researchers also refer to team leadership also as lateral (Gebert, 2004) or peer leadership (Bowers & Seashore, 1966; House & Aditya, 1997). Team leadership also implies a distribution of influence as several people, as opposed to just a single leader, exert influence in a team (House & Aditya, 1997; Pearce & Conger, 2003). As such, team leadership suggests that, in certain task environments, concentration of leadership in a single chain of command may be less optimal than distributing leadership responsibilities among several individuals (Hoch et al., 2007; House & Aditya, 1997). More specifically, team leadership argues that, in demanding team environments, distributed team leadership is more beneficial than vertical leadership because teams can draw upon the knowledge and skills of the whole team, and thus from various team members, instead of being dependent upon the wisdom and actions of a single team leader (Hoch et al., 2007; House & Aditya, 1997; Pearce & Conger, 2003). In sum, team leadership differs from vertical leadership in terms of “who” exerts influence (team members vs. team leader) and “how” influence is exerted (laterally vs. vertically and distributed vs. centered) (Cox et al., 2003; Ensley et al., 2003; Ziegert, 2005).

³ See for an overview of all major leadership theories, for instance: Yukl (1989), Northouse (2001), or Yukl (2006).

Literature offers several different specializations of team leadership. Sivasubramaniam, Murry, Avolio, and Jung (2002) argue that the team as a collective can influence each team member in the same manner as the individual leader can influence his or her followers. Accordingly, they defined team leadership as “collective influence of members in a team on each other” (p. 68). Arguing that such team leadership can have different styles, Sivasubramaniam et al. (2002) showed in an empirical study that collective transformational team influence leads to higher team potency and higher team performance. Team self-leadership, as conceptualized by Neck, Stewart, and Manz (1996), describes behavioral (e.g., team goal-setting and team self-observation) and cognitive (e.g., team self-talk and team mental imagery) self-leadership strategies that can be enacted by the team as a whole. Those team self-leadership strategies are argued to enhance team productivity.

In contrast to these concepts that focus on the team as a collective, the concept of team shared leadership, which is used in this dissertation, is characterized by simultaneous, ongoing mutual influence processes among individual team members (Pearce, Manz, & Sims, 2008). This conceptualization has the advantage in that it is not reliant upon collective team actions, which might not be possible or beneficial under all circumstances (Muethel & Hoegl, 2010). For innovative teams, for instance, certain experts might often provide better leadership than the team as a whole because tasks at hand will often be highly specialized and require expert knowledge (Pearce, 2008). Also, within geographically dispersed teams, collective action cannot always be implemented due to the missing availability of all team members (Gibson & Gibbs, 2006). Hence, taking into account that today’s business world is becoming increasingly complex and virtual, shared leadership was identified as one of the most significant areas of current team leadership research (Avolio et al., 2009; Gibson & Gibbs, 2006).

2.2 Closer Look and Theoretical Perspectives

As defined in chapter 1.1 shared leadership is “a dynamic, interactive influence process among individuals of a group for which the objective is to lead one another to the achievement of group or organizational goals or both” (Pearce & Conger, 2003, p. 1). It entails simultaneous, ongoing influence processes within the team to maximize the potential of the team as a whole (Houghton et al., 2003). Sharing leadership means that team members bring in their respective area of knowledge and expertise to foster the common team goal (Pearce & Conger, 2003). Thereby, the influence exerted by team members is proactive,

deliberate, directed toward goal attainment, and affects other team members or the team as a whole (Carson et al., 2007; Pearce & Conger, 2003; Seers, 1996). Shared leadership is a process through which individual team members share in performing the behaviors and roles of a traditional hierarchical team leader (Houghton et al., 2003). Leadership functions shared include internal and external information processing, teamwork coordination, team processes supervision, performance monitoring, and team problem solving (Houghton et al., 2003; Seibert, Sparrowe, & Liden, 2003). Thereby, when leadership is shared, “important decisions about what to do and how to do it are made through the use of an interactive process involving many different people who influence each other” (Yukl, 2006, p. 4).

With hierarchically equal team members influencing each other, shared leadership relies on the dynamic exchange of lateral influence among peers rather than on the vertical, downward influence by an appointed leader (Cox et al., 2003). Nevertheless, shared leadership does not suggest that there is no formally appointed team leader (Cox et al., 2003; Hoegl & Muethel, 2008; Locke, 2003). Instead, it suggests that all team members, in addition to the vertical leader, can be sources and receivers of shared leadership behaviors in teams (Ziegert, 2005). As such, team shared leadership focuses on peer influence but might also involve upward or downward hierarchical influence depending on the task at hand (Pearce & Conger, 2003; Pearce et al., 2007).

Moreover, it should be noted that shared leadership, just like any leadership process, always comprises at least two individuals acting in interdependent roles (Stogdill, 1974). At least one individual must act in an influential role and at least one individual must act in a follower role (Stogdill, 1974). Therefore, for shared leadership to emerge, two sets of activities must occur. First, the members of a team must offer leadership and seek to influence the direction, motivation, and support of the group. Second, team members must be willing to rely on the leadership of other team members (Carson et al., 2007). Thus, peer followership is an integral part of team shared leadership (Carson et al., 2007; Cox et al., 2003). This issue becomes even more important considering that, being hierarchically at the same level, team members largely lack positional power to coerce other team members into compliance in the same way vertical leaders can (Eckert & Drath, 2009). Instead, for leadership to be shared, there have to be volunteers willing to accept leadership influence from peers (Carson et al., 2007). Accordingly, Cox et al. (2003) note that shared leadership depends critically on both the willingness to provide leadership and the willingness to respond to peers’ influence through peer followership.

Besides this general perspective on team shared leadership, several specific perspectives on shared leadership exist (Hoegl & Muethel, 2008). Based on different theoretical foundations, these perspectives help to further define the concept of team shared leadership.

Social Network Theory Perspective. From a social network theory perspective, shared leadership is defined as a relationship network in which links among team members exist through leadership behaviors (Carson et al., 2007). Thus, researchers following this perspective, like Carson et al. (2007), for example, define a leadership network focusing on relational aspects and the question of who exerts influence within a team (Carson et al., 2007; Mayo et al., 2003; Mehra, Smith, Dixon, & Robertson, 2006). Within this approach, shared leadership is often illustrated through a shared leadership sociogram as shown in figure 2-1 (Carson et al., 2007).

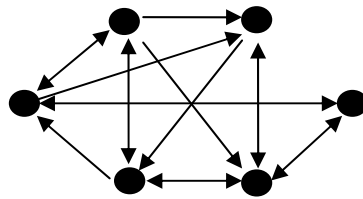


Figure 2-1: Exemplary Shared Leadership Sociogram

The team is depicted as a network in which the nodes are the team members and arrows represent leadership relations. An arrow pointing from one team member A to another team member B means that team member A leads team member B (Carson et al., 2007; Mayo et al., 2003). Two-headed arrows mean that two individuals lead each other (Carson et al., 2007; Mayo et al., 2003). Moreover, the social network theory perspective uses certain measures (e.g., density, which is the number of links in the shared leadership network) to classify and further describe the strength of the shared leadership network (Carson et al., 2007). Thereby, the basis for illustrations and measures within this approach is formed by asking team members if they perceive each other as “leaders” or “leading” (Carson et al., 2007; Mayo et al., 2003; Ziegert, 2005). Even though such an approach might

be handy to identify sources of leadership and also to conceptualize vivid leadership sociograms, this aspect can also be seen as a disadvantage of the social network theory perspective. This is, because such an approach makes the definition of shared leadership totally dependent upon individuals' interpretation of what "a leader" or "leadership" is (Hoegl & Muethel, 2008). Thus, the network theory perspective on team shared leadership fails to specify what makes up shared leadership behaviors (Hoegl & Muethel, 2008). Instead, shared leadership is argued to be high as long as team members title each other as emergent leaders without any further explanation of this designation. This is problematic though, as such leadership perceptions can be easily distorted through various individual definitions of leadership. Moreover, leadership perceptions are often biased through leadership prototypes (e.g., senior team members match the leader schema more so than young team members) (Conger & Pearce, 2003; Seers et al., 2003). Therefore, team members might rely on cognitive prototypes when defining their leadership network, effectively narrowing the set of individuals who are considered as leaders and not giving an adequate picture of whether and how leadership was shared in the team (Conger & Pearce, 2003; Seers et al., 2003).

Social Exchange Theory Perspective. The social exchange theory perspective of shared leadership argues that high quality exchange relationships among team members generate influence, and thus shared leadership, among these team members (Seers et al., 2003; Seibert et al., 2003). Social exchange theory was developed by Blau (1964) and, since then different types of social exchanges have been studied, namely, exchanges between organizations and employees (van Knippenberg, van Dick, & Tavares, 2007), exchanges between vertical leaders and their subordinates (i.e., LMX; Graen & Uhl-Bien, 1995), and exchanges among team members (i.e., TMX; Seers, 1989). Central to all areas of social exchange theory is the idea that social exchanges that evolve between parties can be described in terms of low quality or high quality relationships (Northouse, 2001; Seers, 1989; van Knippenberg et al., 2007; Whitener, Brodt, Korsgaard, & Werner, 1998). High quality relationships, such as so-called generalized exchanges, are characterized by a high level of trust, loyalty, and concern for each other (Seibert et al., 2003; Yukl, 2006). The better the perceived quality of the exchange relationship, the more motivated and committed an individual is to common objectives (van Knippenberg et al., 2007; Yukl, 2006) and the higher mutual influence is (Seers et al., 2003; Yukl, 2006). High quality exchange relationships among team members are supposed to lead to a higher willingness to assist

other team members, by sharing ideas and giving feedback, for instance, and to a higher willingness to follow each other (Seers, 1989). Accordingly, it is suggested that differences among team member exchange quality are relevant for explaining the emergence of shared leadership (Seibert et al., 2003). The social exchange theory perspective argues that high quality relationships among team members lead to leadership duties being shared (Seers, 1996; Seers et al., 2003; Yukl, 2006).

As such, the social exchange theory perspective on shared leadership gives interesting insights into the motivation for shared leadership based on social exchange theory and answers the question of why influence is shared (Seers et al., 2003). However, it hardly further defines the concept of team shared leadership itself (Seers et al., 2003). Nevertheless, some researchers used existing measures of team member exchange relationships (Scandura & Graen, 1984; Seers, 1989) to measure team shared leadership (Hoch, 2007; Hoch & Wegge, 2008). This is clearly problematic, as those measures of team member exchange quality lack face and content validity concerning the concept of shared leadership. Simply taking items of team member exchange measures (Scandura & Graen, 1984; Seers, 1989), such as those referring to trust and satisfaction with the relationship, does not match the definition of team shared leadership as mutual and goal directed influence process and should thus be avoided.

Leadership Styles Perspective. From a leadership styles perspective, shared leadership can be enacted using different leadership styles. Possible leadership styles include transactional, transformational, directive, empowering, supportive, and aversive leadership (Cox et al., 2003; Ensley et al., 2006; Houghton et al., 2003; Pearce, 2004; Pearce & Sims, 2000, 2002; Perry et al., 1999). Thus, in contrast to the social network and social exchange theory perspective, which consider the perception of somebody as an influence hub (who) or of exchange relationships (why), the leadership styles perspective considers perceptions of certain leadership styles (Hoegl & Muethel, 2008). As such, this perspective focuses on how shared leadership is enacted (Hoegl & Muethel, 2008). Thereby, the leadership styles perspective is based on two underlying assumptions (Hoegl & Muethel, 2008). First, team members potentially expose all the same leadership styles that vertical leaders do (Hoegl & Muethel, 2008). Second, while there are no particular shared leadership behaviors, leaders (team members as well as the vertical leader) demonstrate behaviors already subsumed to existing leadership styles (Hoegl & Muethel, 2008). Empirical studies measuring shared leadership are thus based on team-level aggregation of former individual-level leadership

style measures (Hoegl & Muethel, 2008). Thus, it should be noted that Ziegert (2005) used such a leadership styles measure and that, so far, measures according to the leadership styles perspective are the ones most commonly used in shared leadership research (Carte et al., 2006; Ensley et al., 2006; Pearce & Sims, 2002; Pearce et al., 2004; Ziegert, 2005).

Nevertheless, some disadvantages of this perspective and its according measures should be noted. The leadership styles perspective focuses on how shared leadership is enacted rather than on further defining shared leadership actions per se. As such, items of these measures might ask, for instance, if team members tried to influence each other by being threatening or by being supportive, but they do not further address the question of what shared leadership actions are actually about. Moreover, the leadership styles perspective does not even implicitly (as, for instance, social network theory measures do) take into account that, for team shared leadership to occur, team members must also enact peer followership. Instead, focus (especially in terms of measures) is put on team members' leadership initiatives and the according style of these initiatives. But whether these leadership attempts were really successful, in terms of being followed, is not considered. Such an approach might be reasonable for measurements of vertical leadership styles as vertical leaders have positional power that ensures some extent of followership automatically (Eckert & Drath, 2009). When looking at leadership among peers, though, such positional power is missing, and followership aspects become crucial and should be explicitly integrated into conceptualizations of team shared leadership (Cox et al., 2003). Otherwise, it could be that leadership attempts of team members, and not true shared leadership behaviors, are measured.

Functional Leadership Theory Perspective. The functional perspective of shared leadership focuses on the question of what team members should do within a shared leadership process. In particular, this perspective claims that team members must do whatever is necessary to enhance goal attainment, especially to solve the problems threatening the team during task accomplishment (Burke et al., 2003; Hoegl & Muethel, 2008; Morgeson, DeRue, & Karam, 2010). This perspective is based on functional leadership theory developed by McGrath (1962), which argues that the job of the leader “is to do, or get done, whatever is not being adequately handled for group needs” (p. 5). As such, leaders are responsible for (a) diagnosing problems that could potentially impede task accomplishment, (b) generating appropriate solutions, and (c) implementing them (Hoegl & Muethel, 2008). Based on these notions, the functional perspective of shared leadership

argues that multiple individuals in a team are capable of solving team problems and are thus adequate to be leaders (Morgeson et al., 2010).

Based on this functional perspective and integrating peer followership aspects Hoegl and Muethel (2007, 2008) conceptualize shared leadership as having distinct functional leadership and followership properties. Within the functional leadership perspective, team shared leadership includes team members' consideration of task interdependencies, anticipation of other team members' information and action needs, as well as the proactive initiation of action flows to adapt work strategies for goal attainment. Hence, team members are continuously considering not only their own sphere of work, but also how the entire project is unfolding. They exert effort to understand task interrelationships and take initiative to influence single team members or the team as a whole to ensure that project objectives are met. Hence, shared leadership as conceptualized by Hoegl and Muethel (2007, 2008) emphasizes the importance of team members (rather than just one formal vertical leader) as problem solvers who continuously reflect on changes and interrelationships among tasks in the team as well as anticipate information and action needs and initiate subsequent social influence (Hoegl & Muethel, 2007, 2008). Within the follower perspective, team members are supposed to regard the influence attempts by other team members not as a negative interference into their own realm, but rather as useful advice that is followed when agreed upon (passive followership). In addition, team members are expected to actively ask for feedback and advice regarding their work (active followership) (Hoegl & Muethel, 2007, 2008). In sum, not only do Hoegl and Muethel (2007, 2008) focus on what team members need to do for shared leadership to occur and thus further specify the definition of shared leadership, they also explicitly integrate followership aspects into their definition of team shared leadership. As such, this approach clearly extends previous definitions of and perspectives on team shared leadership. Accordingly, the measure developed by Hoegl and Muethel based on this functional conceptualization of shared leadership has clear advantages (see chapter 3.3). Thus, this conceptualization of team shared leadership by Hoegl and Muethel will be used in this dissertation.

2.3 Side Notes on Self-Management Teams, Vertical Leaders, and Teamwork

The historical bases of team shared leadership, such as law of the situation, emergent leadership, substitutes for leadership, co-leadership, followership, empowerment, and self-

leadership, are manifold (Pearce & Conger, 2003; Pearce & Sims, 2000).⁴ The concept of self-managing work teams has taken particularly bold steps toward the concept of shared leadership and is sometimes also confused with it (Pearce & Sims, 2000). Self-managed work teams are defined as teams in which no formal leader is assigned (Carte et al., 2006; Solansky, 2008). Typical conceptualizations of such teams include an external leader (i.e., a leader who is not a direct participant in the teamwork) who is responsible for initiating structure and goal setting, while the team members themselves are responsible for executing and monitoring the work (Wageman, 2001). Within self-management teams, team members take on roles previously reserved for management, therefore, self-management is similar to shared leadership as team members are responsible for leadership of the team (Solansky, 2008; Ziegert, 2005). However, team shared leadership does not assume that there is no assigned leader. Instead, the team leader is seen as somebody who influences others while also receiving influence from others, and is thus considered an integral part of the shared leadership process (Ziegert, 2005). Additionally, self-managing literature, in contrast to shared leadership research, does not go so far as to suggest a systematic approach to the examination of how, and to what effect, the process of leadership can be shared among team members (Pearce & Sims, 2000). Instead, research on self-management focuses on where leadership resides while work on shared team leadership centers on how the leadership functions are carried out (Ziegert, 2005). Therefore, self-management work teams are rather defined in terms of power (i.e. the capacity to influence) (Yukl, 2006). Although self-managing team designs may promote the development of shared leadership through increased autonomy, they do not necessarily result in leadership influence being widely distributed in a team (Carson et al., 2007). A single emergent leader (i.e., a team member leading the team without any formal authority as team leader) is also possible in self-management teams, but not in teams that are described as sharing leadership (Carson et al., 2007). Team shared leadership involves multiple, at best all, team members equally sharing leadership responsibilities (Pearce & Conger, 2003).

While shared leadership suggests that all team members and the vertical leader can be sources and receivers of shared leadership behaviors in teams (Ziegert, 2005), it should be noted that shared leadership research does not assume that vertical leaders do not have any additional, differing leadership responsibilities (Cox et al., 2003; Hoegl & Muethel, 2008; Locke, 2003). Rather, it is argued that team shared leadership changes traditional vertical

⁴ See Pearce and Sims (2000) or Pearce and Conger (2003) for a description and differentiation of shared leadership for all these historical bases.

leadership responsibilities (Cox et al., 2003; Hoegl & Muethel, 2008; Locke, 2003). On the one hand, leadership responsibilities like solving problems and monitoring work procedures are “reduced,” as they are distributed among all team members (Houghton et al., 2003; Seibert et al., 2003). On the other hand, other traditional vertical leadership behaviors remain and still others are added. In sum, this new set of responsibilities expected from vertical team leaders includes the following. First, the vertical leader must carefully select team members with the appropriate mix of attitudes as well as leadership and technical skills necessary to successfully share leadership roles and responsibilities (Cox et al., 2003; Houghton et al., 2003; Pearce, 2004). Second, the vertical leader should strive to develop essential but lacking shared leadership skills and motivation in team members by, for instance, providing the appropriate coaching (Houghton et al., 2003). Third, if they cannot be fulfilled quickly, the vertical leader should fill in for lacking prerequisites of team members. As such, team leaders need to provide vertical leadership support as needed (Cox et al., 2003; Houghton et al., 2003). Fourth, the vertical leader should dedicate a significant amount of time managing boundaries between the team and the rest of the organization as shared leadership is a rather inward-looking team process (Cox et al., 2003; Houghton et al., 2003; Pearce, 2004). Fifth, the vertical leader needs to technically enable shared leadership through structural team empowerment by providing team members with the full authority to make decisions, solve problems, set objectives, and pursue appropriate courses of action (Cox et al., 2003). As such, the overall function of the vertical team leader within team shared leadership processes is to serve as a facilitator of the shared leadership process. He needs to establish, maintain, and foster shared leadership in the team (Cox et al., 2003; Hoegl & Muethel, 2008; Houghton et al., 2003; Pearce, 2004).

Moreover, it should be noted that there might be some confusion about how teamwork differs from shared leadership (Day, Gronn, & Salas, 2004). This confusion might evolve as the concept of shared leadership overrides the distinction between leadership as a process that is put vertically on team members by the team leader and teamwork as a process that happens among followers (team members). Instead, within the shared leadership concept, leadership becomes an outcome at the team-level of analysis, just like teamwork (Day et al., 2004). Nevertheless, teamwork and shared leadership can and should be clearly differentiated from each other due to the following reasoning. Even though shared leadership and teamwork happen at the same level of analysis (i.e., the team), this does not mean that the behaviors comprised within these concepts can be equalized. In contrast to shared

leadership, teamwork simply means that several people interdependently collaborate on a common task (Hoegl & Gemuenden, 2001). The way team members interact with each other and where leadership, as it pertains to guidance on and fostering of teamwork processes, resides are not further specified. Team members might, for instance, collaborate without further guidance by putting together and coordinating individual work packages. As such, teamwork does not necessarily include mutual leadership processes in the same way that shared leadership does. Accordingly, the six facets of teamwork quality, namely, communication, coordination, balance of member contributions, mutual support, effort, and cohesion, do not comprise any team goal directed influence processes among team members (Hoegl & Gemuenden, 2001). In fact, teams can be high on teamwork quality, as team members communicate regularly, coordinate with each other effectively, maintain equal visibility, avoid personal conflicts, put effort into their tasks, and stick together (Hoegl & Gemuenden, 2001), and can at the same time be low on shared leadership, as no responsibility for the overall team goal is accepted in a way that leads to guiding other team members' behaviors. Thus, shared leadership contrasts with teamwork as it means that team members not only address problems of their own work sphere, but also actively share their opinion about what others should do to influence them and improve overall team performance (Hoegl & Muethel, 2008). By introducing new and improved work procedures, team members not only work together, they also change the way others' work, proactively intervene in others' work modes, and thus influence their peers towards team goal achievement (Hoegl & Muethel, 2008). Communication, for instance, is a teamwork process, but introducing new communication norms and means deliberately influences other team members and their "teamwork" and is thus an act of team shared leadership. In fact, just like vertical leadership is a guidance process added to teamwork processes to facilitate team performance, shared leadership can also be seen as a guidance process, though on a team member level, that positively fosters teamwork and thus team performance - only the source of guidance and facilitation differs. As such, high quality team work and high levels of shared leadership may or may not occur at the same time within a team.

3 Design of Empirical Study

3.1 Data Collection

This dissertation aims to give a theoretical and empirical analysis of important team-level antecedents of shared leadership in dispersed innovation teams. The literature review in chapter 1.2 revealed that prior research on team-level antecedents of shared leadership has several limitations. These limitations encompass the fact that there are only a few empirical studies, and that these studies use inappropriate samples, such as military-, fast-food restaurant-, or student teams with rather small sample sizes, for their empirical analysis. Thus, there is a need for analyzing the antecedents of team shared leadership within a larger-scaled sample of real business teams working in a shared leadership relevant context. As shown in chapter 1.1, dispersed innovation teams work within such a shared leadership relevant context, thus, this study draws conclusions from 96 dispersed software project teams that worked on innovative team outcomes. Thus, this study includes only one industry, namely, the software industry, to reduce industry variance. Focus on the software industry was chosen because this industry meets the requirements of a dispersed innovation context. The software industry typically has a high degree of innovativeness and must deal with complex and creative tasks such as new software developments, global software roll-outs, and complex software customizations (He, Butler, & King, 2007; Hoegl & Parboteeah, 2006). Moreover, owing to its digital outputs, the software industry typically has a higher degree of geographical dispersion than other businesses (Espinosa & Carmel, 2003).

To collect data from dispersed software innovation teams, a questionnaire addressing team shared leadership and all further variables of this dissertation was developed. To easily reach all team participants, a web-based online survey was conducted, offering respondents the possibility to access the questionnaire from their individual, often international office locations. All variables considered in the questionnaire referred to the team as the unit of analysis. As such, respondents were asked to evaluate the properties and behaviors of the team as a whole. The questionnaire was administered in German and English. All items were close-ended questions and anchored as 1, “strongly disagree” to 5, “strongly agree” (five-point Likert scale).

As the questionnaire mostly consisted of latent social constructs, attention was drawn to adequate multi-item measures. In a first step, all variables were precisely defined to answer the question of what exactly should be measured (e.g., structural vs. psychological

empowerment) (Faure, 2008). Second, depending on what variable was to be targeted, existing measures were studied. In fact, most measures of this dissertation were identified through literature research and thus drawn from published scales. Within the existing literature research, and as far as the articles provided this information, measures were compared regarding their test-retest reliability, parallel test reliability, inter-item reliability (internal consistency), inter-rater reliability, and factor analysis (Churchill, 1979; Nunnally & Bernstein, 1994). Third, all measures were checked in terms of wording. Some measures needed to be adapted to team-level. Moreover, several items had to be revised to avoid complicated expressions, double-barreled questions, and leading questions (Faure, 2008). Moreover, face validity and content validity were ensured for all measures (Churchill, 1979; Nunnally & Bernstein, 1994). Before sending out the final questionnaire, a preliminary questionnaire was constructed for trial interviews with several representatives from an IT-department of a large European bank (not included in the final sample). These interviews revealed the need to further revise the wording of some questions to facilitate readability and clarity. After these adaptations were made, the survey was sent out.

To acquire participating teams, software companies and companies with large IT-departments were contacted. Thereby, companies had the possibility of nominating several teams to take part in this study. As an incentive to participate, companies were offered a final report and a post-study workshop. The final report included recommendations on how to improve collaboration in dispersed teams and a benchmarking. The post-study workshop focused on key managerial implications. After the companies had confirmed their participation, the data collection procedure was initiated and structured into a number of consecutive steps. In the first step, the participating companies produced a list of team projects that met the sample criteria of this study and provided the contact information of the projects' formally appointed team leaders. The sample criteria were provided to participating companies via a separate document explaining that teams can only be allowed to participate in this study if they a) are "real teams", b) have a particular team size, c) work on an innovative output, d) are dispersed at least across two company sites, and e) completed their project no longer than 24 months ago.

The prerequisite of "real teams" meant that participating teams had to match the common academic definition of a team. A team is defined as a social system of three or more people who recognize themselves as a team and collaborate on a specific common task with high levels of interdependence (Gibson & Gibbs, 2006; Hoegl & Gemuenden, 2001). This

definition contrasts with most enduring “line teams” in companies. Such teams are rather departments or divisions that mostly have no specific common task on which they work and thus do not meet the definition of a team. Team size was also specified to match the definition of a team. At least three individuals are needed to collaborate as a team (otherwise, it is a dyad) (Hoegl & Gemuenden, 2001). On the other hand, teams beyond a certain number of participants lack interdependence and tend to create sub-teams that communicate with each other via selected team members acting as interfaces. It turned out that this aspect was very important for the present study. It became apparent that software projects are frequently organized into large multi-team projects with considerable degrees of dispersion among sub-teams (and not always within those sub-teams themselves). As this study’s focus is teamwork and not inter-team collaboration, multi-team projects were split up into their sub-teams, treating each sub-team as an independent entity. These sub-teams could participate as long as all selection criteria applied. Moreover, to match the particular context of this dissertation (i.e., task innovativeness and dispersion), teams had to work on an innovative task, i.e., a new, complex, uncertain, and non-standardized task (Hoegl et al., 2003), and team members had to be located across at least two different sites of a company. Finally, to adequately assess team processes, only teams whose projects did not end more than 24 month ago were accepted.

In a second step, the team leaders were asked to complete a pre-defined spreadsheet with descriptive details about the participating project. Team leaders provided data on: project name, kind of team task, team size, project person-months, project length, and each team member’s name, location, gender, age, nationality, contact details, and required language of questionnaires. In addition, telephone interviews with all participating team leaders were conducted to clarify the provided project details and to ensure that all study criteria were really met. It turned out that those telephone interviews were especially needed to clearly select core team members and clearly differentiate sub-teams within bigger multi-team projects.

Finally, all team leaders and team members of the participating teams were contacted and asked to complete the online questionnaire. As such, a single source bias was avoided by relying on two different respondent groups: team leaders and team members (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Team leaders assessed team-level antecedents of shared leadership and team members assessed team shared leadership. The respondents’ participation in this study was strictly voluntary and all respondents were invited to

participate by means of an email containing a link to the web-based online questionnaire. By clicking on the individualized link, each respondent was immediately forwarded to the questionnaire. This questionnaire was preceded by a front page explaining fundamentals of the subsequent following questions. Moreover, voluntariness of participation and confidentiality of all responses was ensured in order to a) increase the response rate and b) decrease the probability of answer patterns driven by social desirability or social undesirability (Faure, 2008). The front page of the online questionnaire also named the project on which the recipients would be questioned, as well as the name of the team leader and all team members who had been involved in the software project. This information should ensure that all the participants were clear about the project to which the subsequent questions referred, and it should help them to recall their project experiences as well as possible. Responses of participants were monitored via an online system. In so doing, up to four reminders were sent out to ask for questionnaire completion. Data collection began in June 2008 and was completed in June 2009. Figure 3-1 shows the different steps of data collection at a glance.

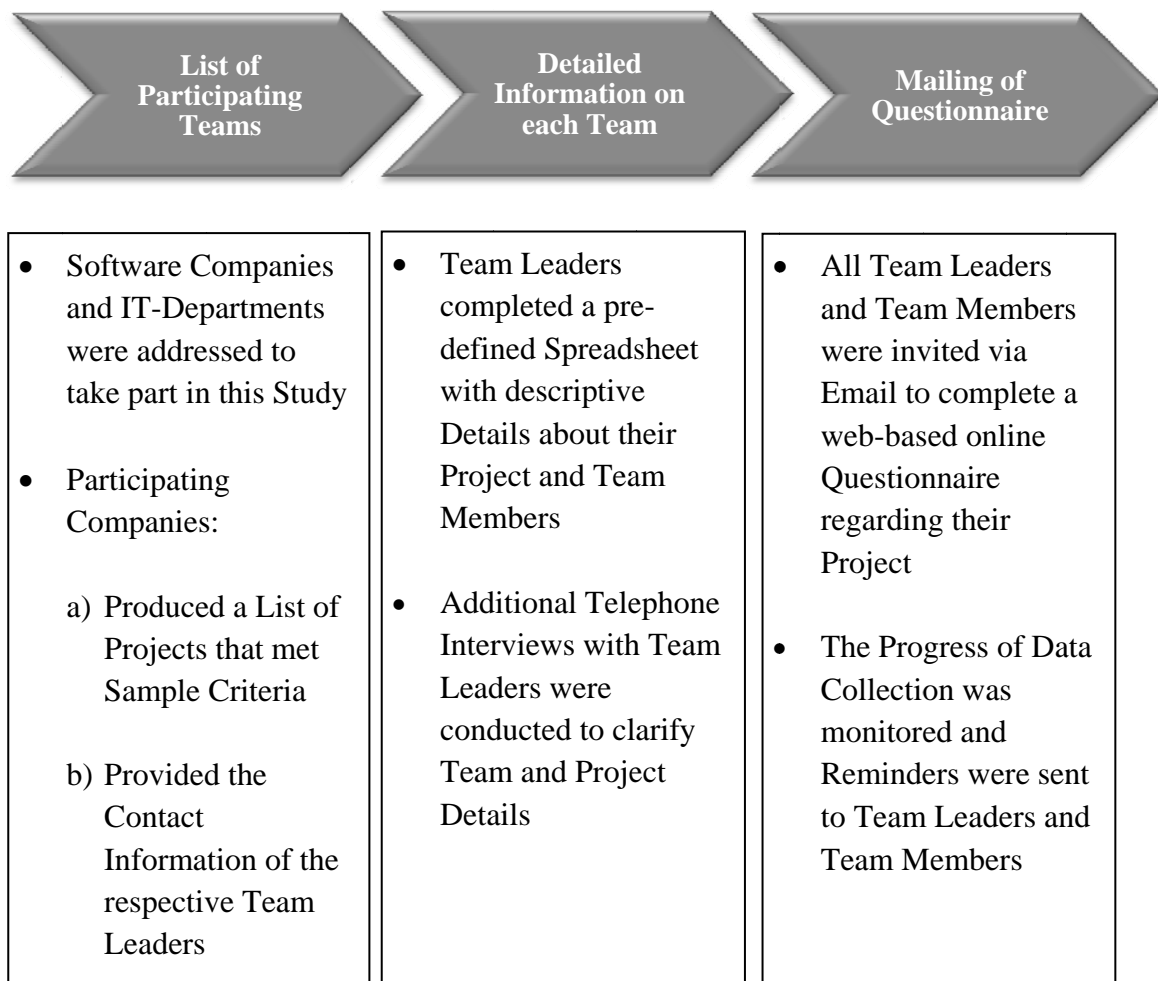


Figure 3-1: Data Collection Procedure

3.2 Sample

Thirty-six companies participated in this research: 31 IT-companies and five companies from other industries that took part in this study with their internal IT-department. As such, internal IT-Departments from three financial service providers, one aircraft manufacturer-, and one consumer goods manufacturer participated. Almost two-thirds of the 36 companies were headquartered in Germany, and company size (in terms of number of employees and volume of sales) ranged from small enterprises to large international groups. Over half of the companies participated with one or two teams. A more detailed overview of the descriptive information of all 36 participating companies is shown table 3-1.

Number of Companies	
Industry	
IT-Companies	31
IT-Departments	5
Location of Headquarters	
Germany	21
USA	4
France, Sweden, UK	2
Canada, Finland, Ireland, Netherlands, Switzerland	1
Number of Employees	
< 100	1
100-1,000	12
1,001-5,000	9
5,001-50,000	7
> 50,000	7
Volume of Sales (in Euros)	
N. a.	1
< 100 Mio.	12
100 Mio.- 1 Mrd.	10
1 Mrd. - 10 Mrd.	5
> 10 Mrd.	8
Number of Teams in Sample	
1	12
2	10
3	6
4	4
> 4	4

Table 3-1: Selected Attributes of Participating Companies (N = 36 Companies)

Overall, the 36 participating companies provided 96 geographically dispersed software project teams. Project tasks ranged from new software developments to software roll-outs and software customizations. An adequate level of innovativeness was ensured for all task types via telephone interviews with team leaders, assuring high levels of task novelty, complexity, and uncertainty as well as low levels of standardization. Figure 3-2 gives a corresponding overview.

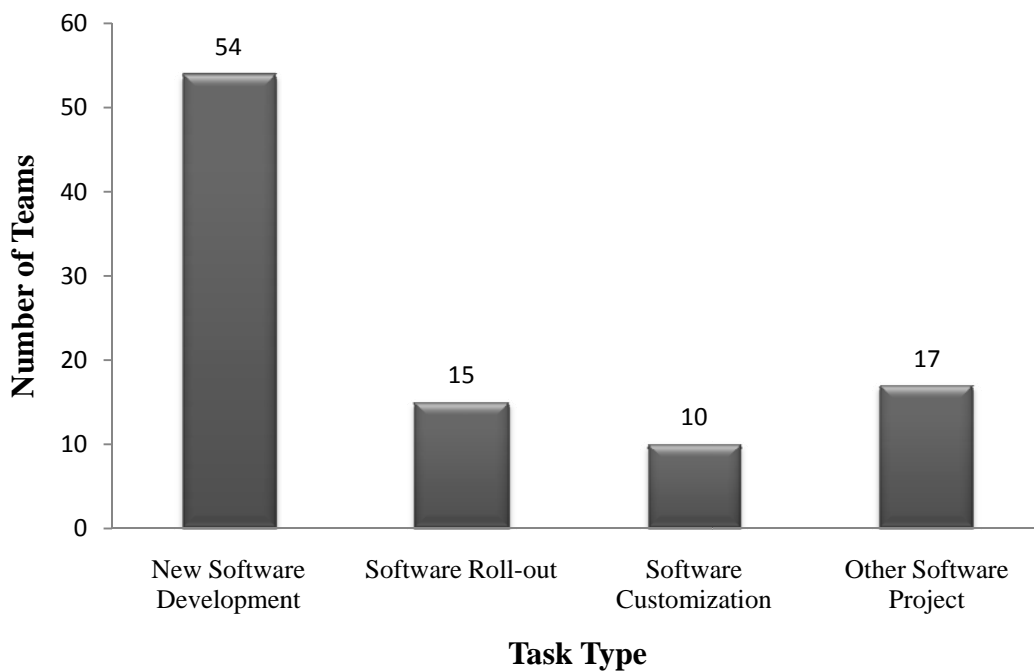


Figure 3-2: Distribution of Task Types (N = 96 Teams)

The average size of a team (including the team leader) was 8.3 employees (median = 7; standard deviation = 4.1; min = 3; max = 23). Thus, the teams of this study comprised 794 employees (96 team leaders and 698 team members). Figure 3-3 shows the team sizes of participating teams in more detail.

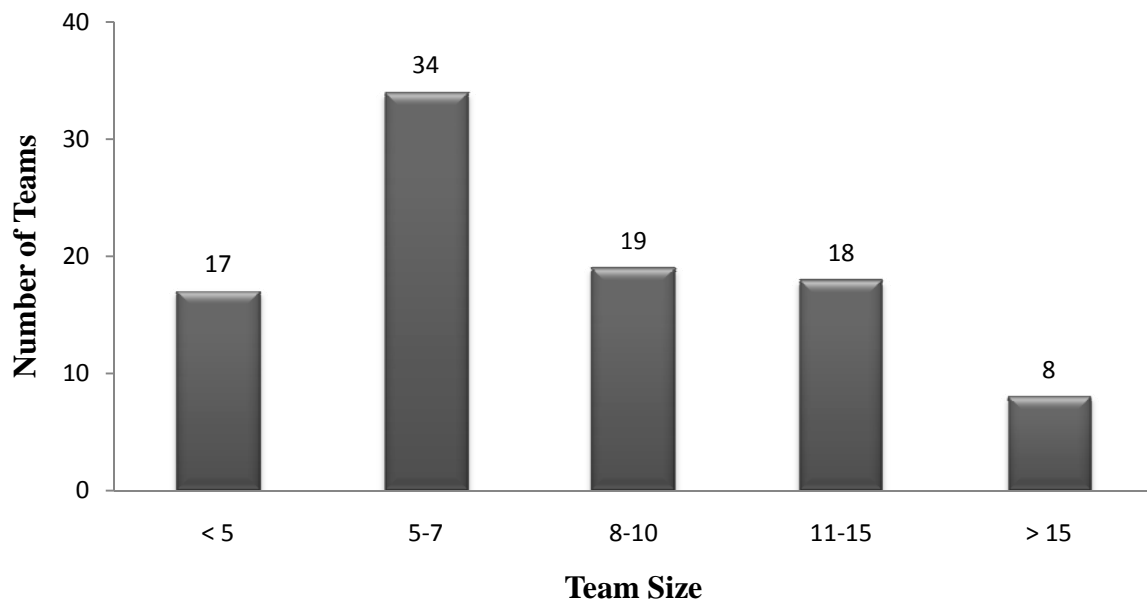


Figure 3-3: Distribution of Team Sizes (N = 96 Teams)

Overall, analyses are based on a total of 96 team leader responses and 337 team member responses. Thus, for each team, on average, the team leader plus 3.5 team members filled out a questionnaire. Usable questionnaires were received from all team leaders and from 63% of all contacted team members (some team members could not be contacted, as they had left the company in the meantime, were ill, etc.). 16.8 % of each team (including the team leader) were female employees (min = 0; max = 100). In terms of nationality, it can be noted that the sample is made up of as many as 28 different nationalities. While 42 teams were nationally homogeneous, 54 teams were comprised of employees with different nationalities. The average project length in this study was 14.4 months (median = 12; standard deviation = 9.5; min = 2; max = 54), and projects had an average size of 56.5 person-months (median = 37; standard deviation = 57.4; min = 1.8; max = 288).

To match the context of this study, all teams were geographically dispersed. Thereby, it makes sense to think of teams as existing on a continuum of dispersion (Carte et al., 2006; Hoegl & Proserpio, 2004; Zigurs, 2003). As such, this dissertation defines a minimum of dispersion by the requirement that teams had to be dispersed across at least two different

sites of a company. The average number of sites in this study was 2.9 (min = 2; max = 7). In fact, 49 teams were dispersed across two sites, 27 teams were dispersed across three sites, 11 teams were dispersed across four sites, and 9 teams were dispersed across five or more sites. The maximum amount of sites in this sample was seven. Figure 3-4 depicts the according distribution.

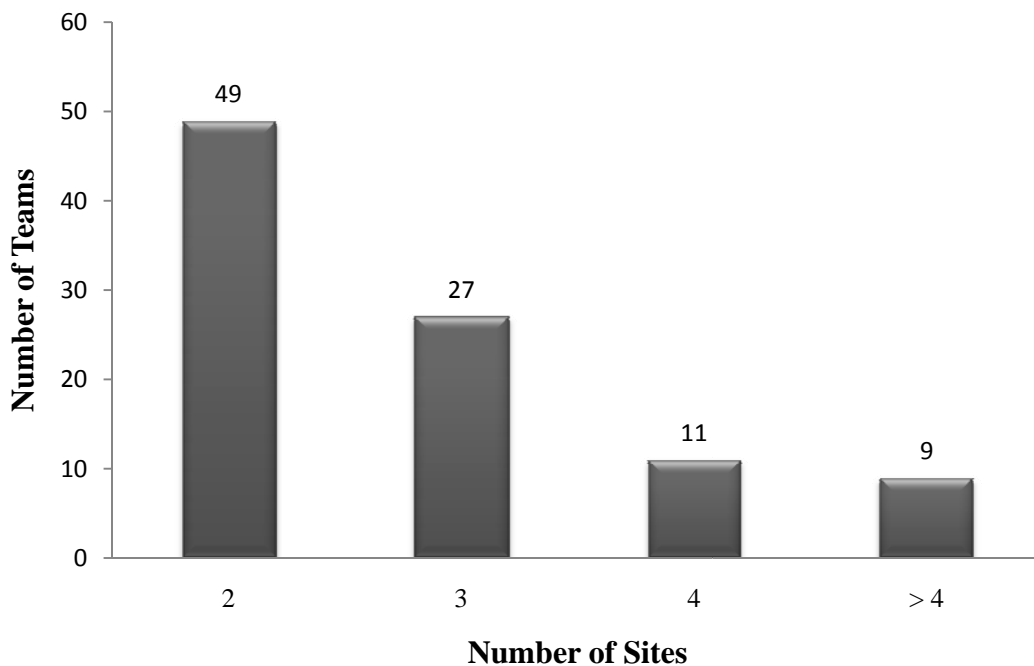


Figure 3-4: Distribution of Number of Sites (N = 96 Teams)

Level of dispersion can also be measured in terms of how distant the different sites of a team were from one another. As such, two teams in this sample were only distributed across different company sites within one large city (different streets/postal addresses), 43 teams were distributed across different cities within one country, 32 teams were distributed across countries within the same continent, and another 19 teams were distributed across different continents. This distribution is shown in figure 3-5.

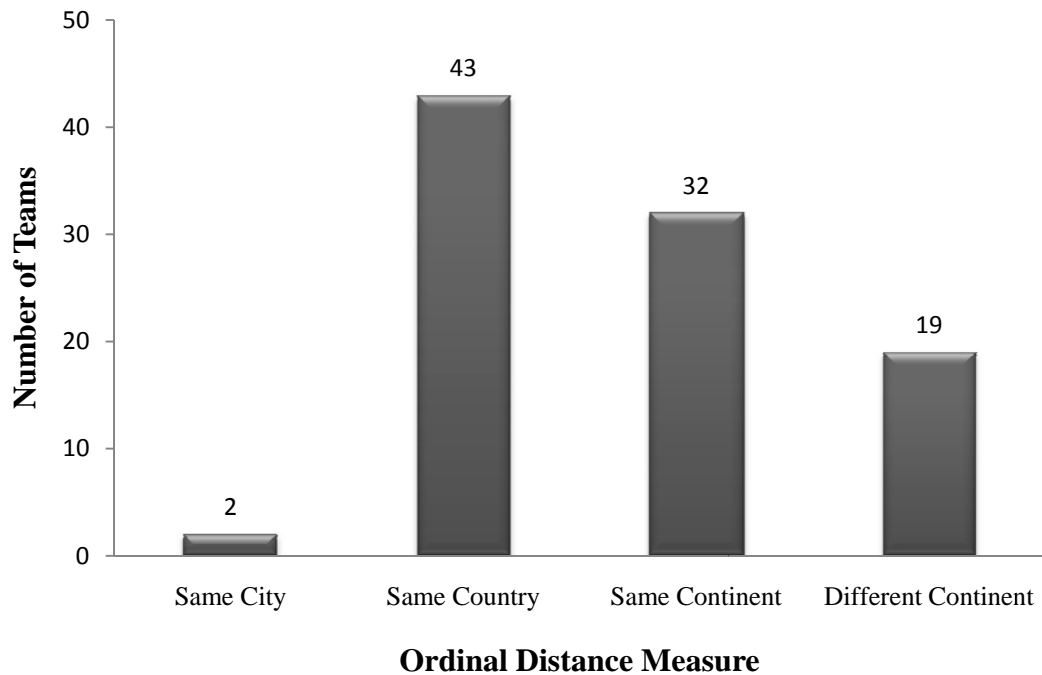


Figure 3-5: Distribution of Ordinal Distance Measure (N = 96 Teams)

Moreover, it can be noted that 36 teams faced temporal dispersion in addition to geographical dispersion by being distributed across different time zones. Measuring temporal dispersion with O’Leary and Cumming’s (2007) temporal dispersion measure, the mean temporal dispersion in the sample was 0.7 hours, which means that, on average, the time difference among members of a team was 0.7 hours.

Figure 3-6 shows the office locations (in terms of country) of all 794 team leaders and members on a world map. 545 employees were located in Germany (69%), 46 in India (6%), 28 in Spain (4%), 20 in the U.S. (3%), 17 in Canada (2%), 17 in the Netherlands (2%), 16 in Finland (2%), 14 in China (2%), 14 in Ireland (2%), 12 in Romania (2%), 11 in Austria (1% or less), 7 in Poland (1% or less), 7 in Russia (1% or less), 6 in Belgium (1% or less), 6 in Sweden (1% or less), 5 in Czech Republic (1% or less), 4 in France (1% or less), 4 in Hungary (1% or less), 4 in UK (1% or less), 3 in Singapore (1% or less), 2 in Brazil (1% or less), 2 in Switzerland (1% or less), 1 in Argentina (1% or less), 1 in Italy (1% or less), 1 in Israel (1% or less), and 1 in Japan (1% or less). Thus, teams were spread across 26 countries.

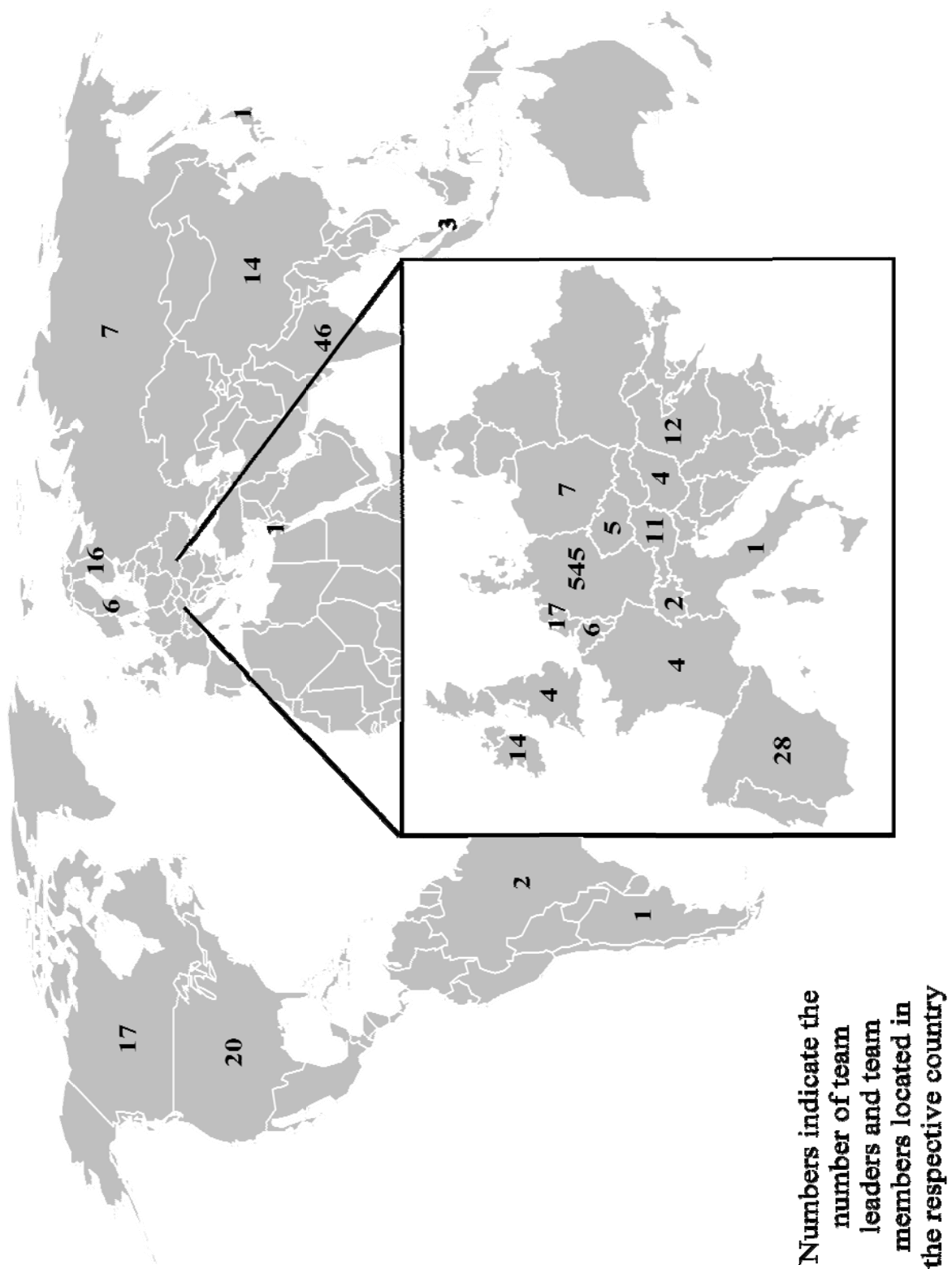


Figure 3-6: World Map with Geographical Dispersion of Team Leaders and Team Members (N = 794 Team Leaders and Team Members)

3.3 Measurement of Team Shared Leadership

Existing empirical studies on shared leadership used either a qualitative approach to analyze shared leadership behaviors in teams (Eisenhardt & Bourgeois, 1988; Klein et al., 2006; Shamir & Lapidot, 2003) or relied on one of the measures discussed in chapter 2.2 that reflect a corresponding theoretical perspective. As discussed in chapter 2.2, all these prior quantitative measures of shared leadership have severe weaknesses. The weakness of the measure of the network theory perspective is that it relies on individuals' perception of leadership and thus on individuals' interpretation of what shared leadership by team members is (Carson et al., 2007; Mehra et al., 2006; Ziegert, 2005). The measure used by social exchange researchers clearly lacks face and content validity with the concept of shared leadership (Hoch, 2007; Hoch & Wegge, 2008). The problem with the measures used by shared leadership styles researchers is that these measures focus on the "how" of shared leadership rather than on shared leadership actions per se, and that these measures do not appropriately take into account that, for shared leadership to occur, team members must also enact peer followership (Carte et al., 2006; Ensley et al., 2006; Pearce & Sims, 2002; Pearce et al., 2004; Ziegert, 2005).

To overcome the weaknesses of former measures, Hoegl and Muethel developed a new measure of team shared leadership that is based on their functional shared leadership work discussed in chapter 2.2 (Hoegl & Muethel, 2007, 2008; Muethel & Hoegl, 2010). This measure is used in this study for two main reasons. First, the measure of Hoegl and Muethel surpasses former measures because it clearly defines shared leadership actions of team members, can be clearly differentiated from relationship measurements, focuses on the "what" instead of the "how" of shared leadership enactment, and explicitly includes followership aspects. Second, quality tests on this measure showed good results (Hair, Black, Babin, Anderson, & Tatham, 2006; Nunnally & Bernstein, 1994). Confirmatory factor analysis suggested good fit: NFI = .92, CFI = .94, RMSEA = .066. In an explorative factor analysis (varimax rotation), all items loaded on one factor with factor loadings ranging from .78 to .62. Further, reliability analysis revealed a good internal consistency of the measure with a Cronbach's alpha of .83. The measure has seven items which are shown in table 3-2.

Variable	Items
Team Shared Leadership	<p>All team members considered not only their own sphere of work, but also how the entire team task unfolded.</p> <p>All team members exerted effort to understand task interrelationships.</p> <p>All team members initiated actions to bring out improved procedures for the team.</p> <p>All team members proactively made constructive suggestions for improving how things operate within the team.</p> <p>All team members actively attacked problems.</p> <p>All team members positively reacted to suggestions from other team members.</p> <p>All team members asked other team members for advice.</p>

Table 3-2: Items Used in this Research to Measure Team Shared Leadership

As shared leadership is a team member process, items were judged by team members. To ensure that aggregation of data from individual team members to create team data was appropriate, inter-team-member agreement and reliability measures for team shared leadership were assessed. While $r_{(wg)(j)}$ was .93 (James, Demaree, & Wolf, 1984, 1993), ICC (1) was .33, and ICC (2) was .82 (McGraw & Wong, 1996). Thus, the aggregation of individual-level data was justified (LeBreton & Senter, 2008). Team member data on team shared leadership was aggregated by calculating the arithmetic mean.

4 Shared Leadership in Dispersed Innovation Teams as a Risk-Taking Behavior: The Importance of Trustworthiness¹

ABSTRACT

Research has shown that geographically dispersed teams charged with innovative tasks rely upon committed team members to bring their expertise to bear and accept shared leadership responsibility to attain high levels of team performance. Although this concept of team shared leadership is receiving increasing attention, there has been hardly any research conducted on the context-specific nature and emergence of shared leadership. This paper discusses team shared leadership in a dispersed team setting from a trust theory perspective as a risk-taking, and thus trusting, behavior among team members that requires trustworthiness. More specifically, it is argued that trustworthiness in terms of ability, benevolence, and integrity fosters team members' willingness to engage in risk-taking peer leadership and followership behaviors (i.e., team shared leadership). Using data from 96 dispersed software project teams, this study reveals that team member benevolence and integrity are positively related to team shared leadership in dispersed innovation teams, while team member ability shows no significant relationship.

Key words: Team Shared Leadership, Dispersed Innovation Teams, Trustworthiness, Ability, Benevolence, Integrity

¹ This paper was written by Sarah Gehrlein based on conjoint work with Prof. Dr. Martin Hoegl and Dr. Miriam Muethel.

4.1 Introduction

Shared leadership is defined as “a dynamic, interactive influence process among individuals of a group for which the objective is to lead one another to the achievement of group or organizational goals or both” (Pearce & Conger, 2003, p. 1). In teams, such influence processes comprise, among others, team members that initiate information flows and proactively develop or revise work strategies of single team members or the team as a whole to achieve team goals (Hoegl & Muethel, 2007). Extant research suggests that shared leadership is particularly effective for teams, such as geographically dispersed innovation teams (Gibson & Gibbs, 2006), that are charged with complex and dynamic tasks (Klein, Ziegert, Knight, & Yan, 2006; Pearce, 2004; Pearce & Manz, 2005). Accordingly, empirical studies have indicated a positive relationship between shared leadership and team performance in various challenging team environments, like for dispersed teams and new venture teams (Ensley, Hmieleski, & Pearce, 2006; Hoch, 2007; Pearce, Yoo, & Alavi, 2004).

Despite this need for shared leadership, the emergence of shared leadership in dispersed innovation teams is challenged for two main reasons. First, team members cannot be forced to engage in shared leadership behaviors. Instead, for leadership to be shared, there have to be volunteers willing to accept leadership responsibilities (Pearce & Manz, 2005). Second, in dispersed innovation teams, physical distance and environmental uncertainty are likely to challenge the motivation of team members for mutual influence processes as tasks are complex, communication is more difficult, and cohesion between team members is less existent (Cox, Pearce, & Perry, 2003; Gibson & Gibbs, 2006; Hoegl & Proserpio, 2004; Polzer, Crisp, Jarvenpaa, & Kim, 2006). Thus, for team shared leadership to occur, the willingness of team members to engage in shared leadership becomes crucial, and the factors that motivate the display of team shared leadership across distance must be seen as one of the most important areas of research surrounding the process of shared leadership (Avolio, Walumbwa, & Weber, 2009; Bligh, Pearce, & Kohles, 2006; Conger & Pearce, 2003; Mayo, Meindl, & Pastor, 2003).

This research argues that trust theory can be used to further investigate the willingness for shared leadership in dispersed innovation teams. Trust theory defines trust as the willingness to take risk in a dependent relationship making oneself vulnerable to the actions of another party (Mayer, Davis, & Schoorman, 1995). Based on this definition of trust, this research argues that shared leadership in dispersed innovation teams can be seen as

such a risk-taking, thus trusting, behavior that makes team members vulnerable to the actions of their peers, especially in the uncertain and complex environment of dispersed innovation teams (Bligh et al., 2006; Gibson & Gibbs, 2006; Li-Fang, An-Chih, Ting-Yu, Min-Ping, & Bor-Shiuan, 2008; Mayer et al., 1995; Rosen, Furst, & Blackburn, 2007). Team members who influence each other in a dispersed innovation context take risks by becoming accountable for actions and potential failures in a highly complex environment (Eckert & Drath, 2009) and depending on each other for successful leadership implementation, often without even personally knowing or facing each other (Seers, Keller, & Wilkerson, 2003). More specifically, team members initiating shared leadership depend on other team members for followership, and team members in a follower role depend on other team members for leadership (Cox et al., 2003). This trust perspective on shared leadership draws attention to the trustworthiness of team members as an enabler of shared leadership behaviors. In particular, it is argued that team members' trustworthiness in terms of ability, benevolence, and integrity is crucial for the willingness of other team members to engage in risky shared leadership behaviors, as trustworthiness decreases the likelihood of negative interaction outcomes (Bhattacharjee, 2002; Bligh et al., 2006; Mayer et al., 1995).

As such, this research offers several contributions. On the one hand, team shared leadership research is enhanced. For the first time, shared leadership is discussed from a trust perspective as a risk-taking, thus trusting, behavior with an emphasis placed on the issue of trustworthiness in teams. Notions of trust as a potential facilitator of shared leadership that have previously only been touched upon are enhanced by elaborating on why and how aspects of trust matter for shared leadership (Bligh et al., 2006; Mayo et al., 2003). Aspects of trust matter because shared leadership can be viewed as risk-taking, thus trusting, behavior. Thus, trustworthiness is a crucial determinant for shared leadership involvement as it increases the willingness for risky shared leadership actions (Mayer et al., 1995). Moreover, the specific relationships between the individual factors of trustworthiness (ability, benevolence, and integrity) and team shared leadership are discussed and empirically investigated (Mayer et al., 1995). As such, conceptual and empirical research on the antecedents of shared leadership that had not yet elaborated on trustworthiness as an antecedent of shared trust is also enhanced. In addition, context-specific research on shared leadership is extended as trust and shared leadership are discussed against the background of dispersed innovation teams. This is reasonable as shared leadership is particularly crucial for team performance in such a context (Muethel & Hoegl, 2010). Thus, this examination

contributes to the context-specific approaches to leadership demanded by Porter and Laughlin (2006).

On the other hand, trust research is also enhanced as shared leadership is shown to be the trusting behavioral outcome of the three factors of trustworthiness (ability, benevolence, and integrity) as conceptualized by Mayer et al. (1995). As such, this study especially extends research that tries to explain differing risk-taking behavioral outcomes of ability, benevolence, and integrity, besides the outcome of a cognitive state of trust per se (Colquitt, Scott, & LePine, 2007; Dyer & Chu, 2003; Gill, Boies, Finegan, & McNally, 2005; Levin, Whitener, & Cross, 2006; Mayer et al., 1995). Moreover, this research extends prior research on trust and leadership. Trust models of Burke, Sims, Lazzara, and Salas (2007) and Brower, Schoorman, and Tan (2000) that linked the trustworthiness of vertical leaders to the risk-taking behaviors of subordinates (e.g., increased citizenship behaviors and followership) and trustworthiness of subordinates to risk taking behaviors of vertical leaders (e.g., increased delegation) are complemented by linking trustworthiness not only to vertical leadership, but also to peer leadership theory. As such, trustworthiness among peers is discussed for the first time as an enabler of risk-taking behaviors by peers and thus as an enabler of shared leadership processes.

The discussion below begins by elaborating on shared leadership from a trust theory perspective as a risk-taking, thus trusting, behavior and further argues that trustworthiness becomes a crucial factor for shared leadership in dispersed innovation teams. Then, the positive relationship between trustworthiness and team shared leadership is discussed in detail through reference to the three factors of trustworthiness: ability, benevolence, and integrity (Mayer et al., 1995). For each facet of trustworthiness, a detailed and specific reasoning will be provided to explain how it affects shared leadership behaviors of team members in dispersed innovation teams. Afterwards, all hypotheses will be tested using a real work sample of 96 geographically dispersed innovation teams in the software industry.

4.2 Team Shared Leadership from a Trust Perspective

Shared leadership relies on a dynamic exchange of lateral influence among peers rather than a vertical, downward influence by an appointed leader (Cox et al., 2003). Shared leadership in teams is characterized by simultaneous, ongoing mutual influence processes among team members toward team goal attainment (Pearce, Manz, & Sims, 2008). These include team members' anticipation of action needs and the initiation of action flows to

revise and adapt work strategies of other team members or the team as a whole to facilitate team goal attainment (Hoegl & Muethel, 2007). Hence, shared leadership is a process through which individual team members accept leadership responsibilities by jointly performing the behaviors and roles of their traditional hierarchical team leader (Houghton, Neck, & Manz, 2003). Thus, it should be noted that shared leadership, like any leadership process, always comprises two parties acting in interdependent roles (Stogdill, 1974). For leadership to occur, one party must act in an influential role, and another party must act in a follower role (Stogdill, 1974). Therefore, for shared leadership to emerge, two sets of activities are in fact necessary (Carson, Tesluk, & Marrone, 2007). First, team members must offer leadership and seek to influence the direction, motivation, and support of the group (Carson et al., 2007). Second, team members must be willing to rely on the leadership provided by their peers (Carson et al., 2007). Thus, peer followership is an inextricably linked, integral part of team shared leadership (Carson et al., 2007; Cox et al., 2003). Within such a followership perspective, team members must accept influence from other team members (i.e., passive followership) and also ask for relevant information and advice (i.e., active followership) (Hoegl & Muethel, 2007, 2008). As such, shared leadership is a process that evolves between dependent parties. Team members initiating shared leadership depend on other team members for followership, and team members in a follower role depend on other team members for leadership (Cox et al., 2003). This issue becomes even more important when considering that both parties in this dependent relationship are hierarchically at the same level. As such, team members cannot automatically be expected to lead others (like vertical team leaders) and team members cannot automatically be expected to follow their peers who lack positional power (like they would follow vertical leaders). Thus, dependent leadership relations become a critical issue within shared leadership processes (Eckert & Drath, 2009).

This study argues that trust theory can be used to further elaborate on these dependent leadership relationships that evolve in teams with high levels of shared leadership. Trust theory defines trust as the willingness to take risk in a dependent relationship making oneself vulnerable to the actions of another party (Mayer et al., 1995). Trusting behaviors are defined as actions of risk taking that make oneself vulnerable to the actions of another party and thus are behavioral manifestations of trust (Currall & Inkpen, 2002; Friedman, 1993; Mayer et al., 1995; Rousseau, Sitkin, Burt, & Camerer, 1998). Thereby, vulnerability and taking risk imply that there is a potentially negative outcome or loss due to the actions of another party (Currall & Inkpen, 2002; Mayer et al., 1995). Team member trustworthiness is

defined as team member attributes and behaviors that support positive expectations of team members' behaviors (Brenkert, 1998; Hodson, 2004). Thus, team member trustworthiness increases the willingness of team members to engage in trusting behaviors with each other (i.e., trust), as team members' positive attributes and behaviors decrease the probability that potentially negative outcomes will occur (Davis, Schoorman, Mayer, & Tan, 2000; Johnson & Johnson, 2009; Levin et al., 2006; Mayer & Davis, 1999; Mayer et al., 1995; Parker, Williams, & Turner, 2006).

This research argues that leading and following peers in a team context (i.e., team shared leadership) can be seen as a behavior that involves risk-taking in a relationship and thus requires trustworthiness (Bligh et al., 2006; Mayer et al., 1995). Shared leadership is riskier than traditional work behaviors. In contrast to taking orders from a vertical team leader, sharing in leadership responsibilities increases accountability for actions and work outcomes, and thus potential failures, and consequently increases professional vulnerability (Eckert & Drath, 2009). Team members taking over leadership responsibilities potentially expose themselves to disappointments, criticism, reputational risk and other professional disadvantages. Moreover, team members sharing leadership must always depend on a second party to avoid such negative outcomes (Carson et al., 2007; Pearce & Conger, 2003). Team members initiating shared leadership depend on adequate followership. They face the risk that their suggestions and advice are followed either not at all or in an inappropriate manner, thus making them vulnerable to professional failure and betrayal by team members (Bligh et al., 2006; Carson et al., 2007; Greenberg, Greenberg, & Antonucci, 2007; Mayo et al., 2003; Pearce & Conger, 2003; Wasti, Tan, Brower, & Önder, 2007). Thus, team members will engage in leadership initiatives only if other team members are trustworthy, as this decreases their probability of negative professional outcomes (Bligh et al., 2006). Trustworthy team members can be expected to do their best in terms of adequate followership. Thus, the probability of negative professional consequences is minimized with high levels of trustworthiness (Bligh et al., 2006). Accordingly, studies found trustworthiness positively related to idea sharing, knowledge transfer, and proactive problem solving (Parker et al., 2006; Szulanski, Cappetta, & Jensen, 2004).

At the same time, shared leadership is also risky for team members in a follower role. Team members in a follower role depend on appropriate leadership initiatives from their peers, otherwise, followership potentially results in exploitation, disappointments, and wrong implementations (Bligh et al., 2006; Carson et al., 2007; Pearce & Conger, 2003; Wasti et

al., 2007). Accordingly, Bligh et al. (2006) note that “an individual who does not feel that other team members uphold commitments, are honest, or feels that she might be taken advantage of if she allows peer influence, is unlikely to accept others’ influence; to do so would involve an unacceptable level of risk” (p. 307). Thus, both initiating leadership and accepting leadership involves vulnerability of team members due to the actions of a second party and are thus risk taking, trusting behaviors (Bligh et al., 2006; Mayo et al., 2003). Thereby, it should be noted that the risk involved in dependent shared leadership behaviors increases for both parties in dispersed innovation teams, as such teams face complex and uncertain tasks (Gibson & Gibbs, 2006) and team members not facing each other rather exhibit social loafing and other harmful opportunistic behaviors due to missing control (Bhattacharjee, 2002; Greenberg et al., 2007; Jarvenpaa & Leidner, 1999; Rosen et al., 2007). Hence, trustworthiness among team members is especially needed in dispersed innovation teams (Jarvenpaa & Leidner, 1999; McAllister, 1995). High levels of trustworthiness in a team can in fact be seen as something that reduces the risk inherent in mutual influence processes in dispersed innovation teams as it decreases the probability of negative outcomes for team members (Bligh et al., 2006; Ganesan & Hess, 1997; Krishnan, Martin, & Noorderhaven, 2006; Mayer et al., 1995). Nevertheless, it should be noted that team member trustworthiness cannot rule out every kind of risk and potential vulnerability inherent in shared leadership in dispersed innovation teams. This is because trustworthiness does not equal perfect predictability of team members and because factors outside of the relationship, like unexpected environmental changes, can also lead to negative outcomes (Mayer et al., 1995). As such, trustworthiness reduces risk but does not eliminate all risks that come along with taking over responsibilities and leading others (Krishnan et al., 2006; Mayer et al., 1995). Hence, trustworthiness increases the willingness of team members to engage in still risky shared leadership behaviors by decreasing the probability of negative outcomes. In sum, this leads to greater risk taking in terms of more enacted shared leadership behaviors than without trustworthiness (Schoorman, Mayer, & Davis, 2007).

In sum, a trust theory perspective demonstrates that shared leadership can be seen as a risk-taking process among team members acting in dependent leader and follower roles that requires team members to have high levels of trustworthiness to engage in risk-taking, trusting behaviors, such as mutual influence, with each other (Bligh et al., 2006; Brower et al., 2000). The following analysis provides more specific arguments for the relationship between trustworthiness and team shared leadership by taking into account that, instead of

being a one-dimensional construct, trustworthiness has three distinct facets: ability, benevolence, and integrity (Mayer et al., 1995).

4.3 Team Trustworthiness and Team Shared Leadership

High levels of trustworthiness in teams can be defined in terms of high levels of team member ability, benevolence, and integrity (Colquitt et al., 2007; Mayer et al., 1995). Therefore, in the following pages, team member ability, benevolence, and integrity will be elaborated upon as antecedents of team shared leadership. The following analysis shows that different reasoning can be provided for each factor of trustworthiness in terms of its ability to reduce potentially negative outcomes of shared leadership behaviors and thus facilitate the willingness for shared leadership. This approach supports prior research that showed that the individual factors of trustworthiness each have a unique relationship to risk-taking, trusting outcomes (Colquitt et al., 2007; Gill et al., 2005). Figure 4-1 shows the conceptual framework of the study.

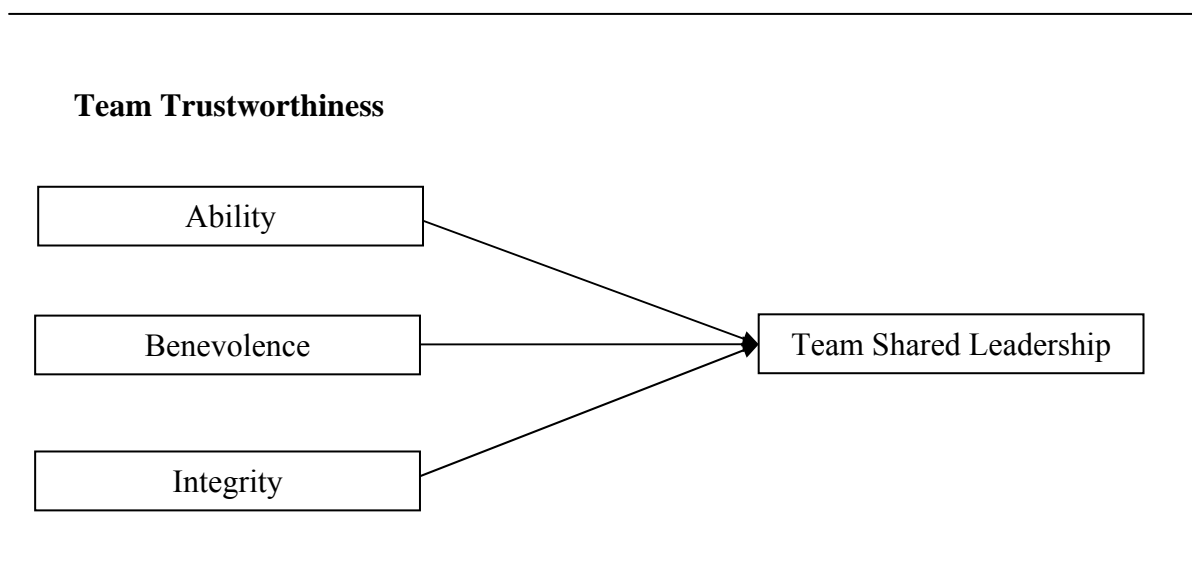


Figure 4-1: Conceptual Framework of this Research

4.3.1 Ability

Within a team context, ability can be defined as the knowledge and skills needed by team members to do their job along with the interpersonal skills and general wisdom needed to succeed in a team (Colquitt et al., 2007). Ability captures the “can-do” component of

trustworthiness by describing whether team members have the competencies needed to act in an appropriate fashion (Colquitt et al., 2007). Within a shared leadership context, ability answers the question of whether team members are in principle able to provide reasonable leadership and followership.

This study argues that team members will only engage in the risky behavior of sharing leadership if others have high abilities as this reduces the risk to team members inherent in shared leadership (Brower et al., 2000). The willingness of team members to take over leadership responsibility by inducing other team members' behaviors will increase if the level of ability in a team is high, since chances are higher that leadership initiatives will be understood and can be implemented correctly (Bligh et al., 2006; Mayo et al., 2003). However, team members facing peers incapable of putting new work procedures into practice will not likely initiate such leadership as the probability for failures and other negative outcomes (e.g., through mistakes during implementation) is high (Bligh et al., 2006; Mayo et al., 2003). Thus, high levels of team ability reduce the risk to team members that leadership initiatives will fail due to the incapacities of others, thus increasing team members' willingness to engage in shared leadership behaviors (Bligh et al., 2006; Mayo et al., 2003). Accordingly, empirical studies have found ability-based trustworthiness to be positively related to knowledge contribution and task coordination in dispersed teams (Kanawattanachai & Yoo, 2007).

Furthermore, in highly competent teams, team members are also rather willing to accept influence from other team members (Conger & Pearce, 2003; Davis et al., 2000; Mayo et al., 2003; Seers et al., 2003). Team members that are asked for compliance are more likely to engage in followership with other competent team members (Conger & Pearce, 2003; Davis et al., 2000; Mayo et al., 2003; Seers et al., 2003), since to do so with incompetent would result in too high risk to the followers of doing something that turns into a disappointment or failure (Bligh et al., 2006; Conger & Pearce, 2003; Yukl, 2006). Active followership is also increased as team members are more likely to ask competent team members for advice and support (Conger & Pearce, 2003; Hoegl & Muethel, 2007, 2008; Seers et al., 2003). In sum, ability provides team members with high security that shared leadership "can be" done in an adequate (less risky) way and thus increases their willingness to pursue such actions (Colquitt et al., 2007; Mayo et al., 2003; Seers et al., 2003). Thereby, ability is even more important in dispersed innovation teams than in face-to-face teams, as tasks are uncertain, complex, and challenging (Gibson & Gibbs, 2006) and thus call for very

high ability levels to reduce the ability-related risk inherent in team shared leadership. Accordingly, several researchers stressed the importance of ability-based trustworthiness in dispersed team settings (Aubert & Kelsey, 2003; Kanawattanachai & Yoo, 2002, 2007; Meyerson, Weik, & Kramer, 1996).

It should be noted that this argument complements existing arguments on ability as being beneficial for shared leadership (e.g., Pearce & Sims, 2000; Perry, Pearce, & Sims, 1999). Prior research primarily suggested that team member ability enhances team shared leadership by it enabling team members to take guidance by competently identifying leadership needs and initiating appropriate influence (Conger & Pearce, 2003; Cox et al., 2003; Pearce & Manz, 2005; Pearce & Sims, 2000; Perry et al., 1999; Ziegert, 2005). This research, however, argues that team members are more willing to interact with others in risky leadership behaviors when those others' are competent since the ability of those others' reduces the team members' risk that sharing leadership has negative consequences (e.g., wrong implementation of work methods) (Bligh et al., 2006; Colquitt et al., 2007; Mayo et al., 2003; Seers et al., 2003). Thus, this research points to the dependence that exists between team members in leadership roles and team members in follower roles to successfully implement shared leadership (Carson et al., 2007; Northouse, 2001; Seers et al., 2003). Accordingly, Seers et al. (2003) note that "beyond the complementarity of skills and abilities brought to team work by group members, the perceptions and reactions [to these competencies] of individuals may also facilitate shared team leadership." This thought is underscored by empirical research that found that group members facilitate power sharing to the extent that they rate each other as competent (Feldman, 1973). Hence, it is argued:

Hypothesis 1: Team Member Ability positively relates to Shared Leadership in Dispersed Innovation Teams.

4.3.2 Benevolence

Benevolence is the extent to which, aside from egocentric profit motives, team members want to do good to other team members (Mayer et al., 1995). In contrast to ability, high levels of benevolence in a team assume that there is a specific attachment among team members in the form of a positive orientation toward each other and a concern for in-group welfare and mutual care (Mayer et al., 1995; McAllister, 1995; Wasti et al., 2007). As such, benevolence is an affect-based source of the willingness to take risk and contrasts with cognitive-based sources of trustworthiness such as ability (Colquitt et al., 2007; McAllister,

1995). Benevolence captures the “will-do” component of trustworthiness by describing whether team members will choose to use their ability in the best (i.e., good-natured) way (Colquitt et al., 2007). Specifically applied to shared leadership, benevolence captures whether team members that are able to do so, also choose to provide reasonable, sense-making guidance and adequate, respectful followership (Colquitt et al., 2007). High levels of benevolence are especially hard to attain in dispersed team settings, as team members often share less common history and have relationships based on electronic means, thus stressing this topic’s importance for dispersed innovation teams (Cramton, 2002; Jarvenpaa & Leidner, 1999; Kanawattanachai & Yoo, 2002; Levin et al., 2006).

Benevolence fosters shared leadership as it leads to team members being less concerned about their own vulnerabilities and fears and thus creates a team climate of openness and confidence for proactive actions (Bligh et al., 2006). Within highly benevolent teams, interpersonal risk taking and thus shared leadership is promoted, as team members become comfortable and open in sharing their individual experiences, contributions and viewpoints, even if these stand counter to the common group belief (Bligh et al., 2006; Huelshager, Anderson, & Salgado, 2009; Johnson & Johnson, 2009). More specifically, sensitive information, ideas and assumptions, and thus leadership initiatives can be challenged without the risk of negative repercussion or concern about negative judgments by others, thus fostering the willingness for mutual influence initiatives among team members (Bligh et al., 2006; Huelshager et al., 2009; Jarvenpaa, Knoll, & Leidner, 1998; Jones & George, 1998). In contrast, team members that face neutral or even ill-spirited team members can be expected to be reluctant in voicing regarding improvements in work processes since they risk the betrayal of their interests are by other team members who, for instance, may either belittle or not take seriously their ideas and thus do not follow their guidance in an inadequate manner or at all (Bligh et al., 2006; Johnson & Johnson, 2009; Wasti et al., 2007). Accordingly, empirical studies found a positive relationship between team benevolence and extra-role efforts, like proactively suggesting new work methods (Lapierre, 2007).

Team members’ appreciation for each other also increases their willingness to be influenced by one another (Conger & Pearce, 2003). Team members will passively and actively follow other team members that are benevolent, thus fostering team shared leadership, since benevolence decreases their risk of implementing and supporting guidance that is not decent and complaisant (Bligh et al., 2006; Yukl, 2006). In contrast, team

members are unlikely to accept the influence of others by whom they might be taken advantage because to do so would involve an unacceptable level of risk (Bligh et al., 2006). In a worst case scenario, team members following non-benevolent other team members could face exploitation or manipulation (Li-Fang et al., 2008; Yukl, 2006), thus, team members will more readily follow others that are benevolent. Moreover, and especially in terms of active followership, team benevolence promotes psychological safety and encourages team members to discuss their errors openly, ask questions, and actively seek feedback, thus fostering higher levels of shared leadership (Huelsheger et al., 2009). In accordance with all these arguments, empirical studies have found that team members facilitated power sharing to the extent that they perceived each other as likeable, which is an attribute closely linked to benevolence (Brower et al., 2000; Feldman, 1973). Hence, it is argued:

Hypothesis 2: Team Member Benevolence positively relates to Shared Leadership in Dispersed Innovation Teams.

4.3.3 Integrity

Integrity describes the extent to which team members adhere to a set of principles that are acceptable to other team members, especially comprising fairness, consistency, and predictability (Brower et al., 2000; Colquitt et al., 2007; Mayer et al., 1995; Wasti et al., 2007). Hence, in teams with high levels of integrity, team members are fair and highly reliable, whereby reliability is defined as the degree to which team members are dependable, follow through on expectations, and keep promises (Brower et al., 2000; Colquitt et al., 2007; Wasti et al., 2007; Yukl, 2006). Like those of other researchers, this study focuses on reliability as a crucial part of integrity (Brower et al., 2000; Colquitt et al., 2007; Simons, 2002), arguing that reliability is especially important for the risk-taking behavior of sharing leadership in dispersed innovation teams due to missing opportunities for monitoring (Aubert & Kelsey, 2003; Colquitt et al., 2007; McAllister, 1995; Schoorman et al., 2007). Thereby, like ability, reliability represents a rather rational reason to trust and, like benevolence, captures the “will-do” component of trustworthiness (Colquitt et al., 2007; McAllister, 1995).

In general, team members with reliable peers can be assumed to engage in mutual agreements and behaviors, such as shared leadership behaviors, because reliability reduces the risk that team members do not act as expected by, for instance, not following through

with a previously agreed upon new work method (Aubert & Kelsey, 2003; Butler, 1991; Jarvenpaa & Leidner, 1999; McAllister, 1995; Perrone, Zaheer, & McEvily, 2003; Yukl, 2006). Accordingly, other researchers have linked reliability to risky citizenship and change behaviors (Simons, 2002). This matter is even more crucial for dispersed innovation teams as the impracticality of direct peer observation in such teams necessitates reliability to take the place of supervision (Aubert & Kelsey, 2003; Colquitt et al., 2007; Jarvenpaa & Leidner, 1999; McAllister, 1995). Accordingly, empirical studies have shown reliability to be crucial for leadership-related risk-taking behaviors in complex and dispersed team settings (Aubert & Kelsey, 2003; Colquitt et al., 2007).

Because they cannot monitor each other, team members in dispersed innovation teams, in contrast to team members in face-to-face teams, face an extraordinary risk when they share leadership (Jarvenpaa et al., 1998; Jarvenpaa & Leidner, 1999; Kirkman, Rosen, Tesluk, & Gibson, 2004). More specifically, team members in dispersed teams that enact a leadership role have hardly any control over whether, and to what quality degree, their leadership attempts are successful and suggested work procedures are implemented (Aubert & Kelsey, 2003; Jarvenpaa et al., 1998). Instead, they must rely on remote colleagues to stick to their words and follow in an adequate manner (Aubert & Kelsey, 2003). Thus, high levels of reliability in a team become crucial to reducing the risk inherent in leadership initiatives across physical distance and thus foster the willingness for shared leadership behaviors (Jarvenpaa et al., 1998; Jarvenpaa & Leidner, 1999; Mayer et al., 1995). Reliability provides the kind of predictability that helps team members to cope with the uncertainty that results from inoperable supervision and control (Colquitt et al., 2007; Jarvenpaa et al., 1998; Kirkman et al., 2004; Mayer et al., 1995). In contrast, team members facing unreliable other team members will hesitate to take over responsibility because they expect that their leadership initiatives will not be received adequately and will therefore put them at risk of critique and failure (Ridings, Gefen, & Arinze, 2002).

Team members will also rather engage in peer followership if other team members are reliable, especially in a dispersed team setting (Burke et al., 2007; Malhotra, Majchrzak, & Rosen, 2007; Yukl, 2006). Because tasks are complex and communication is more complicated due to differing work schedules and dependence upon electronic means, team members in a follower role in dispersed team settings need reliable peer guidance in terms of availability and sticking to their words to interact properly (Greenberg et al., 2007; Jarvenpaa & Leidner, 1999; Mayer & Gavin, 2005). It is unlikely that team members in a

follower role will accept influence from others who are not reliably available for clarifications and corrective actions or do not uphold commitments, as to do so would involve an unacceptable risk for failure (Bligh et al., 2006; Butler, 1991; Mayer & Gavin, 2005). In accordance with all the above arguments, studies have shown that successful leaders often possess high levels of reliability (Stogdill, 1974; Yukl, 2006), and that members in virtual team communities are rather willing to share expertise, receive information, and ask for advice if other members are consistent and reliable in their actions (Ridings et al., 2002). Hence, it is argued:

Hypothesis 3: Team Member Integrity (in terms of Reliability) positively relates to Shared Leadership in Dispersed Innovation Teams.

4.4 Methods

4.4.1 Data Collection

To test the proposed hypotheses, a survey of real work teams in several companies was conducted. Participating companies each produced a list of team projects and provided the names and contact information of team leaders. Team leaders were asked to complete a pre-defined spreadsheet with descriptive details about the project and all team members. In addition, telephone interviews were used to establish that “real teams,” or “core teams,” in which team members were adequately interdependent had been selected. Consequently, a group was only regarded as a “team” if all identified team members collaborated regularly on one common task and were not assigned to independent work packages or several sub-teams charged with different tasks. The latter requirement was very important for the present study, as it became apparent that teams working on software projects are frequently organized into multiple sub-teams. For such multi-team projects, each sub-team could participate separately in the study as long as independent evaluations were possible and a clear team identity existed (i.e., each sub-team had its own name and clear boundaries with other sub-teams). For each project team, the team leader and team members were contacted via email and asked to complete an online questionnaire. This questionnaire was preceded by a front page that explained the fundamentals of the questions to follow and ensured the confidentiality of all responses. Additionally, this front page identified the name of the team project on which the recipients would be questioned and the names of the team leader and team members who had been involved. This information should ensure that all the participants were clear about the project to which the subsequent questions referred and help

them to recall their project experiences as well as possible. The questionnaire was administered in German and English. Respondents' participation in this study was strictly voluntary.

4.4.2 Sample

Ninety-six geographically dispersed software project teams from 36 different companies participated in this study. Project tasks ranged from new software developments to complex software roll-outs and software customizations. An adequate level of innovativeness was ensured for all task types via telephone interviews with team leaders, assuring high levels of task novelty, complexity, and uncertainty as well as low levels of standardization (Hoegl, Parboteeah, & Gemuenden, 2003). Each team was geographically dispersed across at least two different sites of a company. Overall, team leaders and team members were spread across four continents and 26 countries. Only software projects that had been completed within 22 months prior to data collection were included in the study. The average size of a team (including the team leader) was 8.3 employees (median = 7, standard deviation = 4.1). Usable questionnaires were received from all 96 team leaders and from 63% of all contacted team members. Overall, analyses were based on a total of 96 team leader responses and 337 team member responses. On average, 3.5 team members plus the team leader responded for each team. The average project length was 14.4 months (median = 12, standard deviation = 9.5). While 42 teams were nationally homogeneous, 54 teams were comprised of team members with different nationalities.

4.4.3 Measures

All constructs considered in this investigation refer to the team as the unit of analysis and were assessed using multiple questionnaire items. Nearly all items were drawn from published scales, and all latent construct items were anchored as 1, "strongly disagree" to 5, "strongly agree." To avoid a possible common source bias, data from different respondents were used to measure the different variables. Team shared leadership was rated by team members. Measures of ability, benevolence, and integrity of team members were derived from team leader judgments. Table 4-1 shows all latent construct items used in this study.

Variable	Items
Team Shared Leadership	<p>All team members considered not only their own sphere of work, but also how the entire team task unfolded.</p> <p>All team members exerted effort to understand task interrelationships.</p> <p>All team members initiated actions to bring out improved procedures for the team.</p> <p>All team members proactively made constructive suggestions for improving how things operate within the team.</p> <p>All team members actively attacked problems.</p> <p>All team members positively reacted to suggestions from other team members.</p> <p>All team members asked other team members for advice.</p>
Ability	<p>Team members were very capable of performing their job.</p> <p>Team members had much knowledge about the work that needed to be done.</p> <p>Team members had specialized capabilities that increased the team's performance.</p>
Benevolence	<p>Team members were very concerned about each others' welfare.</p> <p>Team members would not have knowingly done anything to hurt each other.</p> <p>Team members would have gone out of their way to help each other.</p>
Integrity	<p>Team members stuck to their word.</p> <p>Team members were reliable.</p> <p>Sound principles have guided the other team member's behavior.</p>

Table 4-1: Items Used in this Research

Team Shared Leadership. Shared leadership was measured with a seven-item measure based on the conceptual work by Hoegl and Muethel (Hoegl & Muethel, 2007; Muethel & Hoegl, 2010). Confirmatory factor analysis suggested good fit (NFI = .92, CFI = .94, RMSEA = .066). A sample item is, "All team members proactively made constructive suggestions for improving how things operate within the team." The seven indicators judged by team members revealed good internal consistency with a Cronbach's alpha of 0.83 (Hair, Black, Babin, Anderson, & Tatham, 2006). To ensure that aggregation of data from team members to create team data was appropriate, inter-team-member agreement and reliability measures for team shared leadership were assessed. While $r_{(wg)(j)}$ was .93 (James, Demaree, & Wolf, 1984, 1993), ICC (1) was .33, and ICC (2) was .82 (McGraw & Wong, 1996).

Thus, the aggregation of individual-level data was justified (LeBreton & Senter, 2008). Team member data on team shared leadership was aggregated by calculating the arithmetic mean.

Ability. Benevolence. Integrity. Trustworthiness was assessed using shortened versions of Mayer and Davis' (1999) measures of ability, benevolence, and integrity, whereby integrity was specifically reduced to its reliability aspects. These measures were chosen because they have been widely used in past research, also to measure trustworthiness cross-culturally, revealing good consistencies (Davis et al., 2000; Mayer & Davis, 1999; Wasti et al., 2007). In comparison to the original scales, all items had to be adjusted to the team level. Ability, benevolence, and integrity of team members were judged by the team leader and showed acceptable Cronbach's alphas (Hair et al., 2006): ability = 0.83; benevolence = 0.73; reliability = 0.74.

Control Variables. Several control variables were used that are theoretically relevant to the hypothesized relationships. These include team size, project length, number of sites, and national diversity. All these variables have been identified as either potential inhibitors or facilitators of shared leadership (e.g. Conger & Pearce, 2003; Cox et al., 2003; Pearce & Sims, 2000) and were provided via the pre-defined spreadsheet with descriptive team details that team leaders filled out.

Team size was defined as the number of team members plus the team leader in a team. The size of a project team is an important structural variable within all team studies as it has the potential to influence various collaborative team processes (Hoegl, 2005; Hoegl & Parboteeah, 2006). Some shared leadership researchers have argued that team size might be positively related to team shared leadership due to a greater availability of potential leadership resources. On the other hand, shared leadership should become more difficult in larger teams as team interaction processes are hindered and familiarity decreases (Carson et al., 2007; Conger & Pearce, 2003; Cox et al., 2003; Pearce & Sims, 2000; Perry et al., 1999; Seers et al., 2003; Ziegert, 2005).

It was also controlled for project length, which was assessed in terms of months from the beginning of the team's work until its conclusion. This variable was considered because several researchers have concluded that shared leadership might take time to develop and thus be positively associated with a team's maturity (Cox et al., 2003; Mayo et al., 2003; Pearce & Sims, 2000; Perry et al., 1999). Nevertheless, Conger and Pearce (2003) also point

to the possibility that during long projects the chance for single, dominant emergent leaders might be higher.

By including the number of sites for each team as a control variable, this research allows for the fact that geographical dispersion is a continuous construct (Carte, Chidambaram, & Becker, 2006; Hoegl & Proserpio, 2004; Zigurs, 2003) and controls for differences that might result within dispersed teams from different levels of dispersion. Teams dispersed across only two sites might behave differently than teams dispersed across many more sites. As described above, each team included in the sample was dispersed across a minimum of two sites. The maximum number of sites across which an individual team was dispersed in this research was seven.

National diversity was measured in terms of variety with Blau's (1977) index ($1 - \sum p_k^2$) (Harrison & Klein, 2007). National diversity could influence shared leadership through negative social categorization processes that lead to a decreased willingness for mutual influence (Perry et al., 1999; Tajfel, 1982; Turner, 1987), but it could also have positive effects due to a broader experience and knowledge base (Dahlin, Weingart, & Hinds, 2005; Kearney & Gebert, 2009; Kearney, Gebert, & Voelpel, 2009).

4.4.4 Analytical Procedures

To test the proposed hypotheses, hierarchical multiple regression analysis was used assessing the significance of main effects after all control variables had been entered into the models. Table 4-2 provides the descriptive statistics and correlations of the used variables. As the correlation matrix shows several significant correlations, the variance inflation factor was calculated for all hierarchical multiple regression analyses to check for potential multicollinearity. As no value exceeded 3.0, values are within an acceptable range (Cohen, Cohen, West, & Aiken, 2003).

	Variables	Mean	SD	1	2	3	4	5	6	7
(1)	Team Size	8.27	4.09							
(2)	Project Length	14.42	9.47	-.02						
(3)	Number of Sites	2.86	1.19	.31**	.11					
(4)	National Diversity	0.27	0.26	-.05	.16	.15				
(5)	Ability	4.27	0.69	.14	.08	.13	.05			
(6)	Benvolence	4.16	0.67	.02	.13	-.05	-.06	.38**		
(7)	Integrity	4.04	0.67	.13	.06	.05	-.03	.45**	.59**	
(8)	Team Shared Leadership	3.89	0.34	-.13	-.07	.08	.09	.12	.34**	.36**

Note: ⁺p < .10; *p < .05; **p < .01.

Table 4-2: Descriptive Statistics and Correlations (N = 96 Teams)

4.5 Results

Table 4-3 reports the results of the regression analyses. While model 2 includes all variables, model 1 only includes controls. Model 2 in table 4-3 shows that ability was not significantly related to team shared leadership, thus, hypothesis 1 is not supported. Hypothesis 2 regarding benevolence is supported, however, as benevolence showed a significant positive relationship with team shared leadership. A significant positive relationship could also be found for integrity, thus, hypothesis 3 is confirmed. In addition to these results, model 1 shows that none of the controls had a significant relationship with team shared leadership. It should be noted that adding ability, benevolence, and integrity one after another or individually into the regression model does not change the regression results for each variable.

Variables	Model 1	Model 2
Team Size	-.16	-.20 ⁺
Project Length	-.11	-.16
Number of Sites	.13	.15
National Diversity	.08	.11
Ability		-.09
Benevolence		.24 [*]
Integrity		.29 [*]
R ²	.05	.23
R ² adjusted	.00	.17
R ² change	/	.19 ^{**}
F	1.09	3.81 ^{**}

Note: ⁺p < .10; ^{*}p < .05; ^{**}p < .01. Dependent variable: Team Shared Leadership. Table shows standardized Beta-Coefficients.

Table 4-3: Regression Analysis predicting Team Shared Leadership (N = 96 Teams)

4.6 Discussion

The main objective of this article is to examine trustworthiness of team members as an antecedent of shared leadership in dispersed innovation teams. Based on the discussion of shared leadership as a risk-taking behavior, it is argued that the ability, benevolence, and integrity of team members foster the willingness for shared leadership behaviors as the probability of negative interaction outcomes is decreased. In support of the proposed hypotheses, benevolence and integrity of team members were positively related to team shared leadership. In contrast to the proposed hypotheses though, ability was not related to team shared leadership. As such, this manuscript offers implications for theory, managerial practice, and future research.

4.6.1 Theoretical Implications

This study extends existing team shared leadership research in two important ways. First, shared leadership is discussed from a trust perspective as a risk-taking, and thus trusting, behavior between team members in dependent leadership and follower roles (Bligh et al., 2006; Carson et al., 2007). For the first time in shared leadership research, it is argued that sharing leadership responsibilities is not only a matter of team members enacting certain influencing behaviors, but also a matter of team members enacting certain risky behaviors. It is argued that shared leadership does not only change the way a team is led, it also increases the vulnerability of team members, as accountability for potential failures increases and team members face the risk of criticism and losing their reputation. Moreover, attention is drawn to the fact that shared leadership is a highly relational process that takes place between team members in dependent leader and follower roles. Thus, sharing leadership requires not only individual risk taking, but also risk taking in a relationship and is thus a trusting behavior that requires trustworthiness (Mayer et al., 1995). This new perspective on shared leadership especially extends and integrates prior rudimentary notions linking shared leadership to risk and trust theory aspects (Bligh et al., 2006; Mayo et al., 2003). These notions are further enhanced by specifying that sharing leadership can be viewed as a risk-taking, and thus trusting, behavior and by specifying how such risk taking can be fostered by trustworthiness (Bligh et al., 2006; Mayo et al., 2003). More specifically, trustworthiness is argued to decrease the risk inherent in shared leadership in terms of the probability of negative outcomes, thus fostering the willingness to engage in shared leadership behaviors (Bligh et al., 2006). This study also answers calls for more context-specific research on leadership (Porter & Laughlin, 2006) by stressing the context of dispersed innovation teams and noting that reducing risk of shared leadership through trustworthiness is especially required in dispersed innovation teams due to environmental uncertainty and missing control (Bhattacharjee, 2002; Gibson & Gibbs, 2006; Greenberg et al., 2007; Jarvenpaa & Leidner, 1999; Rosen et al., 2007).

Second, this study extends research on antecedents of shared leadership. Despite the importance of shared leadership processes, research on the development of shared leadership is still scarce (Avolio et al., 2009; Bligh et al., 2006; Mayo et al., 2003). This study provides conceptual and empirical support for trustworthiness as an important driver of shared leadership in dispersed innovation teams. More specifically, benevolence and integrity, in terms of reliability, could be shown as positively related to shared leadership. As such, this

research underscores shared leadership as a risk-taking, trusting behavior that requires high levels of team benevolence and integrity, as both aspects increase the probability that team members will use their ability in an optimal way, thus decreasing the probability of negative outcomes (Colquitt et al., 2007; Mayer et al., 1995). Thereby, both aspects are argued to be particularly important for team shared leadership in dispersed innovation teams as affect-based sources of trust, such as benevolence, are especially hard to obtain in such a context (Jarvenpaa & Leidner, 1999; Kanawattanachai & Yoo, 2002; Levin et al., 2006) and reliability helps to overcome the missing possibility to monitor each other (Aubert & Kelsey, 2003; Colquitt et al., 2007; Jarvenpaa & Leidner, 1999; McAllister, 1995). As such, context-specific research on the antecedents of shared leadership is especially extended. Interestingly, ability as the “can-do” attitude showed no relationship with shared leadership in dispersed innovation teams. This is surprising, as prior research on team member ability underscored the importance of ability-based trustworthiness in dispersed team settings (Aubert & Kelsey, 2003; Kanawattanachai & Yoo, 2002, 2007; Meyerson et al., 1996), and research on shared leadership provided clear reasoning for a positive relationship (Conger & Pearce, 2003; Pearce & Sims, 2000; Perry et al., 1999). A possible explanation might be that analyzed teams had very high levels of ability, thus, ability might not have been a constraining factor that further increased shared leadership (Siemsen, Roth, & Balasubramanian, 2008). The higher mean level (4.27) and comparable standard deviation (0.69) of ability in comparison to benevolence and integrity point to such an explanation. Perhaps ability is not a critical aspect for shared leadership in dispersed innovation teams as such teams are often specifically set up to bring together highly educated experts from different locations, thus almost automatically resulting in high levels of team member ability (Gibson & Gibbs, 2006; Kayworth & Leidner, 2000).

Moreover, in addition to shared leadership research, trust research is also extended. This study extends trust theory by newly introducing shared leadership as a risk-taking, and thus trusting, behavioral outcome of the facets of trustworthiness (Colquitt et al., 2007). As such, this study validates trustworthiness as a driver of trusting behaviors and is in line with existing trust research (Colquitt et al., 2007; Jarvenpaa et al., 1998; Mayer et al., 1995). Thereby, this study especially addresses calls for more context-specific examinations of trust by relating ability, benevolence, and integrity to shared leadership in dispersed innovation teams (Graebner, 2009; Schoorman et al., 2007). From a trust theory perspective, it should be noted that, against prior argumentations, ability, as a cognitive dimension of trustworthiness, could not be shown as being particularly important in dispersed team

settings (Aubert & Kelsey, 2003; Kanawattanachai & Yoo, 2002, 2007; Meyerson et al., 1996). This study instead points to benevolence and reliability as antecedents to trusting shared leadership behaviors in dispersed innovation teams. As noted above, this might be because, in contrast to prior trust studies that considered interviews with randomly composed student teams in lab conditions (Aubert & Kelsey, 2003; Kanawattanachai & Yoo, 2002, 2007), this study considered interviews with real work teams charged with innovative tasks whose members might have been selected for such tasks due to their high abilities, thus, ability might not have been a constraining factor in the analyzed teams. These considerations further underscore the need for trust research to examine aspects of trustworthiness and trusting behaviors very carefully in terms of context (Graebner, 2009; Schoorman et al., 2007). Moreover, this study for the first time links trust to peer leadership. The models of Burke et al. (2007) and Brower et al. (2000), which link trustworthiness between vertical leaders and their team members to risk-taking behaviors, are transferred to peer leadership, thereby extending research that aims to integrate trust and leadership. Finally, it should be noted that trust theory is enhanced by linking trustworthiness to a team and leadership process (i.e., team shared leadership), which, in turn, has shown to be positively related to performance in dispersed teams (Pearce et al., 2004). Hence, this study sheds light on the contradictory research findings regarding the direct relationships between trustworthiness, cognitive states of trust, and dispersed team performance (Aubert & Kelsey, 2003; Jarvenpaa et al., 1998). As such, this study gives some insight into the “black box” between trustworthiness and dispersed team performance by showing that trustworthiness relates to trust and trusting behaviors in terms of shared leadership, which in turn has been shown in previous studies to positively affect dispersed performance (Pearce et al., 2004).

4.6.2 Managerial Implications

Research has shown that high levels of participation and mutual influence among team members are needed to attain high performance levels in geographically dispersed innovation teams (Pearce et al., 2004). This study shows that the trustworthiness of team members, especially in terms of benevolence and integrity, fosters such required shared leadership behaviors in dispersed innovation teams. However, the development and maintenance of high levels of trustworthiness is continuously challenged in dispersed innovation teams due to high uncertainty, less common ground, missing visual cues, and increased misunderstandings (Cramton, 2002; Kanawattanachai & Yoo, 2002; Kankanhalli,

Tan, & Kwok-Kee, 2006). Managerial implications therefore focus on establishing high levels of benevolence and integrity despite the context of dispersed team collaboration.

With regard to benevolence, management must establish an affective attachment among team members in the form of a positive orientation toward each other (Mayer et al., 1995; McAllister, 1995; Wasti et al., 2007). Research has shown that, to develop such personal connections in dispersed teams, companies are well advised to invest in face-to-face meetings, especially at the beginning of a dispersed team project (Malhotra et al., 2007; Monalisa, Daim, Mirani, Dash, Khamis, & Bhusari, 2008). Personal kick-off meetings allow the team members to get to know one another personally, share information, and openly discuss goals, processes, and procedures, thus fostering benevolence (Cohen & Bailey, 1997). During subsequent face-to-face meetings, personal bonds and thus benevolence can further be strengthened (Monalisa et al., 2008). If face-to-face meetings are not possible, managers should invest time in virtual team building (Greenberg et al., 2007; Majchrzak, Malhotra, Stamps, & Lipnack, 2004). Even across distance, exercises that enable team members to get to know each other personally, perhaps even enabling them to find similarities (e.g., asking each member to “interview” a teammate and introduce him/her to the rest of the group via telephone), have a significant influence on team members’ benevolence (Greenberg et al., 2007; Henttonen & Blomqvist, 2005). During the project, team members should be encouraged to express their appreciation for each other’s contributions and to communicate social and emotional information to reach positive and understanding relationships (Greenberg et al., 2007; Monalisa et al., 2008). In addition, a team leader who commemorates the team’s achievement of interim deadlines helps to build positive, common experiences that in turn foster team benevolence (Greenberg et al., 2007). Moreover, personal conflicts should be handled quickly or avoided in the first place through adequate conflict management (Kankanhalli et al., 2006; Tekleab, 2009). Ways to avoid personal conflicts in a dispersed team setting include, for instance, making sure that team members suffer equally from the team’s distribution by rotating meeting times and locations (Malhotra et al., 2007) or avoiding the exclusion of team members by conducting trainings specifically on virtual collaboration (Greenberg et al., 2007).

In contrast to benevolence, which focuses on establishing emotional bonds through positive interactions among team members, integrity-based trustworthiness of team members can be established by behavioral team norms and rules (Cohen & Bailey, 1997; Greenberg et al., 2007; Malhotra et al., 2007; Nemiro, 2004). As dependence and uncertainty is high in

dispersed innovation teams, it should be made clear from the beginning that keeping promises and maintaining consistency between words and deeds are crucial for effective coordination (Gibson & Gibbs, 2006; Monalisa et al., 2008). Because integrity, in terms of reliability, of team members in dispersed team environments is most likely challenged by the context-specific aspects of communication (dependence on electronic means, asymmetry, cultural differences, language barriers, and different time zones), integrity of team members can be especially supported by monitoring communication patterns and establishing communication norms that describe how communication should be carried out (Gibson & Gibbs, 2006; Greenberg et al., 2007; Malhotra et al., 2007; Monalisa et al., 2008; Nemiro, 2004). Specifically, availability and interaction frequency should be agreed upon (e.g., each team member must check his email once per day and respond within two hours) (Nemiro, 2004). Moreover, when reliability is violated, dispersed innovation teams need procedures to repair trustworthiness to secure the willingness for team shared leadership. A possible solution is obtaining an apology and clarification from the unreliable team member (Ferrin, Kim, Cooper, & Dirks, 2007). Such clarification should explicitly state the reasons for not being consistent and be offered soon after the violation had occurred, as this signals that the team member recognizes his or her deviant behavior (Lewicki & Bunker, 1996).

4.6.3 Limitations and Future Research

This study has several limitations that need to be addressed in future research. First, the characteristics of the sample may reduce the generalizability of the results. A transfer of the results to shared leadership development in face-to-face or teams with more standardized tasks might not be possible. Moreover, the sample focused on software project teams because the IT-industry has taken a pioneering role in handling innovative tasks and virtual team collaboration (He, Butler, & King, 2007; Hertel, Konradt, & Orlikowski, 2004; Orlikowski, Hertel, & Konradt, 2004). Although it is not assumed that the results of this research are specific to the task contexts inside software projects, future research to assess whether the present study's findings could be replicated in dispersed innovative task contexts outside the software industry is recommended. Second, the cross-sectional design makes it impossible to ascertain any causal directions. While this research demonstrates relationships, a longitudinal research design would be needed to further the knowledge of causality. Third, this study did not consider team members' propensity to trust since prior studies have shown that propensity to trust is a rather immutable trait that is much less related to trusting behaviors in dispersed team settings than are aspects of trustworthiness

(Aubert & Kelsey, 2003; Colquitt et al., 2007; Gill et al., 2005). Nevertheless, to be consistent with trust theory research and draw a more complete picture for shared leadership research, future studies might want to include aspects of trust propensity. Thereby, such considerations of trust propensity in dispersed team settings should account for the notion that, in contrast to trustworthiness, trust and risk propensity have been argued as highly dependent on culture and nationality in prior research (Grichnik, 2008; Wasti et al., 2007). Fourth, the result that ability-based trustworthiness was not positively related to team shared leadership in this study calls for more research, especially empirically, on this topic. The assumption that the missing relationship is due to the context of dispersed innovation teams should be tested in further empirical studies using samples with a higher variance in terms of ability.

4.7 Conclusion

Organizations are increasingly relying upon team members to accept leadership responsibility, especially in complex and dispersed team settings. This research draws upon data in the form of responses collected from different informants in 96 dispersed real work teams that show that team members' trustworthiness is crucial for team shared leadership to evolve. This study shows that sharing leadership in dispersed team settings can be viewed as a risk-taking, and thus trusting, behavior that team members are more willing to perform if their peers are trustworthy in terms of benevolence and integrity. Surprisingly, ability-based trustworthiness did not affect shared leadership in dispersed innovation teams, calling for according future research to clarify this finding.

4.8 References

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5 Team Reflexivity as an Enabler of Shared Leadership in Dispersed Innovation Teams¹

ABSTRACT

Geographically dispersed innovation teams rely upon committed team members who accept shared leadership responsibility to attain high performance levels. Although this concept of team shared leadership is receiving increasing research attention within the context of dispersed innovation teams, there has hardly been any investigation regarding the antecedents of shared leadership in this context. This paper conceptualizes team reflexivity as important an facilitator of shared leadership in dispersed innovation teams. It is argued that in the complex and constantly changing environment in which dispersed innovation teams must perform, team reflexivity provides the basic opportunity for team shared leadership to occur as it gives team members a clear information basis that makes leadership needs apparent. Furthermore, team role breadth self-efficacy and team empowerment are argued to strengthen team reflexivity's positive effect on team shared leadership as both processes increase team members' motivation to act upon identified leadership needs. Using data collected from 96 dispersed software project teams, this study reveals that team reflexivity is positively related to team shared leadership and that team role breadth self-efficacy and team empowerment positively moderate this relationship.

Key words: Team Shared Leadership, Dispersed Innovation Teams, Team Reflexivity, Team Role Breadth Self-Efficacy, Team Empowerment

¹ This paper was written by Sarah Gehrlein based on conjoint work with Prof. Dr. Martin Hoegl and Dr. Miriam Muethel.

5.1 Introduction

Shared leadership is defined as “a dynamic, interactive influence process among individuals of a group for which the objective is to lead one another to the achievement of group or organizational goals or both” (Pearce & Conger, 2003, p. 1). Team shared leadership can be seen as an emergent team property that results from the distribution of leadership influence across multiple team members (Carson, Tesluk, & Marrone, 2007). Shared leadership is enacted through team members influencing other individual team members or the team as a whole toward team goal achievement (Hoegl & Muethel, 2007). Examples of leadership functions that might be shared include problem solving, performance monitoring (Seibert, Sparrowe, & Liden, 2003), and decision making (Seibert et al., 2003; Shamir & Lapidot, 2003; Yukl, 2006). Above all, shared leadership actions comprise the initiating of information and action flows to revise work strategies of individual team members or the team as a whole for team goal achievement (Hoegl & Muethel, 2007). Thereby, peer followership is an integral part of team shared leadership as team members must not only offer but also accept leadership from other team members (Carson et al., 2007). Shared leadership is considered as crucial for geographically dispersed teams charged with innovative tasks (so-called dispersed innovation teams) as it brings the expertise of all team members to bear. This is needed in such complex projects as it is almost impossible for a single team leader to be an expert on all aspects of work and act as the sole direction-giver on all task-related issues (Burke, Fiore, & Salas, 2003; Pearce, 2004; Pearce & Manz, 2005). In dispersed innovation teams, team shared leadership can also ameliorate the potentially negative impacts of the team leader’s limited social influence resulting from physical distance (Orlikowski, Hertel, & Konradt, 2004; Perry, Pearce, & Sims, 1999) by coordinating, controlling, and focusing teamwork across distance through the use of mutual social influence among team members (Cox, Pearce, & Perry, 2003; Orlikowski et al., 2004). This positive impact of shared leadership on team performance in challenging and dispersed team contexts has been empirically validated in various studies (e.g. Hoch, 2007; Klein, Ziegert, Knight, & Yan, 2006; Pearce, Yoo, & Alavi, 2004).

Despite this relevance of shared leadership in the context of dispersed innovation teams, only a small amount of research exists on the antecedents of team shared leadership in this context (Muethel & Hoegl, 2010). Moreover, in general only a limited amount of empirical research on team shared leadership antecedents and on possible interaction effects within shared leadership development exists (Avolio, Walumbwa, & Weber, 2009; Carson et

al., 2007; Muethel, Gehrlein, & Hoegl, 2009). However, the premises of team shared leadership behavior should be of particular interest when studying shared leadership as employees can hardly be forced to engage in a shared leadership process (Seibert et al., 2003) and might be used to hierarchical structures with strong top-down vertical leadership (Bligh, Pearce, & Kohles, 2006). Moreover, in dispersed team settings in which tasks are complex and dynamic and team members are geographically dispersed, the emergence of team shared leadership is particularly challenged as the identification and evaluation of action needs becomes more difficult (Gibson & Gibbs, 2006).

This research argues that in order to attain high levels of team shared leadership in dispersed innovation teams, team members must be given the opportunity to realize team leadership needs and also motivated to act upon such needs. Team reflexivity, which is the process of team members collectively discussing different opinions and thereby reflecting on how to best handle the team's tasks (Hirst, Mann, Bain, Pirola-Merlo, & Richver, 2004), is argued to help make complex and constantly changing task demands clear and thus provide clear opportunities for team members to realize leadership needs and pursue goal-directed shared leadership actions. Moreover, it is argued that the positive relationship between team reflexivity and team shared leadership is strengthened by the team members' motivation to act upon new insights gained from team reflection and thus engage in even more shared leadership behaviors. First, team role breadth self-efficacy, defined as team members' confidence in carrying out a range of proactive, interpersonal, and integrative activities that extend beyond the prescribed technical core (Parker, Williams, & Turner, 2006), is argued to strengthen the positive relationship between team reflexivity and team shared leadership by providing team members' with the confidence to act upon leadership needs identified through team reflection processes. Such confidence might be especially important in dispersed settings as challenges like language barriers or dependence upon electronic communication means become prevalent (Gibson & Gibbs, 2006). Second, team empowerment, which refers to a heightened team task motivation due to the team members' collective, positive assessments of their team task (Kirkman, Rosen, Tesluk, & Gibson, 2004a), is argued to strengthen the relationship between team reflexivity and team shared leadership by providing team members with an increased care for the team task making leadership needs identified through team reflexivity as being worthwhile to act upon. Such intrinsic motivation has been shown to be particularly important in dispersed teams as

extrinsic motivators (e.g., immediate recognition and feedback) are often missing (Kirkman et al., 2004a).

As such, this article offers several contributions to team shared leadership research. First, this study goes beyond previous research by conceptualizing antecedents of shared leadership in dispersed innovation teams and arguing that shared leadership, especially in this context, needs a clear information basis, provided by team reflexivity and a strong motivational basis, provided by team role breadth self-efficacy and team empowerment, to make use of this clear information basis. Previous research has hardly discussed facilitators of shared leadership context-specifically and has not at all discussed a possible basic interaction between opportunity and motivation. This research newly argues that for team shared leadership to occur, information-based opportunity must be provided (by team reflexivity) and that this opportunity leads to even higher team shared leadership if there are high levels of motivation to act upon identified leadership needs in terms of confidence (through team role breadth self-efficacy) and intrinsic care (through team empowerment) for the team task. Second, by referring to team reflexivity, this research conceptually and empirically introduces a new variable to team shared leadership research. Even though team reflexivity, like shared leadership, is argued as especially important for teams with complex and dynamic tasks (Schippers, Den Hartog, Koopman, & Wienk, 2003; West, 1996, 2000), existing research has not yet proposed a relationship between team reflexivity and team shared leadership. In a complex and dynamic environment, however, team reflexivity is necessary for team shared leadership as goal and team clarity cannot be as easily assumed the same way they can be assumed to have for standardized tasks. Team reflexivity provides the information basis upon which goal-directed mutual influence (i.e., team shared leadership) can be exercised by team members. Third, team role breadth self-efficacy is introduced to team shared leadership literature. Although general remarks on self-efficacy as a facilitator of shared leadership exist (Bligh et al., 2006; Houghton, Neck, & Manz, 2003), previous discussions of this topic failed to define the kind of self-efficacy that could be beneficial for shared leadership and how it could affect team shared leadership. This study provides for the first time conceptual and empirical support for team role breadth self-efficacy as a positive moderator between team reflexivity and team shared leadership. Fourth, although team empowerment has been briefly noted in prior research as a possible enabler of shared leadership (Carson et al., 2007), team empowerment has not yet been discussed in detail as being positive for team shared leadership. This study provides

conceptual and empirical support for the importance of team empowerment as it increases the effectiveness of team reflexivity and thus fosters team shared leadership.

Finally, team reflexivity research is also enhanced as for the first time team reflexivity is considered against the specific background of dispersed team settings (in contrast to complex environments in general) (West, 1996, 2000), discussed as relating to a behavioral team process (such as shared leadership) as opposed to linking it to team performance (Carter & West, 1998; Hoegl & Parboteeah, 2006; Schippers et al., 2003) and shown to have increased effectiveness under the presence of high levels of team role breadth self-efficacy and team empowerment.

The discussion below begins with an illustration of the conceptual framework of this study. Then, the positive relationship between team reflexivity and team shared leadership is elaborated upon, followed by a discussion of team role breadth self-efficacy and team empowerment as positive moderators of this relationship. Afterwards, all hypotheses will be tested against the background of dispersed innovation teams using a real work sample of 96 dispersed software teams.

5.2 Theory and Hypotheses

5.2.1 Conceptual Framework

Figure 5-1 shows the conceptual framework of this study. Team reflexivity is argued as an antecedent of team shared leadership in dispersed innovation teams. Team role breadth self-efficacy and team empowerment are discussed as positive moderators of this relationship.

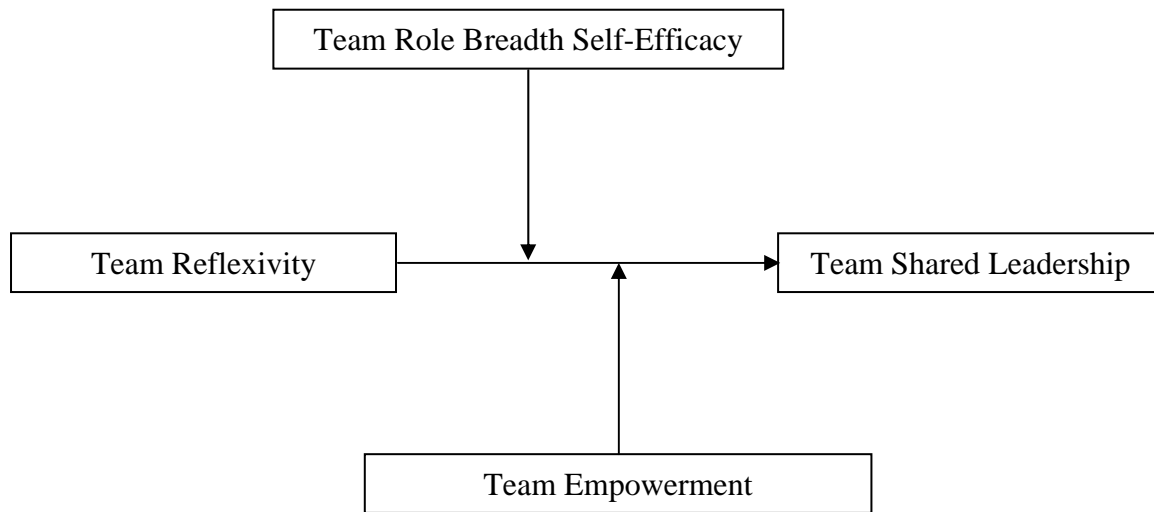


Figure 5-1: Conceptual Framework of this Research

5.2.2 Team Reflexivity

West (1996, 2000) identified team reflexivity as an important determinant of team effectiveness and defined it as the “extent to which team members collectively reflect upon the team’s objectives, strategies, and processes, as well as their wider organizations and environments, and adapt them accordingly” (West, 2000, p. 3).² Team reflexivity is based on the notion of a changing environment in which constant reflection is needed to assess current circumstances and apply the best action accordingly (Hoegl & Parboteeah, 2006). Consequently, team reflexivity is especially important for teams, like dispersed innovation teams (Gibson & Gibbs, 2006), charged with complex and dynamic tasks (Schippers et al., 2003; West, 1996, 2000). Such teams are more likely to succeed if they continually engage in open discussions about what they are doing, how they are doing it, and how well they do in terms of achieving their team goal (Carter & West, 1998). Empirical studies have confirmed such positive effects of team reflexivity in innovative team environments. Team

² Like most studies this examination treats team reflexivity as unidimensional and with a clear focus on reflection processes. Nevertheless, it can also be seen as consisting of at least two different components: reflection and according adaption (West, 2000; Schippers, Den Hartog, & Koopman, 2007). Yet, existing and widely accepted measures of team reflexivity (e.g., Carter & West, 1998; West, 2000) show that such adaption processes are always collective and rather cognitive (e.g., a team modifies its objectives) and thus are clearly differentiated from ongoing individual team member actions like team shared leadership.

reflexivity has been found to be positively related to performance in television production teams (Carter & West, 1998), research and development teams (Hirst & Mann, 2004; Les Tien-Shang, 2008), and software development teams (Hoegl & Parboteeah, 2006). In contrast to shared leadership, team reflexivity does not result from the ongoing individual behavior of team members, but rather from the collective behavior of the whole team at certain points in time via, for instance, face-to-face team meetings or electronic conferencing (West, 2000). Moreover, reflection processes are defined in terms of cognitive considerations and planning (West, 2000) and, in contrast to team shared leadership, not in terms of team members' goal-directed actions such as influence and followership.

Team reflexivity is argued to be related to a variety of outcomes, such as team communication (Hoegl & Parboteeah, 2006) and team creativity (Les Tien-Shang, 2008; West, 2000). Most notably though, reflexive teams are argued to show a greater awareness of their team objectives (Schippers, DenHartog, & Koopman, 2007). Accordingly, empirical research has shown that team reflexivity is positively related to the clarity of a team's goal (Carter & West, 1998). This is probably even more true for dispersed innovation teams as such teams have more difficulties in establishing a clear direction due to constantly changing task demands (Gibson & Gibbs, 2006), communication difficulties, missing contextual information, and unevenly distributed information (Cramton, 2001). Reflection allows team members to develop a new and clear meaning regarding their team goal, making it easier for them to identify the necessary steps to and problems of team goal attainment and therefore enabling proactive leadership behaviors like proposing new work approaches and sharing ideas on problem solutions (Hirst & Mann, 2004; Hoegl & Parboteeah, 2006; Johnson & Johnson, 2009; West, 1996). Hence, this study argues that by making action needs for team goal accomplishment apparent, team reflexivity in dispersed innovation teams enables goal-directed behaviors, such as shared leadership, of all team members. This argument also integrates well with goal setting theory, which argues that team members can only pursue goal-relevant activities, such as shared leadership, when goals are clear (Latham, 2004; Latham & Locke, 2009; Locke & Latham, 2002). Also based on goal setting theory, it can be argued that team reflexivity enhances the meaningfulness of the team goal experienced by team members as goal understanding is more complete (Kirkman & Rosen, 1999) and time is spent discussing the teams objectives. This further increases team goal commitment (Johnson & Johnson, 2009; Latham & Locke, 2006; Locke & Latham, 2002) and thus the likelihood of shared leadership actions toward team goal attainment. Accordingly, Carter and

West (1998) found team reflexivity to be positively correlated with high team task orientation.

In addition to a clearer goal, team reflexivity might also lead to a better information basis regarding various team issues (Les Tien-Shang, 2008; Schippers et al., 2007) and thus shared mental models among team members (Cannon-Bowers, Salas, & Converse, 1993; Klimoski & Mohammed, 1994), which are also harder to attain for dispersed teams (Cramton, 2001, 2002). As such, team reflexivity might establish a common understanding of, for instance, team members' abilities. Such shared mental models, in turn, are likely to enhance shared leadership as they enable team members to predict shortcomings and needs of others (Cannon-Bowers et al., 1993; Edwards, Day, Arthur, & Bell, 2006; Klimoski & Mohammed, 1994), form common expectations on social interactions (Edwards et al., 2006; Lim & Klein, 2006), and coordinate activity with one another successfully (Cannon-Bowers et al., 1993; Klimoski & Mohammed, 1994; Lim & Klein, 2006). In particular, a shared understanding of each other's expertise provides team members with the ability to realize when and by whom their guidance is needed and when instead followership is appropriate (Faraj & Sproull, 2000; He, Butler, & King, 2007). Accordingly, Burke et al. (2003) argue that shared mental models enhance shared leadership by guiding team members in determining who needs to be approached for shared leadership and when leadership needs to be shared (Burke et al., 2003). Specifically, in terms of followership Pearce and Conger (2003) note that "without similar mental models, it seems unlikely that team members would be able to accurately interpret influence attempts within the team, and the potential effectiveness of shared leadership would be seriously limited" (p. 12). While several authors noted a possible positive relationship between shared mental models and shared leadership (e.g., Burke et al., 2003; Muethel & Hoegl, 2010; Pearce & Conger, 2003), Carson, Tesluk, and Marrone (2007) empirically found a positive relationship between the construct of "internal team environment," which comprises a shared understanding of the teams' tasks and issues, and team shared leadership.

In sum, team reflexivity primarily provides the opportunity for team shared leadership by extending the team members' information basis and enabling leadership as well as followership needs to become clear. This concept integrates with the notion proposed by Hoegl and Muethel (2007) that the identification of action needs is a necessary premise for shared leadership behaviors to occur. Through team reflexivity, team members get a sense of what needs to be done, even in the uncertain and complex environment of dispersed

innovation teams. Without such a clear and shared picture of the team goal and various team-related issues, goal-directed mutual influence (i.e., shared leadership) can hardly be pursued effectively by team members. Hence, it is proposed:

Hypothesis 1: Team Reflexivity positively relates to Shared Leadership in Dispersed Innovation Teams.

5.2.3 Team Role Breadth Self-Efficacy

Self-efficacy relates to “judgments of how well one can execute courses of action required to deal with prospective situations” (Bandura, 1982, p. 122). Thereby, self-efficacy is specific not to a situation (e.g., work environment vs. personal relationships) but rather a task, as it relates to one’s belief in his or her own capability to perform a specific task (Bligh et al., 2006; Galperin, 2005; Parker, 2000; Parker et al., 2006). Self-efficacy is a major component of Bandura’s (1982, 1988) social cognitive theory and is seen as a basic motivation for individual behavior (Harrison, Rainer Jr, Hochwarter, & Thompson, 1997; Locke & Latham, 2004; Stajkovic, 2006). According to social cognitive theory, individuals are motivated to act if they believe they will be in control of their actions and the likelihood of success is high (Bandura, 1989; Parker et al., 2006). Individuals who demonstrate strong self-efficacy are more likely to undertake challenging tasks, exert greater effort, persist longer, and perform more successfully than those who demonstrate weak self-efficacy (Bandura, 1982; Grichnik, 2008; Harrison et al., 1997; Wood & Bandura, 1989).

Extending previous research (Bligh et al., 2006; Houghton et al., 2003) that did not specify self-efficacy beliefs as an antecedent of shared leadership or discuss a possible moderator role, this research argues that in particular team members’ role breadth self-efficacy is important for team shared leadership as it positively moderates the relationship between team reflexivity and team shared leadership. Using role theory (Ilgen & Hollenbeck, 1991) as a basis, team role breadth self-efficacy displays the extent to which members of a team feel confident in performing broader work roles (Galperin, 2005; Parker et al., 2006). It describes the degree to which team members believe that they are able to carry out a broader set of work tasks that extend beyond their prescribed technical work requirements (Parker, 1998). Thus, it specifically refers to the confidence of carrying out proactive, integrative, and interpersonal tasks (Parker, 1998). Examples of such tasks include solving long-term problems and contacting people outside of the company (e.g., customers and suppliers) (Parker, 1998, 2000). Within a dispersed team context, role breadth self-efficacy is

especially interesting to look at as it is not a trait-like belief but rather a judgment specific to one's situation and context (Parker et al., 2006). Geographical dispersion probably challenges high levels of role breadth self-efficacy, thus role breadth self-efficacy might be an even more important variable for shared leadership development in dispersed innovation teams. Team members in dispersed innovation teams face other team members with whom they are less familiar and from whom they are sometimes culturally different (Gibson & Gibbs, 2006). This might influence one's role breadth self-efficacy as expectations are not clear (Watson & Kumar, 1992). Moreover, language barriers and the dependence upon electronic means might lead to team members being insecure about their capabilities to extend their traditional work role (Gibson & Gibbs, 2006).

Parker (2000) proposed that individuals who define their role broadly feel responsible for extended goals and will be more motivated to engage in proactive and flexible behaviors that help to achieve these extended goals. Thus, applied in a team context, team members with high role breadth self-efficacy will likely view the team's common goal as such an extended and aspired goal, while team members' with low role breadth self-efficacy will likely focus solely on their individual and traditional tasks. Accordingly, Griffin, Neal, and Parker (2007) found role breadth self-efficacy to be positively related to not only individual task proactivity, but also team role proactivity. Team role proactivity reflects the extent to which an individual engages in self-starting, future-directed behavior to change a team's situation or the way the team works as a whole (Griffin et al., 2007). Thus, team role breadth self-efficacy leads to an expansion of a team member's traditional work role toward a team-orientated work role. Such a team-orientated work role, in turn, increases the effects of team reflexivity as team members are more willing to act upon identified team needs. In fact, it is argued that the positive effects of team reflexivity are particularly strong when team role breadth self-efficacy is high. While team reflexivity primarily increases team members' cognitive awareness of what needs to be done, role breadth self-efficacy increases team members' motivation to accept their new role as leaders, by providing them with a high belief of what they can do. This motivation, provided by team role breadth self efficacy, thus augments the positive team reflexivity effects on team shared leadership as team members feel competent to act upon team problems, environmental changes, and team needs identified through team reflexivity. If team members feel more comfortable in their ability to approach one another and conduct a fruitful and goal-directed interaction, then the mere awareness of leadership needs (derived from team reflexivity) is more likely to result in a higher intensity

of peer influence in the team (i.e., shared leadership behaviors). In contrast, without the according role breadth self-efficacy, team members might realize leadership needs but sometimes still rely on a strong vertical leader to step in and fix identified problems. Thus, with team role breadth self-efficacy, the relationship between team reflexivity and team shared leadership becomes even stronger. Moreover, in terms of peer followership aspects, high team role breadth self-efficacy might lead to a generally positive attitude towards a proactive and role-expanding work atmosphere in the team, which would also necessarily comprise accepting the influence of other peers. In this respect, Homans (1961, p. 286) noted that “influence over others is purchased at a price of allowing one’s self to be influenced by others.”

In sum, it is argued that team role breadth-self efficacy makes the positive effect of team reflexivity on team shared leadership even stronger as it leads to an increased motivation of team members to implement necessary team goal-directed actions, identified through team reflexivity, due to high levels of confidence regarding such role-extending behaviors. Hence, it is proposed:

Hypothesis 2: Team Role Breadth Self-Efficacy positively moderates the Relationship between Team Reflexivity and Shared Leadership in Dispersed Innovation Teams.

5.2.4 Team Empowerment

This study argues that psychological team empowerment fosters team shared leadership through strengthening the positive effects of team reflexivity on team shared leadership. Psychological empowerment contrasts with structural empowerment, which focuses on managerial practices of sharing power with employees and leads to high levels of team autonomy or self-management (Chen, Kirkman, Kanfer, Allen, & Rosen, 2007; Conger & Kanungo, 1988). Psychological empowerment, in contrast, has its roots in the quality of work life and is defined in terms of beliefs that employees have about their work (Spreitzer, 2007). Psychological empowerment is an “increased task motivation resulting from an individual's positive orientation to his or her work role” (Kirkman & Rosen, 1999, p. 58). On a team level, empowerment is an emergent state whereby team members experience heightened levels of intrinsic task motivation based on a collective positive view of the team task (Carson et al., 2007; Chen et al., 2007; Kirkman et al., 2004a; Ziegert, 2009). Thus, team empowerment represents team members’ assessments of their collective team task

(Kirkman et al., 2004a). Team empowerment is conceptualized as having four facets (Kirkman & Rosen, 1999; Kirkman, Tesluk, & Rosen, 2001). As such, empowered teams developed a sense of: meaningfulness, the extent to which team members value their team task as being meaningful due to a fit between the needs of the team task and their personal beliefs, values, and behaviors; potency, the team members' confidence in the general and collective ability of the team as a whole; autonomy, the degree to which team members think that they as a team have control over important decisions; and impact, the extent to which team members feel that their team task makes a significant organizational contribution (Kirkman & Rosen, 1999, 2000; Kirkman et al., 2004a; Spreitzer, 1996). These dimensions are mutually reinforcing (Kirkman & Rosen, 1999, 2000) and combine additively (Kirkman et al., 2004a; Spreitzer, 1996). For example, when team members experience potency, they are also more likely to desire higher autonomy (Kirkman & Rosen, 2000). And if a team believes it can make an impact but does not feel like it has the skills and abilities to perform the team task, it will feel less empowered (Spreitzer, 2007). It should be noted that it is the team members' perception of their working environment rather than some objective reality that shapes team empowerment (Spreitzer, 1996). In general, the argumentative basis of psychological empowerment is closely related to intrinsic motivation theories like Herzberg's theory of "motivators" (Herzberg, 1968, 2003) and Hackman's job characteristics theory (Hackman & Oldham, 1980).

Psychological team empowerment is an interesting variable to look at as it provides team members with a strong team orientation and a strong willingness to act on behalf of the team. Such a behavior motivating effect is underpinned by research. Through team empowerment, team members are argued to seek the continuous improvement of team processes (Burke et al., 2003) and respond with higher levels of effort toward their team task (Kirkman et al., 2004a; Spreitzer, 1995). Team empowerment is also positively associated with trust among team members and acceptance of guidance from fellow team members (Bligh et al., 2006; Kirkman et al., 2004a). Empirical studies have found positive relations of psychological team empowerment with team productivity, team commitment, and innovative team behaviors (Kirkman & Rosen, 1999, 2000; Kirkman et al., 2004a; Kirkman, Tesluk, & Rosen, 2004b; Mathieu, Gilson, & Ruddy, 2006). Such team task-oriented behaviors and efforts on behalf of the team are, in turn, crucial for team shared leadership processes. While team reflexivity may to a large extent provide the possibility to realize leadership needs and what should be done for team goal attainment, it can be argued that team empowerment,

similar to role breadth self-efficacy, is additionally needed to further activate team members' motivation to act upon such identified needs. Team empowerment produces the kind of intrinsic team task orientation that encourages team members to put into practice the leadership needs identified through team reflexivity and thus enhances the positive effects of team reflexivity on shared leadership. Without team empowerment team members might realize leadership needs through team reflexivity and have some motivation, but they still might lack enough reason to act upon the identified needs due to their perception of the team task as not being important enough for them to exert effort upon. Thus, the generally positive effects of team reflexivity are particularly strong when team empowerment and thus intrinsic care for the team task is high.

Thereby, this study agrees with Kirkman, Rosen, Tesluk and Gibson (2004a) that team empowerment is especially critical for behavioral processes in geographically dispersed teams as extrinsic motivators (e.g., immediate recognition and feedback) are likely missing. Accordingly, their empirical analysis showed that team empowerment was significantly positively related to team process improvement activities, like feedback seeking to improve work processes, in teams with high dispersion and was not related to team process improvement activities in teams that often met face-to-face (Kirkman et al., 2004a). This emphasizes the importance of team empowerment for shared leadership processes in dispersed innovation teams. Hence, it is proposed:

Hypothesis 3: Team Empowerment positively moderates the Relationship between Team Reflexivity and Shared Leadership in Dispersed Innovation Teams.

5.3 Methods

5.3.1 Data Collection

To test the proposed hypotheses, a survey of real work teams in several companies was conducted. Participating companies each produced a list of team projects and provided the names and contact information of team leaders. Team leaders were asked to complete a pre-defined spreadsheet with descriptive details about the project and all team members. In addition, telephone interviews were used to ensure that “real teams,” or “core teams,” in which team members were adequately interdependent had been selected. Consequently, a group was only regarded as a “team” if all identified team members collaborated regularly on one common task and were not assigned to independent work packages or several sub-

teams charged with different tasks. The latter requirement was very important for the present study, as it became apparent that software projects are frequently organized in multi-team projects. For such multi-team projects, each sub-team could participate separately in the study as long as independent evaluations were possible and a clear team identity existed (i.e., each sub-team had its own name and clear boundaries with other sub-teams). For each project team, the team leader and team members were contacted via email and asked to complete an online questionnaire. This questionnaire was preceded by a front page that explained the fundamentals of the questions to follow and ensured the confidentiality of all responses. Additionally, this front page identified the name of the team project on which the recipients would be questioned and the names of the team leader and team members who had been involved. This information should ensure that all the participants were clear about the project to which the subsequent questions referred and help them to recall their project experiences as well as possible. The questionnaire was administered in German and English. Respondents' participation in this study was strictly voluntary.

5.3.2 Sample

To obtain teams to participate in the study, software companies and companies with large IT-departments were addressed. In the end, 96 geographically dispersed software project teams from 36 different companies could be acquired. Project tasks ranged from new software developments to complex software roll-outs and software customizations. Only software projects that had been completed within 22 months prior to data collection were included in the study. Each team was geographically dispersed across at least two different sites of a company. In fact, 49 teams were dispersed across two sites, 27 teams were dispersed across three sites, 11 teams were dispersed across four sites, and 9 teams were dispersed across five or more sites. The maximum number of sites across which an individual team was dispersed in this research was seven. The average size of a team (including the team leader) was 8.3 employees (median = 7, standard deviation = 4.1). Data was gained from 100% of all team leaders and 48% of all team members. Thus, on average, 3.5 team members plus the team leader responded for each team. Overall, analyses are based on a total of 96 team leader responses and 337 team member responses. On average 16.8 % of each team were female employees.

5.3.3 Measures

All constructs considered in this investigation refer to the team as the unit of analysis and were assessed using multiple questionnaire items. Nearly all items were drawn from published scales and all latent construct items were anchored as 1, “strongly disagree” to 5, “strongly agree.” To avoid a possible common source bias, data from different respondents were used to measure the different variables. Team shared leadership was rated by team members. Measures of team reflexivity, team role breadth self-efficacy, and team empowerment were derived from team leader judgments. Table 5-1 shows all latent construct items used in this study.

Variable	Items
Team Shared Leadership	<p>All team members considered not only their own sphere of work, but also how the entire team task unfolded.</p> <p>All team members exerted effort to understand task interrelationships.</p> <p>All team members initiated actions to bring out improved procedures for the team.</p> <p>All team members proactively made constructive suggestions for improving how things operate within the team.</p> <p>All team members actively attacked problems.</p> <p>All team members positively reacted to suggestions from other team members.</p> <p>All team members asked other team members for advice.</p>
Team Reflexivity	<p>Team members often collectively reviewed the team's objectives.</p> <p>The methods used by the team to get the job done were often collectively discussed by the team members.</p> <p>Team members regularly collectively discussed whether the team is working effectively together.</p> <p>Team members often collectively reviewed the team's approach to getting the job done.</p> <p>How well the team communicates information was often collectively discussed by the team members.</p>
Team Role Breadth Self-Efficacy	<p>Team members felt confident presenting information.</p> <p>Team members felt confident helping to set targets in their own work area.</p> <p>Team members felt confident designing new procedures for their own work.</p> <p>Team members felt confident contacting people outside the team (e.g., customers) to discuss problems.</p> <p>Team members felt confident analyzing a long-term problem to find a solution.</p>
Team Empowerment	<p>Team members had confidence in themselves as a team.</p> <p>Team members believed they could get a lot done as a team when they worked hard.</p> <p>Team members believed that the team's work was significant.</p> <p>Team members felt that the team tasks were worthwhile.</p> <p>Team members felt they could select different ways to do the team's work.</p> <p>Team members felt that they determined how things were done in the team.</p> <p>Team members believed they performed a team task that mattered to this company.</p> <p>Team members believed the team made a difference in the organization.</p>

Table 5-1: Items Used in this Research

Team Shared Leadership. Shared leadership was measured with a seven-item measure based on the conceptual work by Hoegl and Muethel (Hoegl & Muethel, 2007; Muethel & Hoegl, 2010). Confirmatory factor analysis suggested good fit (NFI = .92, CFI = .94, RMSEA = .066). A sample item is, “All team members proactively made constructive suggestions for improving how things operate within the team.” The seven indicators judged by the team members revealed good internal consistency (Cronbach’s alpha = 0.83). To ensure that aggregation of data from team members to create team data was appropriate, inter-team-member agreement and reliability measures for team shared leadership were assessed. While $r_{(wg)(j)}$ was .93 (James, Demaree, & Wolf, 1984, 1993), ICC (1) was .33, and ICC (2) was .82 (McGraw & Wong, 1996). Thus, the aggregation of individual-level data was justified (LeBreton & Senter, 2008). Team member data on team shared leadership was aggregated by calculating the arithmetic mean.

Team Reflexivity. Team reflexivity was measured using a shortened version of Carter and West’s (1998) team reflexivity scale. This measure has been widely used and has shown good reliability in various contexts (Carter & West, 1998; De Dreu, 2002; Hirst & Mann, 2004; Hirst et al., 2004; Schippers et al., 2007; Swift & West, 1998). A sample item is, “Team members regularly collectively discussed whether the team is working effectively together.” The five items judged by the team leader revealed good consistency (Cronbach’s alpha = 0.82).

Team Role Breadth Self-Efficacy. Team role breadth self-efficacy was assessed using the five highest loading items of Parker et al.’s (2006) measure of role breadth self-efficacy. This measure has been used in several studies and has shown good consistency (Galperin, 2005; Griffin et al., 2007; Parker, 2000; Parker et al., 2006; Rafferty & Griffin, 2006). The measure had to be adapted to the team level so that team members could be asked how confident the members of their team felt carrying out a range of proactive, interpersonal, and integrative tasks. A sample item is, “Team members felt confident helping to set targets in their own work area.” The five indicators judged by the team leader revealed good consistency (Cronbach’s alpha = 0.83).

Team Empowerment. Team empowerment was assessed with a shortened version of Kirkman et al.’s (2004a) measure of team empowerment that included two items for each dimension of team empowerment. This measure was used by Kirkman et al. (2004a) to measure team empowerment in a virtual team context and showed good reliability of 0.93 in

a sample of 35 dispersed teams. A sample item is, “Team members believed they performed a team task that mattered to this company.” The eight items judged by the team leader revealed good consistency (Cronbach’s alpha = 0.85).

Control Variables. Several control variables were used that are theoretically relevant to the hypothesized relationships. These are team size, project length, number of sites, and gender. All these variables have been identified as either potential inhibitors or facilitators of shared leadership (e.g., Conger & Pearce, 2003; Cox et al., 2003; Pearce & Sims, 2000) and were provided via the pre-defined spreadsheet with descriptive team details that team leaders filled out.

Team size was defined as the number of team members plus the team leader in a team. The size of a project team is an important structural variable within all team studies as it has the potential to influence various collaborative team processes (Hoegl & Parboteeah, 2006). Some shared leadership researchers have argued that team size might be positively related to shared leadership due to a greater availability of potential leadership resources (Conger & Pearce, 2003; Cox et al., 2003; Pearce & Sims, 2000; Seers, Keller, & Wilkerson, 2003). On the other hand, shared leadership should become more difficult in larger teams as team interaction processes are hindered and familiarity decreases (Carson et al., 2007; Conger & Pearce, 2003; Cox et al., 2003; Pearce & Sims, 2000; Perry et al., 1999; Seers et al., 2003; Ziegert, 2005).

It was also controlled for project length, which was assessed in terms of months from the beginning of the team’s work until its conclusion. This variable was considered because several researchers have concluded that shared leadership might take time to develop and thus be positively associated with a team’s maturity (Cox et al., 2003; Mayo, Meindl, & Pastor, 2003; Pearce & Sims, 2000; Perry et al., 1999). Nevertheless, Conger and Pearce (2003) also point to the possibility that during long projects the chance for single, dominant emergent leaders might be higher.

By including the number of sites for each team as a control variable, this research allows for the fact that geographical dispersion is a continuous construct (Carte, Chidambaram, & Becker, 2006; Hoegl & Proserpio, 2004; Zigurs, 2003) and controlled for differences that might result within dispersed teams from different levels of dispersion. Teams dispersed across only two sites might behave differently than teams dispersed across

many more sites. As described above, each team included in the sample was dispersed across a minimum of two sites and a maximum of seven sites.

Gender was measured using the female ratio for each team. Gender is an important indicator of a team's demographic heterogeneity, which has shown crucial effects on team outcomes in previous research (Kirkman et al., 2004a). Specifically gender is also hypothesized affect shared leadership, even though researchers do not yet agree upon a direction. Some researchers argue negative effects of gender diversity due to the generally negative implications of dissimilarities and resulting conflicts within a team (Mayo et al., 2003; Perry et al., 1999; Seers et al., 2003), while other researchers propose positive effects due to positive variety and creativity implications (Conger & Pearce, 2003; Cox et al., 2003; Pearce & Sims, 2000).

5.3.4 Analytical Procedures

To test the proposed hypotheses, hierarchical multiple regressions were used (Aiken & West, 1991; Cohen, Cohen, West, & Aiken, 2003). The significance of the proposed interaction effects was assessed after all control variables and main effects had been entered, using the significance level (p-value) of the interaction term as the key indicator for moderation (Baron & Kenny, 1986). To reduce multicollinearity between the interaction terms and original variables, a mean centering procedure was applied and only one interaction term per model was considered (Aiken & West, 1991). Table 5-2 provides the descriptive statistics and correlations of the used variables. Table 5-3 reports the results of the regression analyses, with columns numbered model 2-4 referring to the three hypotheses and column/model 1 only including the controls. As the correlation matrix shows several significant correlations, the variance inflation factor was calculated for all models to check for potential multicollinearity. The highest value identified across all models refers to team empowerment in model 4 and amounts to 2.16. Thus, values are within an acceptable range (Cohen et al., 2003).

Variables	Mean	SD	1	2	3	4	5	6	7
(1) Team Size	8.27	4.09							
(2) Project Length	14.42	9.47	-.02						
(3) Number of Sites	2.86	1.19	.31**	.11					
(4) Female Ratio	0.17	0.19	.10	.05	.10				
(5) Team Reflexivity	3.21	0.82	.08	-.01	-.05	.04			
(6) Team Role Breadth Self-Efficacy	3.75	0.73	.13	.16	.21*	.05	.41**		
(7) Team Empowerment	3.97	0.66	.07	.16	.11	.05	.63**	.55**	
(8) Team Shared Leadership	3.89	0.34	-.13	-.07	.08	.16	.23*	.19 ⁺	.23*

Note: ⁺p < .10; *p < .05; **p < .01.

Table 5-2: Descriptive Statistics and Correlations (N = 96 Teams)

5.4 Results

Looking at hypothesis 1 in model 2, a positive relationship between team reflexivity and shared leadership could be found, therefore, hypothesis 1 is confirmed. Hypothesis 2 states that this effect of team reflexivity is conditional upon team members’ role breadth self-efficacy. In support of this hypothesis, model 3 in table 5-3 shows that the interaction term for team role breadth self-efficacy is significant. To understand the form of the interaction, simple slope analyses were performed. These analyses showed that team reflexivity has a slightly negative relationship with shared leadership at low levels of team role breadth self-efficacy. At high levels of team role breadth self-efficacy, by contrast, the relationship between team reflexivity and shared leadership is strongly positive. The findings show that an increase in team role breadth self efficacy strengthens the general positive effects of team reflexivity. This is illustrated in figure 5-2. Hypothesis 3 was also supported. Model 4 in table 5-3 shows a significant interaction term for team empowerment and figure 5-3 provides

the interaction plot. Again, the relationship between team reflexivity is rather negative at low levels of team empowerment but is strongly positive when team empowerment is high. This proves that high team empowerment strengthens the general positive effects of team reflexivity. Regarding control variables, model 1 shows that only team size had a marginally significant and negative relationship with shared leadership. This implies that shared leadership behaviors might occur more often in small teams.

Variables	Model 1	Model 2	Model 3	Model 4
Team Size	-.18 ⁺	-.21 ⁺	-.24*	-.24*
Project Length	-.10	-.10	-.12	-.14
Number of Sites	.13	.15	.15	.14
Female Ratio	.17	.16	.18 ⁺	.17 ⁺
Team Reflexivity		.24*	.21 ⁺	.20
Team Role Breadth Self-Efficacy			.16	
Team Reflexivity x Team Role Breadth Self-Efficacy			.21*	
Team Empowerment				.23 ⁺
Team Reflexivity x Team Empowerment				.25*
R ²	.07	.12	.18	.19
R ² adjusted	.03	.08	.11	.12
R ² change upon entering interaction	/	.06*	.04*	.05*
F	1.62	2.56*	2.70*	2.91**

Note: ⁺p < .10; *p < .05; **p < .01. Dependent variable: Team Shared Leadership. Independent Variables were centered before entering into the Models. Table shows standardized Beta-Coefficients.

Table 5-3: Regression Analysis predicting Team Shared Leadership (N = 96 Teams)

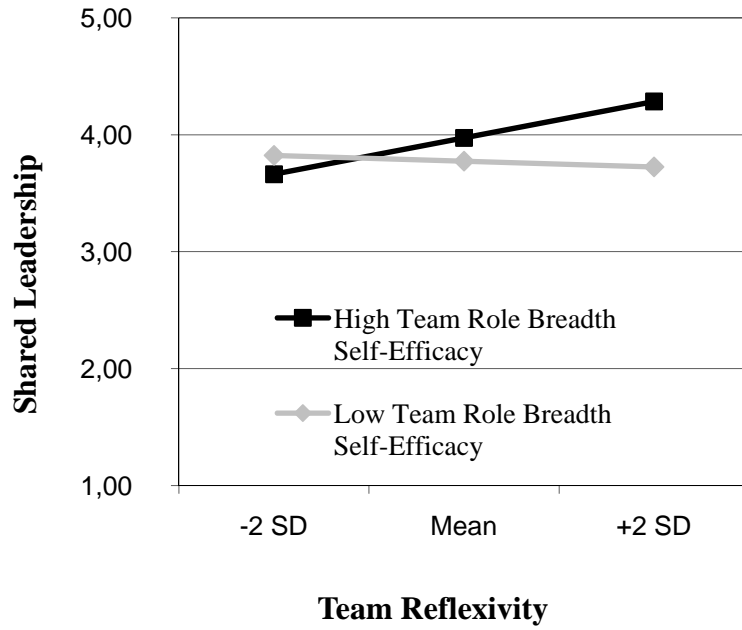


Figure 5-2 : Team Role Breadth Self-Efficacy as a Moderator

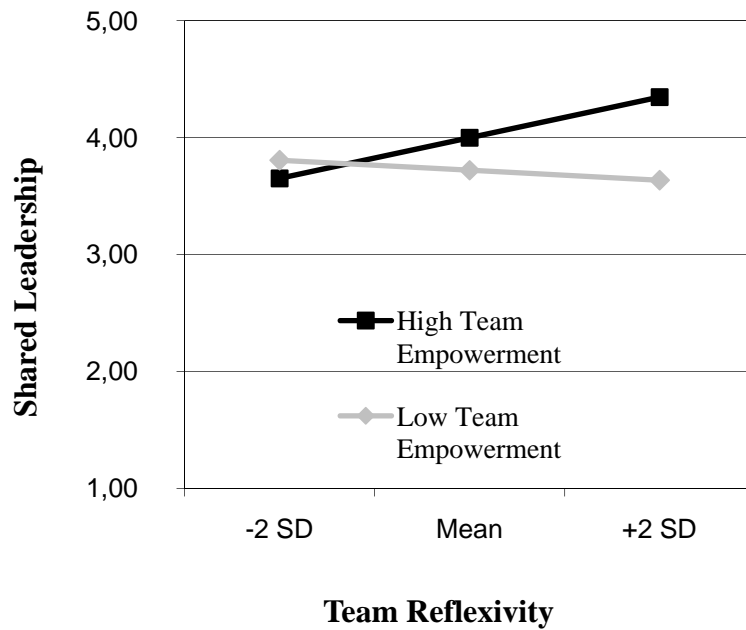


Figure 5-3: Team Empowerment as a Moderator

5.5 Discussion

In sum, the proposed model was confirmed. In the present sample of 96 dispersed software teams, the positive effects of providing a clear opportunity for team shared leadership through team reflexivity were particularly strong when team members had high levels of motivation to act upon identified team needs in terms of confidence for team goal related behaviors, through team role breadth self-efficacy, and in terms of intrinsic care for the team task, through team empowerment. Looking at the interaction effect of team role breadth self-efficacy, the interaction plot shows that at low levels of team role breadth self-efficacy, team reflexivity might even be negatively related to team shared leadership. This implies that team members with low role breadth self-efficacy who experience an increasing need for action through team reflexivity might rather want to rely on the vertical leader to take over an active leadership role, as these team members might feel that any shared leadership related behaviors are beyond their capabilities. A similar argumentation might hold for team empowerment. As they gain clarity on task and team needs through team reflexivity, team members who are not intrinsically motivated for the team task do not consider it to be their task to step in and take over responsibility and thus increasingly want their team leader to do so. Even though this is comprehensible, further probing of the interaction according to Hayes and Matthes (2009) showed that the negative slopes for low team role breadth self-efficacy and low team empowerment were not significant, whereas the slopes for high team role breadth self-efficacy and high team-empowerment were significant at a $p < .05$ significance level (team role breadth self-efficacy: $\beta = .16$, $p = .01$; team empowerment: $\beta = .17$, $p = .02$). This shows that team reflexivity in combination with high team role breadth self-efficacy or team empowerment is highly related to team shared leadership development, while low levels of these motivational constructs lead to no significant relationship between team reflexivity and shared leadership. This indicates that rather than having a negative relationship, team reflexivity instead has no predictive relationship with team shared leadership at low levels of team role breadth self-efficacy or team empowerment. But at higher levels of these motivational constructs, team reflexivity acts as facilitator for shared leadership in dispersed innovation teams. In sum, this supports the positive moderation effect of team role breadth self-efficacy and team empowerment and thus the importance of these processes for the effectiveness of team reflexivity in dispersed innovation teams.

5.5.1 Theoretical Implications

This research extends previous team shared leadership research by conceptually and empirically introducing new variables into team shared leadership literature, namely, team reflexivity, team role breadth self-efficacy, and team empowerment. This research demonstrates that concepts like team reflexivity, team role breadth self-efficacy, and team empowerment that are based on the notion of complex task environments (West, 1996, 2000), changing work roles (Parker, 2000), and dispersed team settings (Kirkman et al., 2004a) should be considered in shared leadership research, especially in research on shared leadership in dispersed innovation teams (Hoegl & Muethel, 2007; Pearce, 2004). Hence, in addition to extending research on shared leadership emergence, this study especially extends context-specific research on shared leadership. Specifically, in the context of dispersed innovation teams, team reflexivity is argued as crucial for team shared leadership as in such teams a clear and constant information basis upon which influence can be exercised is non-existent, thus, regular reflection on team goals, the team, and its environment is needed for effective goal-directed mutual influence. Moreover, such positive effects of team reflexivity on team shared leadership can be increased by high levels of team role breadth self-efficacy, which are especially important in dispersed teams due to increased the role requirements resulting from physical distance and cultural differences, and by high levels of team empowerment, which are especially important in dispersed teams that might be missing other mechanisms, like immediate feedback, for regulating behavior (Kirkman et al., 2004a). Moreover, this work points to the importance of interaction effects within team shared leadership emergence, which has only barely been considered before by shared leadership researchers (Carson et al., 2007; Muethel et al., 2009). Team role breadth self-efficacy and team empowerment were identified as moderators of the relationship between team reflexivity and team shared leadership. In particular, the interplay of processes that provide cognitive task-related opportunities for shared leadership, like team reflexivity, with additional motivational processes that leverage the positive effects of a clear information basis, like team role breadth self-efficacy and team empowerment, is theoretically interesting for shared leadership research. This study implies that future research should take a closer look at possible interaction effects within shared leadership development processes especially in terms of opportunity and according motivational moderators.

In terms of self-efficacy, this study extends previous notions on the positive effects of confident team members on the enactment of shared leadership (Bligh et al., 2006; Houghton

et al., 2003). By being more specific on the concept of self-efficacy, it could be shown that specifically role theory aspects are important for shared leadership in dispersed innovation teams and that team role breadth self-efficacy is an important moderator between team reflexivity and team shared leadership. This approach also extends the existing research on self-efficacy and social cognitive theory that often uses a concept of generalized self-efficacy and mainly argues direct effects on outcome variables (Parker et al., 2006).

By introducing team empowerment as an important moderator between team reflexivity and shared leadership in a dispersed team setting, this study supports the growing body of research suggesting that empowerment is a very important motivational construct for dispersed teams (Kirkman et al., 2004a). Researchers who build comprehensive models of virtual team effectiveness or team shared leadership should thus include team empowerment as an important predictor variable. Regarding measurement, it should be noted that according to existing theory and measures, a global scale was used to measure team empowerment (Kirkman & Rosen, 1999; Kirkman et al., 2004a) and analyze its effect on the relationship between team reflexivity and team shared leadership. Nevertheless, it could also be theoretically argued that each dimension of team empowerment has moderating effects. Thus, moderating effects for each dimension were also tested after the same, previously-used control variables and main effects had been entered, using the significance level (p-value) of the interaction term as the key indicator for moderation (Baron & Kenny, 1986), and plotting the interaction effects. Team potency, team task meaningfulness, and team autonomy showed significant positive interaction effects at a $p < .10$ level, and team impact positively moderated at a $p < .05$ level. Hence, a (marginally) positive moderation effect could also be argued for all four empowerment dimensions.

Moreover, it should be noted that this research particularly underscores the importance of team reflexivity in dispersed innovation teams, thus enriching not only shared leadership theory but also team reflexivity literature. While most previous research has assumed that cognitive processes directly relate to team outcomes (Carter & West, 1998; Hirst & Mann, 2004; Hoegl & Parboteeah, 2006; Schippers et al., 2003), this study shows team reflexivity as a cognitive process that relates to team processes (i.e., shared leadership), which, in turn, have been shown to positively influence team outcomes (Pearce et al., 2004). Moreover, by applying goal setting theory and information processing theory, a detailed argumentation for the effectiveness of team reflexivity is offered. Additionally, the analysis of this research underscores the importance of team reflexivity for shared leadership

development in the context of geographically dispersed teams, whereas previous research has only argued the importance of team reflexivity in the context of complex task environments in general (Schippers et al., 2003; West, 1996, 2000). Finally, this study points to motivational processes as amplifiers of the behavioral outcomes of team reflexivity. By showing that team role breadth self-efficacy and team empowerment strengthen the relationship between team reflexivity and team shared leadership, this research points to the ability of motivational aspects to increase team reflexivity's effectiveness.

5.5.2 Managerial Implications

In practice more and more teams need members who not only carry out the initiatives of the vertical team leader, but also bring their own expertise to bear and engage in responsibilities, like monitoring work progress and making decisions, that were formerly reserved for team leaders (Pearce, 2004; Pearce & Manz, 2005). Members of virtual teams are expected to be especially proactive in utilizing their knowledge and skills, as such teams are often specifically created to combine expertise in order to address diverse markets (Kayworth & Leidner, 2000).

This study presents important ways to spur such members of dispersed innovation teams into action, or, more specifically, into team shared leadership action. This research demonstrates the importance of team members receiving an appropriate information basis, and therewith the opportunities for sharing leadership responsibilities, through the team's collective reflection on team goals and processes. Thus, team meetings in which team members reflect upon their task are important and should be implemented regularly. And even though past research showed the importance of face-to-face interaction (Chidambaram & Lai Lai, 2005; Hoegl & Proserpio, 2004), telephone- and video meetings have also been shown to be beneficial. In a qualitative study of Majchrzak, Malhotra, Stamps, and Lipnack (2004), for instance, several team members mentioned that they contributed much more during virtual team meetings than they would have in face-to-face settings, as they felt more compelled to articulate their views on account of the lack of visual cues (Majchrzak et al., 2004).

Moreover, this study stresses that in addition to the opportunity to identify action needs, motivational processes are also crucial for team shared leadership development. Self-efficacy beliefs of team members and intrinsic team task motivation could be shown as important to strengthening the positive effects of team reflection processes. Here it is

important to note that both motivational constructs are not stable characteristics of employees, but rather can be shaped by management. For instance, role breadth self-efficacy could be shaped by supportive supervision that encourages team members to expect a lot from themselves (Parker et al., 2006). In terms of team empowerment, Spreitzer (1995) notes that empowerment is not an enduring personality trait generalizable across situations, but rather a set of cognitions shaped by a work environment. Thereby, team empowerment is a belief, and not an objective assessment, of how worthwhile and important a team task is (Spreitzer, 1995, 1996). Therefore, managers can shape team empowerment by creating a feeling of meaningfulness, potency, autonomy, and impact. Inviting important stakeholders to team meetings, for instance, could provide feelings of impact without actually changing the project's importance in terms of volume or suchlike.

In sum, these practical implications underscore the still important role of management and a team leader within team shared leadership processes (Cox et al., 2003; Hoegl & Muethel, 2008; Locke, 2003). As such, vertical leadership is especially crucial for processes that foster shared leadership development such as the initiation and establishment of team reflexivity, team role breadth self-efficacy, and team empowerment (Cox et al., 2003; Hoegl & Muethel, 2008; Houghton et al., 2003; Pearce, 2004).

5.5.3 Limitations and Future Research

This study has several limitations that need to be addressed in future research. First, the characteristics of the sample may reduce the generalizability of the results. A transfer of the results to shared leadership development in face-to-face teams or teams with more standardized tasks might not be possible. Moreover, the sample focused on software project teams because the IT-industry has taken a pioneering role in handling innovative tasks and virtual team collaboration (He et al., 2007; Hertel, Konradt, & Orlikowski, 2004; Orlikowski et al., 2004). Although it is not assumed that the results of this research are specific to the task contexts inside software projects, future research to assess whether the present study's findings could be replicated in dispersed innovative task contexts outside of the software industry is recommended. Second, the cross-sectional design makes it impossible to ascertain any causal directions. While this research demonstrates relationships, a longitudinal research design would be needed to further the knowledge of causality. Third, this research used a rather new measure of team shared leadership that should definitely be tested in more studies and within various contexts in order to confirm its validity and reliability. Fourth, the current work provides insights into team reflexivity as an antecedent

of team shared leadership and contingency factors to this relationship, but additional insights with regard to further contingency variables on other levels of analysis could provide a more comprehensive picture of the relationship between team reflexivity and team shared leadership. Team leader behavior or organizational guidelines (Fiore, Salas, & Cannon-Bowers, 2001), for instance, could also be an interesting moderator variable for the relationship between team reflexivity and team shared leadership. Nevertheless, this research has shown the importance of interaction effects for the development of team shared leadership. Hence, future researcher should focus much more on possible contingency factors when analyzing team shared leadership evolution.

5.6 Conclusion

Dispersed innovation teams rely on team members to accept leadership responsibility. This research draws upon data in the form of responses collected from different informants in 96 dispersed real work teams that show that for team shared leadership to develop, team members must reflect on their team task to realize leadership needs and also establish a strong motivational basis in order to act upon such identified needs. This study shows that team role breadth self-efficacy and team empowerment can provide such a motivational basis in dispersed innovation teams.

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6 Influences of Team Composition on Shared Leadership in Dispersed Teams – Implications for HRM¹

ABSTRACT

In order to attain high performance levels, team members in geographically dispersed teams are increasingly expected to show high degrees of participation and mutual influence by approaching others, irrespective of physical distance. This crucial process of mutual guidance in teams is called team shared leadership. Despite resulting high expectations, which cannot be met by every employee, on team members in dispersed team settings, aspects of team composition that have important implications for HRM in terms of team staffing and employee development have so far been neglected in team shared leadership research. This study tries to fill this gap. The effects of team composition in terms of demographic team characteristics (female ratio, mean age, age diversity, and national diversity) and team member skills (social skills and project management skills) on team shared leadership are examined. In a sample of 96 dispersed software project teams, female ratio, national diversity, and social skills were found to be positively related to team shared leadership, while mean age was found to be negatively related. Age diversity and project management skills did not have a significant relationship with team shared leadership.

Key words: Team Shared Leadership, Dispersed Teams, Team Composition, Demographic Team Characteristics, Diversity, Social Skills, Project Management Skills

¹ This paper was written by Sarah Gehrlein based on conjoint work with Prof. Dr. Martin Hoegl and Dr. Miriam Muethel.

6.1 Introduction

Past surveys have demonstrated that 50% of all dispersed teams fail to meet their objectives due to the inability to manage their distributed workforce (Kanawattanachai & Yoo, 2002). This fact points to the need for human resource management (HRM) to address new leadership and teamwork approaches. As HRM develops a more strategic focus, the need to be more inclusive of recent team-level phenomena and address the current challenges of teams is critical (Hollenbeck, DeRue, & Guzzo, 2004). In fact, an increasing number of teams in today's business world face high levels of task complexity and geographical dispersion, forcing team members to work together on demanding tasks primarily through electronic means (Gibson & Gibbs, 2006). Past research has shown that even very low levels of dispersion (namely, team members working on different floors) can bring along increased dynamism that strongly affects a team's efficiency (Monalisa, Daim, Mirani, Dash, Khamis, & Bhusari, 2008; Siebdrat, Hoegl, & Ernst, 2009). Extant research suggests that especially shared leadership approaches are effective in today's demanding team environment (Klein, Ziegert, Knight, & Yan, 2006; Pearce, 2004; Pearce & Manz, 2005). As such, empirical studies have indicated a positive relationship between shared leadership and team performance in various contexts (Avolio, Jung, Murry, & Sivasubramaniam, 1996; Ensley, Hmieleski, & Pearce, 2006; Pearce, Yoo, & Alavi, 2004; Sivasubramaniam, Murry, Avolio, & Jung, 2002). Shared leadership is defined as "a dynamic, interactive influence process among individuals of a group for which the objective is to lead one another to the achievement of group or organizational goals or both" (Pearce & Conger, 2003, p. 1). Above all, shared leadership comprises team members' identification of action needs and subsequent initiation of action flows to revise and adapt work strategies for team goal achievement (Hoegl & Muethel, 2007). Thereby, it should be noted that for team shared leadership to emerge team members must offer leadership as well as rely on peer leadership (Carson, Tesluk, & Marrone, 2007).

This study argues that HRM can address this current need for team shared leadership approaches by selecting and developing team members adequately. More specifically, this study argues that team composition aspects, in terms of demographic team characteristics and team member skills (Morgeson, DeRue, & Karam, 2010), should be considered to reach high levels of shared leadership, leading to important implications for HRM in terms of team staffing, diversity management in teams, and employee development (Pearce, 2004; Pearce & Manz, 2005). Sharing leadership responsibilities in dispersed teams is a highly

challenging task that cannot be assumed to automatically happen by putting team members together at random. Instead, the need to perform shared leadership behaviors (as compared to taking orders from a vertical team leader) (Eckert & Drath, 2009) and the context of geographical dispersion, characterized by high task complexity, electronic dependence, higher uncertainty, and often also national diversity (Gibson & Gibbs, 2006), result in high demands on team members and call for a thoughtful process of team member selection and development to achieve high levels of shared leadership. Such team composition aspects are especially crucial to analyze as HRM is expected to find answers to the question of how to deal with a workforce that has become more and more diverse within the last few years (Baugh & Graen, 1997; Ely, 1994; Riach, 2009). While many companies promote diversity initiatives, it is still unclear how diversity, in terms of gender, for instance, affects important team processes (Baugh & Graen, 1997; Ely, 1994). In particular, age is becoming an increasingly important topic for companies due to changing demographics (Riach, 2009). Companies face a work force that is steadily growing older, stressing the topic of an increasing mean age in teams. At the same time, the ongoing war for young talent signals that issues of age diversity in teams are forthcoming (Ng & Burke, 2005). Moreover, in practice, dispersed teams are often set up by focusing solely on questions of technical knowledge integration (Gibson & Gibbs, 2006; Kayworth & Leidner, 2000), giving little consideration to other consequences that come along with such knowledge diversity that could affect team shared leadership and thus overall team performance, for example, higher resulting levels of national diversity could potentially lead to negative motivational processes. This strong focus on technical knowledge integration is even more questionable as it seems unreasonable to assume that team members who are put together due to their diverse technical knowledge bases automatically have all the necessary abilities for mutual leadership in a dispersed team setting (Pearce, 2004; Pearce & Manz, 2005). Rather, team members might be technically-skilled or accustomed to centralized work systems, thus having low shared leadership relevant abilities (Bligh, Pearce, & Kohles, 2006; Pearce, 2004; Pearce & Manz, 2005). Hence, this research argues that demographic team characteristics, regarding gender, age, and nationality, as well as team member skills should be investigated as important aspects for shared leadership processes in dispersed teams.

Even though the importance of team composition aspects for shared leadership has been noted in prior research (Perry, Pearce, & Sims, 1999; Seers, Keller, & Wilkerson, 2003), up to now only rather general and context-unspecific remarks have been provided,

mentioning aspects of team diversity as inhibitors of shared leadership (Perry et al., 1999; Seers et al., 2003) and high abilities as facilitators of shared leadership development (Pearce, 2004; Seers et al., 2003). No context-specific hypotheses for particular demographic team characteristics or skills have been argued though, nor does much empirical analysis exist on this topic. Only Ziegert (2005) empirically investigated task ability aspects in a sample of 39 fast-food restaurant teams. This study wants to fill this research gap. Based on the notion that team members must be able and motivated to share leadership roles for team shared leadership to occur (Houghton, Neck, & Manz, 2003; Pearce & Manz, 2005; Perry et al., 1999), this research investigates the influence of several demographic team variables and team member skills on the ability and motivation to share leadership in dispersed teams. Thereby, it is argued that while team member skills obviously and primarily relate to a team's ability to share leadership, demographic aspects potentially influence team members' ability and motivation for shared leadership. More specifically, prevailing ability-related effects on team shared leadership in dispersed teams are argued for a team's female ratio and team members' mean age. Prevailing motivational effects on team shared leadership in dispersed teams are argued for a team's age and national diversity. Moreover, social skills and project management skills are analyzed as specific skills primarily enhancing ability for shared leadership in dispersed teams. By choosing these skills, this study recognizes that teams are socio-technical systems (Cummings, 1978) in which leadership, and thus also shared leadership, necessarily comprises aspects of social interaction and team task control.

As such, this article offers several contributions. On the one hand, this article enhances research on shared leadership that has so far not adequately discussed aspects of team composition as antecedents of team shared leadership. Specific demographic characteristics and skills are introduced to shared leadership research. More specifically, it is argued for the first time that team composition affects shared leadership in two basic ways, namely, in terms of ability for team shared leadership behaviors and in terms of motivation for team shared leadership behaviors. Moreover, social and project management skills are discussed for the first time as basic and complementary skill sets needed for the ability to shared leadership. Thereby, context-specific research on shared leadership is extended as all aspects of team composition and their relations to team shared leadership are argued against the background of a dispersed team setting. This is reasonable as shared leadership is particularly crucial for team performance in such a context. Thus, this examination

contributes to the context-specific approaches to leadership demanded by Porter and Laughlin (2006).

On the other hand, this study enhances research on team composition, which has so far had difficulties (especially in the area of demographic team characteristics) concluding clear, direct effects of a team's composition on team performance (see meta-analysis Joshi & Roh, 2009). As such, gender research often relies on arguments based on gender stereotypes despite empirical analyses contradicting such a view (Northouse, 2001). Research on age is surprisingly silent on the topic of mean age, even though demographic change is one of the most current challenges of HRM (Verworn, Schwarz, & Herstatt, 2009). And research on age and national diversity is highly inconsistent as several studies exist that found positive effects on team performance, while quite a few other studies found negative effects or no relationship at all (Joshi & Roh, 2009). In contrast to most prior research, the present study follows Pfeffer's (1983) theoretical model in which demographic aspects are argued to influence important team processes, like in this study shared leadership, that, in turn, affect team performance. Thus, the "black box" between team composition and team performance is opened. Moreover, this study sheds light on the contradictory findings of prior research by focusing on the context of dispersed teams, thus answering calls for more context specific-research on team composition in order to adequately explain outcomes (Jehn & Bezrukova, 2004; Joshi & Roh, 2009; Kamenou, 2007; Kearney, Gebert, & Voelpel, 2009; Morgeson et al., 2010).

In the following pages, possible effects of team composition on shared leadership are discussed in detail. Figure 6-1 shows the according framework of this study.

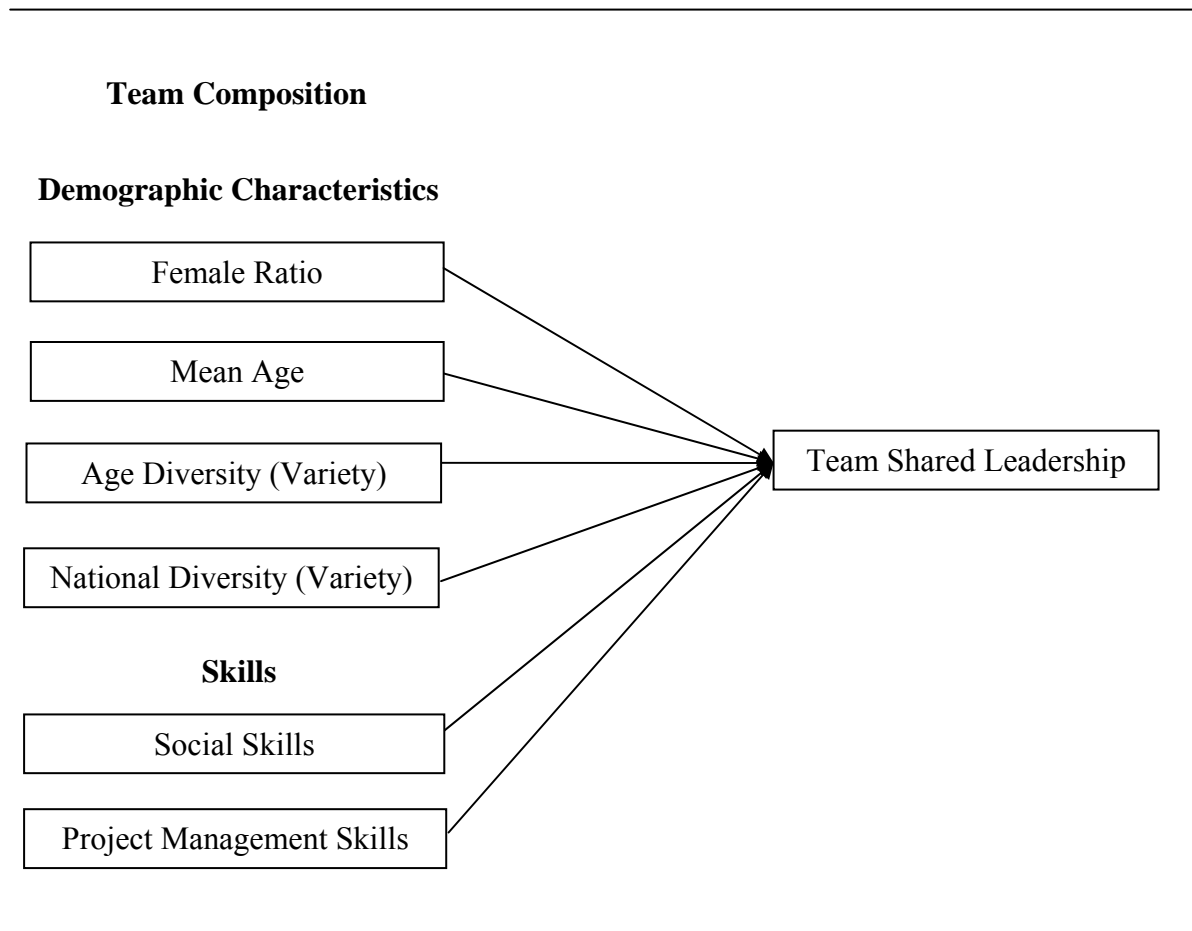


Figure 6-1: Conceptual Framework of this Research

6.2 Theory and Hypotheses

6.2.1 Demographic Team Characteristics

Looking at a team's demographic characteristics as antecedents of shared leadership, two kinds of attributes of a team's composition can be distinguished: mean levels and diversity levels. Demographic mean levels describe the extent to which a certain demographic characteristic is present in a team (Kearney et al., 2009). In this research, a team's ratio of females and a team's mean age are considered as such mean level constructs. Demographic diversity represents the extent to which demographic differences exist within a team (Joshi & Roh, 2009). This study considers a team's age and national diversity. With respect to the conceptualization of Harrison and Klein (2007), diversity is defined in terms of variety, thus looking at how teams differ in the extent to which their members are spread

across demographic categories (i.e., in this research across age categories and nationalities). Blau (1977) originally termed this form of diversity, heterogeneity.

6.2.1.1 Female Ratio

For shared leadership to occur, team members must be able and motivated to share leadership responsibilities (Carson et al., 2007). Both aspects could potentially be influenced by a team's female ratio. On the one hand, motivation for shared leadership could be negatively influenced by gender stereotypes. In women underrepresented contexts, like dispersed knowledge teams, gender stereotypes are fostered (Joshi & Roh, 2009; Northouse, 2001). Such stereotypes consider women to be less skilled, less confident, passive, and thus followers (Brown, 1979; Joshi & Roh, 2009; Parboteeah, Hoegl, & Cullen, 2008). Even if these stereotypes are false, expectations theory suggests that women emulate the characteristics associated with them as individuals have a preference for having expectations supported (Ridgeway, 1988; Seers et al., 2003). Moreover, according to status characteristics theory, team members for whom others hold lower expectations will be given less chance to influence due to others' lower motivation to follow them (Bunderson, 2003; Seers et al., 2003). Hence, females might be less motivated for leadership initiatives and might get fewer possibilities to lead due to stereotypes, thus resulting in less shared leadership with an increasing female ratio.

On the other hand, such stereotype-oriented views and expectations probably diminish as more and more women enter the business world (Ely, 1995; Frink, Robinson, Reithel, Arthur, Ammeter, Ferris, Kaplan, & Morrisette, 2003). Moreover, empirical analyses on this topic refute this stereotype-oriented opinion of woman's unsuitability for leadership (Brown, 1979; Karau & Eagly, 1999; Northouse, 2001). Previously conducted empirical studies could not provide proof of a gender bias regarding leader emergence or leader effectiveness in various contexts (Brown, 1979; Drach-Zahavy & Somech, 2002; Eagly, Karau, & Makhijani, 1995; Karau & Eagly, 1999; Northouse, 2001). Rather, based on behavioral leadership theories, it was found that women have different leadership abilities than men that result in women leading others in a different way than men do (Fenwick & Neal, 2001; Gardiner & Tiggemann, 1999). In contrast to men, women use a more participative, trust-based, and less autocratic style of influencing others (Gardiner & Tiggemann, 1999; Northouse, 2001; Sun, Wiedenbeck, Chintakovid, & Zhang, 2007). As shared leadership relies on mutual influence and followership processes among all team

members, and not on single, dominant emergent leaders, it thus could be argued that the female ratio in a team positively relates to shared leadership. This is because women tend to integrate others (Fenwick & Neal, 2001), thus enabling important decisions and implementations in a team to be made through the use of interactive processes involving many different people influencing each other, which is the essence of shared leadership (Yukl, 2006). Empirical results underpin the positive effects of an increasing female ratio for mutual processes in high knowledge teams. Female ratio has been shown as positively related to team problem solving (Hirschfeld, Jordan, Feild, Giles, & Armenakis, 2005) as well as knowledge-sharing attitudes (Hasan, Ahmed, & Ali, 2009) and knowledge-sharing activities (Sawng, Kim, & Han, 2006). In a business game experiment, women's more integrative, trust-based, and permissive work style led to a higher performance on complex management activities like information management and decision making (Fenwick & Neal, 2001). Considering geographically dispersed team settings in particular, females in a team were found to help achieve higher levels of information sharing through their ability to build trust (Sun et al., 2007). In sum, it is argued that these positive ability-related effects of an increasing female ratio outweigh the possible negative effects of gender stereotypes on team shared leadership that are primarily based on motivational processes. Thus, it is proposed that female ratio is positively related to team shared leadership in dispersed teams as females are more competent in participative leadership behaviors such as team shared leadership. Hence, it is proposed:

Hypothesis 1: Female Ratio positively relates to Shared Leadership in Dispersed Teams.

6.2.1.2 Mean Age

The mean age of employees in a team could influence team shared leadership due to the following reasons. On the one hand, with increasing age, team members tend to be more experienced, having more practical knowledge (Kearney & Gebert, 2009), and have more status (Mayo, Meindl, & Pastor, 2003; Seers, 1996; Seers et al., 2003). Thus, with an increasing mean age, shared leadership might emerge more naturally because delegation and participation are easier to transfer among team members (Mayo et al., 2003). In contrast, with less expertise and less status in a team due to lower team member age levels, team members' ability to step in with new suggestions and goal-directed influence attempts (Mayo et al., 2003) as well as their motivation for peer followership might be less likely (Mayo et al., 2003; Seers, 1996; Seers et al., 2003).

On the other hand, a team comprised of more experienced team members might have high technical knowledge from previous projects but lack other abilities important for team shared leadership. The older the employees are, the more likely they have been trained and seasoned in more traditional hierarchical structures, thus making it more difficult for them to adjust to new shared leadership approaches (Bligh et al., 2006; Pearce & Manz, 2005). Some might have been exposed for years to controlling bosses or centralized work systems that allowed little development of necessary, leadership-oriented skills (Pearce & Manz, 2005). Others may have simply developed a habitual focus with increasing age by focusing only on their individual knowledge work and thinking little about the nature of influence in their work system (Pearce & Manz, 2005). Moreover, in addition to perhaps being less used to hierarchical structures, younger colleagues might also be more likely to bring up-to-date knowledge, new ideas, and thus fresh creativity to a team, thereby fostering high mutual influence (Joshi & Roh, 2009; Kearney & Gebert, 2009; Rosen & Jerdee, 1976). Especially in the context of dispersed teams, young teams might have advantages for shared leadership development due to a better fit of their abilities to the task characteristics, like uncertainty, electronic dependence, and national diversity, inherent to dispersed tasks (Gibson & Gibbs, 2006). The younger team members are, the more flexible they are in adjusting to a team task's changing demands stemming from high uncertainty in dispersed team settings (Faix & Laier, 1996). Accordingly, Van Heijden, de Lange, Demerouti, and Van der Heijde (2009) found organizational tenure to be negatively related to the competence of coping with fast-changing job requirements. And Cleveland and Landy (1983) note that there is empirical support for a slight performance decrease of older employees regarding high-paced tasks. Moreover, the younger the team members are, the better they might be trained in terms of electronic devices and language skills, thus feeling more comfortable interacting with others across physical distance via electronic means and enabling them to engage with other team members on a remote site (Kearney & Gebert, 2009). Hence, teams with many young members may have more appropriate ability sets that make it easier for them to share leadership responsibilities across the whole dispersed team. Therefore, these teams might find it easier to overcome the negative implications of dispersion (Gibson & Gibbs, 2006; Kearney & Gebert, 2009). In sum, it is proposed that in the context of dispersed teams, these context-specific ability effects outweigh the possible disadvantages of a low mean age. Hence, it is proposed:

Hypothesis 2: Mean Age negatively relates to Shared Leadership in Dispersed Teams.

6.2.1.3 Diversity

Two schools of thought have shaped investigations on diversity (Ely, 2004; Jehn & Bezrukova, 2004; Kearney et al., 2009). On the one hand, information and decision-making theories argue that diversity will provide a broader range of abilities, perspectives, and skills, which increases the group's creativity and problem-solving capabilities, thereby enhancing performance (Ely, 2004; Kearney et al., 2009). Accordingly, studies could find team heterogeneity to be positively related to team performance measures (e.g., Campion, Papper, & Medsker, 1996). From such an information and decision-making theory point of view age and national diversity might lead to more starting points for team shared leadership due to a broader range of abilities within a team. In terms of age diversity, older team members are more likely to have deep industry knowledge and practical know-how, while younger team members are more likely to be skilled in intercultural collaboration, the newest approaches used within the team's area of expertise, and the handling of electronic communication means (Kearney & Gebert, 2009). These differences are likely to facilitate mutual influence and followership in dispersed teams, as in teams with a wide variety of ages, and thus experiences and kinds of knowledge, various team members are suitable to give guidance depending on the matter, for instance, if a team problem is rather a practical issue or calls for recent technologies (Pearce, 2008). High national diversity might have positive effects on shared leadership behaviors as culturally unique and complementary perspectives are brought to the team (Dahlin, Weingart, & Hinds, 2005; Kearney & Gebert, 2009). This is especially true for dispersed teams as such teams are often particularly set up with highly skilled team members from different countries in order to address diverse global markets (Gibson & Gibbs, 2006; Majchrzak, Malhotra, & John, 2005). Multiple nationalities within a team enable organizations to adequately meet current challenges (Hertel, Geister, & Konradt, 2005), like analyzing culturally different market needs or country-specific legal issues, for instance. Thus, depending on the country-specific expertise needed, different team members can take guidance in nationally diverse teams. As such, increasing diversity in terms of age and nationality could lead to higher levels of shared leadership due to more diverse ability sets of team members that enable the serial emergence of leaders depending on the task at hand.

On the other hand, social identity/categorization theory (e.g., Tajfel, 1982; Turner, 1987) and the similarity-attraction/homophily paradigm (e.g., Byrne, 1971; Lazarsfeld & Merton, 1954) argue that diversity instigates ingroup-outgroup distinctions in which

individuals prefer to have positive interactions only with others that are in the same social category (social identity/categorization theory) respectively similar to themselves (similarity-attraction/homophily paradigm) (Ely, 2004; Jackson & Joshi, 2004; Kearney et al., 2009). Thus, high levels of diversity are argued to lead to negative effects on social processes as, for instance, friendliness, cohesion, and cooperation, also resulting in more conflict and communication difficulties among team members, and thus negatively affecting team performance (Chatman & Flynn, 2001; Colquitt, Noe, & Jackson, 2002; Ely, 2004; Jackson & Joshi, 2004; Kearney et al., 2009). In particular, demographic diversity, also called relations-oriented or surface level diversity, is argued to engender such negative effects as such demographic differences are easily cognitively accessible, pervasive, and immutable as well as strongly associated with processes of social categorization and homophily (Baugh & Graen, 1997; Bunderson, 2003; Choi, 2007; Huelshager, Anderson, & Salgado, 2009; Joshi & Roh, 2009; Kearney et al., 2009). Hence, team shared leadership as a process of mutual social influence that is highly dependent upon team member's motivation to interact with each other could be hindered by the negative social effects of diversity (Cox, Pearce, & Perry, 2003; Pearce & Conger, 2003). In terms of age diversity in the context of new product development teams, Cox et al. (2003) point to evidence of skill-based rivalry and resentment between more senior developers and newcomers who are perceived by the senior developers as overconfident with leading-edge skills. Hence, due to social categorization and homophily processes, age diversity is argued to hinder team members' willingness to provide supportive guidance and followership to others that differ from them in terms of age (Balkundi, Kilduff, Barsness, & Michael, 2007; Ely, 2004; Jackson & Joshi, 2004; Kearney et al., 2009). Correspondingly, in empirical studies, teams with high age diversity showed less communication (Zenger & Lawrence, 1989), less cohesion (Tsui, Egan, & O'Reilly Iii, 1992), and more conflict due to generational differences in attitudes toward technology (Ely, 2004) and more disagreements on justice in the team (Colquitt et al., 2002). Such negative effects on mutual processes have also been validated for national diversity. Earley and Mozakowski's (2000) empirical study found that teams with high national diversity face problems building a common team identity and communicating effectively. Communication difficulties were in part because nationally diverse teams were less willing to listen to one another, which would be especially negative for peer followership aspects of team shared leadership. Additionally, other empirical studies reported increased problems of cohesion and problems in terms of interaction behaviors in nationally diverse teams, such as difficulties in agreeing on what is important and withholding of information (Thomas,

Ravlin, & Wallace, 1996; Watson & Kumar, 1992; Watson, Kumar, & Michaelsen, 1993). Despite possible positive effects in the area of creativity, Gibson and Gibbs (2006) found a negative overall relationship between national diversity and innovation due to national differences in norms, expectations, and behaviors. Finally, a meta-analysis of 80 studies with a combined sample size of 9,212 teams performed by Stahl et al. (2007) concluded that cultural diversity in teams creates barriers to social interaction and increases the potential for conflict and that only part of these losses can be offset by process gains from increased creativity. Additionally, it should be noted that in dispersed teams, dividing lines due to age and national diversity are even more prevalent as distance generally reduces social ties between team members (Colquitt et al., 2002; Joshi, Lazarova, & Liao, 2009) and dispersed teams are rather short-termed with higher member turnover (Gibson & Gibbs, 2006). Both circumstances make it more difficult to overcome the negative social effects of diversity (Chatman & Flynn, 2001; Choi, Price, & Vinokur, 2003). Moreover, national diversity often coincides with geographical dispersion (Gibson & Gibbs, 2006), stressing the interpersonal distance felt in terms of nationality, fostering stereotyping, and thus leading to even stronger negative impacts of national diversity (Polzer, Crisp, Jarvenpaa, & Kim, 2006). Accordingly, Polzer, Crisp, Jarvenpaa, and Kim (2006) empirically found that national subgroups within a team were stronger, leading to more conflict and less trust, when team members were geographically dispersed according to these national subgroups. In sum, it is argued that the negative consequences of age and national diversity on team shared leadership resulting from a decrease in motivation for team shared leadership outweigh the possible positive effects of diverse knowledge sets. This is because age and national diversity as forms of surface level diversity are easily cognitively accessible, pervasive, immutable (Joshi & Roh, 2009; Kearney et al., 2009), and even more difficult to overcome in dispersed team settings. Hence, it is proposed:

Hypothesis 3a: Age Diversity negatively relates to Shared Leadership in Dispersed Teams.

Hypothesis 3b: National Diversity negatively relates to Shared Leadership in Dispersed Teams.

6.2.2 Team Skills

So far, abilities have been discussed in general as implications of demographic characteristics. The following explanations argue that besides looking at the ability-related effects of demographic characteristics, specific team member skills should also be

considered when thinking about an adequate team composition for the evolvement of team shared leadership in dispersed teams. It is argued that in addition to any demographical ability implication, social skills and project management skills are crucial for a team's ability to share leadership responsibilities. Because teams are socio-technical systems, social skills and project management skills are considered as basic and complementary skill sets needed for team shared leadership (Cummings, 1978; Stevens & Campion, 1994; Stevens & Campion, 1999). This argumentation integrates with behavior-oriented leadership theories that argue that leadership comprises a concern for people, for which social skills are needed, and a concern for production, for which project management skills are needed (e.g. Blake & Mouton, 1975; Hersey, Blachard, & Natemeyer, 1979; Hersey & Blanchard, 1979). As such, shared leadership, defined as a mutual influence process among team members toward goal attainment (Pearce & Conger, 2003), always involves two aspects. There is an interaction with others in terms of influence, which calls for social skills, and there is a focus on the team task accomplishment, which calls for project management skills. As discussed below, it is argued that in the context of dispersed teams, both skills are even more crucial as such teams face high challenges in terms of social processes and team task-related issues (Gibson & Gibbs, 2006). This sets higher demands on both skill sets.

6.2.2.1 Social Skills

Social skills describe a person's capability to interact with other people (Faix & Laier, 1996). Varney (1989) refers to this capacity as "interpersonal competence" and further defines it as the ability to maintain healthy working relationships and react to others with respect. Social skills especially include skills for communication, such as openly approaching others, clearly expressing one's opinions, and actively and non-evaluatively listening to others (Stevens & Campion, 1994; Stevens & Campion, 1999). Social skills also include the ability to understand and respect other people's opinions and activities by putting oneself in their positions (Hoegl & Parboteeah, 2006). Accordingly, Hoegl and Parboteeah (2006) note that, in sum, "social skills enable one to act and interact competently and responsibly in social systems such as teams" (p. 116).

Shared leadership, defined as a mutual process of influence attempts and followership (Carson et al., 2007; Conger & Pearce, 2003; Pearce & Conger, 2003), is a process of social interaction among team members (Mayo et al., 2003). Hence, team members' abilities to interact with one another are crucial for team shared leadership. Social skills permit team

members to openly communicate their views and regard others' perspectives (Hoegl & Parboteeah, 2006; Stevens & Campion, 1994; Stevens & Campion, 1999). This creates the basis for the effective exchange of information (Hoegl & Parboteeah, 2006) and influence. Accordingly, Cox et al. (2003) note that interpersonal skills are vital for the social give-and-take that characterizes team shared leadership. Team shared leadership depends on team members who try to influence others (Hoegl & Muethel, 2007, 2008; Muethel & Hoegl, 2010) by addressing them and clearly formulating their suggestions. Therefore, team members' social skills, like adequately approaching others and clearly expressing one's opinions (Hoegl & Parboteeah, 2006; Stevens & Campion, 1994; Stevens & Campion, 1999), are crucial for initiations of influence and thus for team shared leadership. Social skills ensure that all relevant and important issues are brought before the team and are not ignored (Stevens & Campion, 1994). Additionally, team shared leadership depends on team members being able to understand others' influence attempts in order to follow, thus without team members socially skilled in actively and non-evaluatively listening to others and their suggestions, in being able to understand others' perspective, and in respecting others' opinions no effective shared leadership can occur (Pearce & Conger, 2003). These aspects are especially true for dispersed teams. Being highly skilled in terms of social interaction is even more crucial in such teams as team members face high challenges on communication (Cramton, 2001). In routine team settings, it seems quite easy to approach others who are nearby and known, express an opinion in person, and listen openly. In contrast, dispersed team members often interact only via electronic means, deal with others who are physically remote, and face culturally different team members (Gibson & Gibbs, 2006). Thus, if team members are not highly skilled in terms of social competence, mutual influence is likely to fail in dispersed teams as social interaction is much more difficult (Cramton, 2001).

Further, if team members in dispersed teams do have social skills, it is also more likely that they reflect on their team task (Hoegl & Parboteeah, 2006) and contact others outside of the team through which new task-related information and inspiring impulses can be acquired (Hoegl & Parboteeah, 2006; Huelshager et al., 2009). This enables new goal-oriented initiatives by team members and thus team shared leadership. Accordingly, Cox et al. (2003) argue that boundary spanning behavior will enhance the potential for shared leadership. Especially for teams with complex and innovative tasks, like dispersed teams, consistent integration of new information is crucial for goal-relevant behaviors (Hoegl & Parboteeah, 2006).

Moreover, social skills create positive bonds among team members that positively influence team processes like cohesion and affective commitment to the team (Fletcher & Kaeufer, 2003). Such positive affective effects of socially skilled team members are even more important in dispersed teams as such teams often face geographic dividing lines that split the team, foster conflict, and hinder collaboration (Polzer et al., 2006). Cohesion and team commitment, in turn, are likely to further foster team shared leadership due to increasing efforts on behalf of the team (Burke, Fiore, & Salas, 2003; Mayo et al., 2003). Hence, it is proposed:

Hypothesis 4: Social Skills positively relate to Shared Leadership in Dispersed Teams.

6.2.2.2 Project Management Skills

Project management skills refer to team members' abilities to plan and control a project, like the ability to structure a team task and to plan a project workflow (Hoegl & Parboteeah, 2006). Project management skills are necessary to set team goals, plan activities, coordinate activities and task interrelationships, ensure a proper balance of work load in the team, and to monitor team performance (Stevens & Campion, 1994; Stevens & Campion, 1999).

It is argued that team members' project management skills are positively related to team shared leadership as high levels of the ability to plan and monitor a team task offer the basis for realizing action and coordination needs for team task accomplishment. Without such a realization of leadership needs, shared leadership behaviors, like introducing better work strategies, for instance, could not occur (Hoegl & Muethel, 2007). Project management skills prompt the awareness of a teams' goals and current work status relative to a given set of quality, budget, and schedule expectations (Hoegl & Parboteeah, 2006). Thus, team members reflect upon their team task (Hoegl & Parboteeah, 2006) and get a better sense of when leadership action is required and which areas of work are affected, thus enabling directed and coordinated actions of mutual influence. Especially, aspects which might easily be neglected without an adequate project plan are rather considered and verbalized with team members being highly skilled in project management. Additionally, team members highly skilled in project management might also be better at understanding their team members' influence attempts (which are e.g., suggesting a new deadline for an individual task accomplishment) as they understand the project's workflow and its current status. This instance particularly fosters peer followership aspects of team shared leadership. Project

management skills are especially needed in dispersed teams as leadership and followership needs for team goal accomplishment are not so easy to identify due to high task complexity and high environmental uncertainty (Gibson & Gibbs, 2006). Constantly changing task demands, for instance, call for the quick adaption of team goals, project plans, and performance measures, thus requiring more than basic levels of project management skills. Moreover, circumstances like working together across different time zones call for high levels of skills regarding efficient team discussion and workflow planning.

High levels of project management skills in a team are also likely to result in a clear team goal and task that are especially hard to attain for dispersed teams due to communication difficulties, missing contextual information, and unevenly distributed information (Cramton, 2001). According to goal setting theory, such goal clarity enables goal-directed behaviors like team shared leadership (Locke & Latham, 2002; Pearce & Conger, 2003).

Finally, it should be noted that project management behaviors (e.g., planning the work) are often assumed to be classical (vertical) leadership behaviors (Connelly, Gilbert, Zaccaro, Threlfall, Marks, & Mumford, 2000; Hackman, 1987; Morgeson et al., 2010; Yukl, 2006). Thus, team members highly skilled in project management are more likely to feel confident in taking over an active leadership role. Because they feel that they have leader-relevant knowledge, team members possessing high levels of project management skills can be assumed to be confident in giving guidance to others, thus resulting in more influence attempts and a higher likelihood that such attempts will be successful (Wood & Bandura, 1989; Yukl, 2006). Hence, it is proposed:

Hypothesis 5: Project Management Skills positively relate to Shared Leadership in Dispersed Teams.

6.3 Methods

6.3.1 Sample and Data Collection

The present analyses draw upon data from 96 geographically dispersed software project teams from 36 companies. Projects ranged from new software developments to complex software roll-outs. In order to acquire participating teams, software companies and companies with large IT-departments were addressed. They had the possibility of nominating several project teams to take part in this study. Team leaders of participating

teams were asked to complete a pre-defined spreadsheet with descriptive details about the participating project team (project name, team task, team size, project length, etc.). In addition, team leaders and team members were contacted and asked to complete an online questionnaire. Usable questionnaires were received from all 96 team leaders and from 63% of all contacted team members. Overall, analyses were based on a total of 96 team leader responses and 337 team member responses. The average size of a team was 8.3 people (median = 7, standard deviation = 4.1). Only software projects that had been completed within 22 months prior to data collection were included in the study. Projects had an average size of 56.5 person-months (median = 37, standard deviation = 57.4). Each team was geographically dispersed across at least two different sites of a company. Thirty-six teams faced temporal dispersion in addition to geographical dispersion by being distributed across different time zones.

6.3.2 Measures

All constructs considered in this investigation refer to the team as the unit of analysis. Information on demographic characteristics was drawn from the pre-defined spreadsheet that team leaders filled out. Shared leadership, social skills, and project management skills were assessed via multi-item measures anchored as 1, “strongly disagree” to 5, “strongly agree.” To avoid a possible common source bias, team shared leadership was rated by the team members, while social skills and project management skills were rated by the team leader. Table 6-1 shows the items used to measure shared leadership, social skills, and project management skills.

Variable	Items
Team Shared Leadership	<p>All team members considered not only their own sphere of work, but also how the entire team task unfolded.</p> <p>All team members exerted effort to understand task interrelationships.</p> <p>All team members initiated actions to bring out improved procedures for the team.</p> <p>All team members proactively made constructive suggestions for improving how things operate within the team.</p> <p>All team members actively attacked problems.</p> <p>All team members positively reacted to suggestions from other team members.</p> <p>All team members asked other team members for advice.</p>
Social Skills	<p>Team members were competent at approaching each other.</p> <p>Team members were competent at expressing their needs and requirements.</p> <p>Team members were competent at comprehending other peoples' needs and requirements.</p> <p>Team members were competent at projecting themselves into others' situations.</p> <p>Team members were competent at making sense of others' situations and actions.</p> <p>Team members were capable of adjusting to others' personal styles.</p>
Project Management Skills	<p>Team members had the necessary skills for planning the team task (e.g., setting sub-goals, structuring the work, etc.).</p> <p>Team members had the necessary skills to control the progress of the team's work.</p>

Table 6-1: Items Used in this Research

Team Shared Leadership. Team shared leadership was measured with a seven-item measure based on the conceptual work by Hoegl and Muethel (Hoegl & Muethel, 2007; Muethel & Hoegl, 2010). Confirmatory factor analysis suggested good fit (NFI = .92, CFI = .94, RMSEA = .066). A sample item is, "All team members proactively made constructive suggestions for improving how things operate within the team." The seven indicators judged by the team members revealed good internal consistency (Cronbach's alpha = 0.83).

Female Ratio. Female ratio for each team was measured as the percentage of women in each team. On average, 17% of each team (min = 0; max = 100) were female employees.

Mean Age. Mean age for each team was measured by calculating the mean age across all participants of a team. On average, teams' mean age was 38 years. It should be noted that details on age were provided through indication of an age class (e.g., 21-30) for each employee. Within these age classes, an equal distribution was assumed.

Age Diversity. Age diversity was measured in terms of variety (Harrison & Klein, 2007). Thus, members of a team were categorized into four age classes: 21-30 years; 31-40 years; 41-50 years; 51-60 years. The sample did not contain employees who were younger than 21 or older than 60. Based on this categorization, Blau's (1977) heterogeneity index was calculated with the formula $1 - \sum p_k^2$. In this formula, p is the proportion of a team in a particular category and k is the number of different categories represented on the team. Values of this measure can range from zero (no diversity) to close to one (highest possible diversity = each team member belongs to a different age class).

National Diversity. Similar to age diversity, national diversity was also measured in terms of variety with Blau's (1977) index ($1 - \sum p_k^2$) (Harrison & Klein, 2007). Each nationality represented one category. Nationality was defined in terms of citizenship. Again, values could range from zero to almost one, where a value of zero indicated that all team members had the same nationality and a value of close to one indicated that each team member had a different nationality. In sum, the sample comprised 28 different nationalities.

Social Skills. Social skills were measured by a six-item measure developed by Hoegl and Parboteeah (2006) that has shown good consistency in past studies. A sample item is "Team members were competent at approaching each other." Social skills were judged by team leaders. The measure revealed very good consistency (Cronbach's alpha = 0.92).

Project Management Skills. Project management skills were measured by a two-item measure developed by Hoegl and Parboteeah (2006) that has shown good consistency in past studies. A sample item is, "Team members had the necessary skills to control the progress of the team's work." Project management skills were judged by team leaders. Cronbach's alpha was 0.75 and was thus still within an acceptable range (Hair, Black, Babin, Anderson, & Tatham, 2006).

Control Variables. Project type, person-months, number of sites, and temporal dispersion were used as control variables. All these variables have been identified as potentially influencing team shared leadership (e.g., Conger & Pearce, 2003; Cox et al.,

2003; Pearce & Sims, 2000). Control variables were provided via the pre-defined spreadsheet with descriptive team details.

Project type was considered by including dummy variables (1 = pertaining to this project type; 0 = not pertaining to this project type) to control for effects due to different kinds of software tasks. New software development projects might be organized differently than software roll-outs, which could affect team shared leadership.

Person-months indicates the size of a team task, which has been argued to facilitate shared leadership due to increasing opportunities for mutual influence (Conger & Pearce, 2003; Cox et al., 2003; Pearce, 2004; Pearce & Sims, 2000).

By including number of sites and temporal dispersion for each team as control variable, this study allowed for the fact that geographical dispersion is a continuous construct (Carte, Chidambaram, & Becker, 2006; Hoegl & Proserpio, 2004; Ziguers, 2003) and controlled for differences that might result within dispersed teams from differing levels of dispersion. Teams dispersed across only two sites might behave differently than teams dispersed across many more sites (O'Leary & Cummings, 2007). The maximum number of sites across which an individual team was dispersed in this research was seven.

Furthermore, teams without time zone differences might behave differently than teams facing such a challenge (Boutellier, Gassmann, Macho, & Roux, 1998; Tabaka, 2006). Temporal dispersion was measured using O'Leary and Cumming's (2007) temporal dispersion measure, which indicates the average time difference between team members in hours. The mean temporal dispersion in this sample was 0.7 (hours).

6.3.3 Analytical Procedures

To test the proposed hypotheses, hierarchical multiple regression analysis was used and the significance of main effects was assessed after all control variables had been entered into the model. Table 6-2 provides the descriptive statistics and correlations of the used variables. As the correlation matrix shows several significant correlations, the variance inflation factor was calculated for all hierarchical multiple regression analyses to check for potential multi-collinearity. As no value exceeded 3.0, values are within an acceptable range (Cohen, Cohen, West, & Aiken, 2003).

Variables	Mean	SD	1	2	3	4	5	6	7	8	9
(1) Person-Months	56.5	57.4									
(2) Number of Sites	2.86	1.19	.28**								
(3) Temporal Dispersion	0.73	1.35	.40**	.17 ⁺							
(4) Female Ratio	0.17	0.19	.13	.10	-.10						
(5) Mean Age	38.3	6.36	.06	.09	-.09	.23*					
(6) Age Diversity	0.47	0.18	.20*	.22*	.02	.03	.04				
(7) National Diversity	0.27	0.26	.31**	.15	.50**	-.17 ⁺	-.21*	.01			
(8) Social Skills	3.93	0.69	-.02	.09	-.20 ⁺	.05	.12	.02	-.07		
(9) Project Managem. Skills	3.78	0.79	-.10	.08	.05	-.03	.09	-.04	.12	.50**	
(10) Team Shared Leadership	3.89	0.34	-.07	.08	-.10	.16	-.13	-.08	.10	.37**	.12

Note: ⁺ p < .10; * p < .05; ** p < .01.

Table 6-2: Descriptive Statistics and Correlations (N = 96 Teams)

6.4 Results

Table 6-3 reports the results of the regression analysis in two models. While model 2 includes all variables, model 1 only includes controls. Model 2 in table 6-3 shows that female ratio was positively related to team shared leadership, thus indicating support for hypothesis 1. Hypothesis 2 regarding mean age is also supported as a team's mean age showed a significant negative relationship with team shared leadership. Regarding age diversity, no significant relationship could be found, thus, hypothesis 3 is not confirmed.

National diversity showed a marginally ($p < .10$) positive relationship with team shared leadership, thus, hypothesis 4, proposing a negative relationship, is not confirmed either. Hypothesis 5 is confirmed as social skills were found to be positively related to team shared leadership. In terms of project management skills, no relationship could be found, hence, hypothesis 6 is not confirmed.

Variables	Model 1	Model 2
Project Type	6 Dummy Variables included	
Person-Months	-.06	-.13
Number of Sites	.11	.09
Temporal Dispersion	-.10	-.09
Female Ratio		.25*
Mean Age		-.20*
Age Diversity		-.11
National Diversity		.21 ⁺
Social Skills		.44**
Project Management Skills		-.13
R ²	.05	.30
R ² adjusted	-.03	.18
R ² change	/	.25**
F	0.61	2.48**

Note: ⁺ $p < .10$; * $p < .05$; ** $p < .01$. Dependent variable: Team Shared Leadership. Table shows standardized Beta-Coefficients.

Table 6-3: Regression Analysis predicting Team Shared Leadership (N = 96 Teams)

6.5 Discussion

In sum, the results of this study show that aspects of team composition are important for team shared leadership in dispersed teams. As proposed, female ratio and social skills were positively related to team shared leadership and mean age was negatively related, thus supporting arguments that these variables either positively (in the case of female ratio and social skills) or negatively (in the case of mean age) influence a teams' ability for team shared leadership. No support could be found for the hypotheses regarding age diversity and project management skills. Moreover, contrary to the hypotheses stated in this research, national diversity was marginally positively (as opposed to negatively) related to team shared leadership. Thus, while possible negative motivational consequences of demographic diversity do not seem to be dominant for the outcome of team shared leadership in dispersed teams, positive effects due to diverse ability sets seem to be at least equally existent. In terms of specific skills, social skills seem to be more important than cognitive-oriented project management skills for the evolvement of shared leadership in dispersed teams.

6.5.1 Theoretical Implications

This study points to the importance of team composition aspects, in terms of demographic team characteristics and skills, for team shared leadership in dispersed teams. Thus, this study extends research on antecedents of team shared leadership. Prior research has not empirically tested or even conceptualized effects of team composition on team shared leadership (e.g. Pearce, 2004; Perry et al., 1999; Seers et al., 2003). Thereby, this study argues for the first time that demographic aspects influence both, ability related requirements for team shared leadership and the motivation for team shared leadership enactment. Skills are argued to primarily enlarge team members' ability base for team shared leadership. This study additionally extends context-specific research on leadership as demographic team characteristics and skills are conceptualized and empirically tested in a dispersed context in which shared leadership is crucial (Porter & Laughlin, 2006).

Moreover, by focusing on team shared leadership as the outcome variable of team composition aspects, this study also extends previous research on team demographics, diversity, and skills. Following Pfeffer's (1983) theoretical model those aspects of teams are shown to influence team shared leadership, which in turn affects team performance, as shown in previous studies (e.g. Avolio et al., 1996; Ensley et al., 2006; Pearce et al., 2004). Thus, this research helps clarify the contradictory findings of previous research in the area of

direct effects of team composition on team performance by opening the “black box” between team composition and team performance. By focusing on the context of dispersed teams, this study also answers specific calls for more context-specific research on demographic team characteristics and skills (Jehn & Bezrukova, 2004; Joshi & Roh, 2009; Kamenou, 2007; Kearney et al., 2009).

Specifically in terms of gender, it could be found that the presence of more women in a team is positively related to team shared leadership, thus supporting behavioral leadership theory notions on women being more adept at participative leadership styles (Gardiner & Tiggemann, 1999; Northouse, 2001) and contradicting prior research notions on negative female stereotyping regarding leadership (Ely, 1995; Joshi & Roh, 2009; Northouse, 2001; Seers et al., 2003). As such, this study enhances behavioral leadership theories by introducing shared leadership behaviors as a specific, participative leadership style that is positively related to a team’s female ratio. By contradicting arguments for women stereotyping in contexts in which females are underrepresented, this study also sheds light on current calls for more context-specific research on gender (Baugh & Graen, 1997; Joshi & Roh, 2009). The sample of this study had an average female ratio of 17% for each team (ranging from 0% to 100%), thus supporting the assumption that dispersed teams (at least in the software industry) are still male dominated. Nevertheless, female ratio was positively related to team shared leadership, implying that future research on gender stereotyping, relying on expectations theory and status characteristics theory (Northouse, 2001; Ridgeway, 1988; Seers et al., 2003), should investigate more thoroughly the possibility that gender stereotyping is diminishing, even in work contexts in which females are still underrepresented.

A team’s mean age was found to be negatively related to team shared leadership. Thus, for the topic of age, context-specific arguments of higher abilities for dispersed team collaboration with lower age are supported (Joshi & Roh, 2009; Kearney & Gebert, 2009; Rosen & Jerdee, 1976). Thereby contradicting arguments made by status characteristics theory (suggesting more status and thus influence with increasing age) (Mayo et al., 2003; Seers, 1996; Seers et al., 2003), these results point to the need for more context-specific and maybe even revised research on age status in today’s constantly changing work environment. In contrast to what status characteristics theory has so far suggested, this study suggests that in the context of dispersed teams, increasing age might not automatically be associated with

higher levels of relevant experience and thus higher status (Mayo et al., 2003; Seers, 1996; Seers et al., 2003).

From a diversity research perspective, this study is especially interesting because against expectation, negative effects of demographic age and national diversity on mutual team processes could not be found, despite strong theoretical arguments presented by identity/social categorization theory and similarity-attraction/homophily theory (Baugh & Graen, 1997; Bunderson, 2003; Choi, 2007; Huelshager et al., 2009; Joshi & Roh, 2009; Kearney et al., 2009). In contrast, national diversity even showed a marginally positive relationship with team shared leadership. Hence, this study underscores that the effects of demographic diversity should not be generalized as “negative” on team processes per se, i.e., regardless of the kind of diversity, context, and outcome. Instead, age and national diversity should be analyzed separately taking into consideration the specific context and outcome investigated.

In terms of age diversity, where no relationship to shared leadership was found, one explanation might be that from a social comparison theory perspective, positive effects of age diversity on team shared leadership might have evolved due to less competition among age-diverse team members, than among team members of one age and thus similar career stages (Balkundi et al., 2007). These positive effects combined with the positive ability-related effects provided by information and decision-making theories on the one hand and the negative motivational effects on team shared leadership explained by social identity/social categorization theory and similarity-attraction/homophily theory on the other hand might have canceled each other out, thus ultimately leading to no significant effect of age diversity on shared leadership. Another theoretical explanation could be that social identity theory not only suggests negative effects of age diversity due to categorization processes, but also points out that aspects of a team’s task can minimize the salience of diversity attributes by reinforcing a common group perspective (Joshi & Roh, 2009; Kearney & Gebert, 2009). In the present case, such team task attributes might be the result of looking at dispersed teams with rather high knowledge tasks leading to team members who highly relied upon each other for team task accomplishment. Therefore, high task complexity and interdependence might have motivated team members to cast aside age differences (Joshi & Roh, 2009; Kearney & Gebert, 2009).

A similar argumentation might hold for the rather positive effects of national diversity on team shared leadership ($p < .10$). In the context of dispersed teams that face complex tasks with high task interdependence, motivational processes based on social categorization theory and homophily might have been outweighed by the positive diversity effects of a fruitful ability variety. In such a context, team members are motivated to cast national differences aside in order to attain the difficult common team goal (Joshi & Roh, 2009; Kearney & Gebert, 2009). Moreover, there are notions that the negative motivational effects of national diversity might only occur in the early stages of a project (Cox et al., 2003; Perry et al., 1999). Also implying such an effect for national diversity, Watson et al. (1993) found that while racially diverse teams reported less effective team interactions in the initial stages of team development, over time the racially diverse teams' processes improved and eventually matched those of the racially homogeneous teams. In addition, faultline theory (Lau & Murnighan, 1998) suggests that very high levels of national diversity actually protect teams from the negative effects on social processes as team members do not have a common characteristic with which to align themselves and therefore cannot build subgroups (Polzer et al., 2006). This study seems to support this argument, pointing to the need to analyze diversity in a more differentiated way.

As proposed, social skills were positively related to shared leadership, thus underlining the theoretical notions that influence over others (i.e., leadership) is a strongly social process that therefore relies on socially skilled persons who are able to approach others adequately for leadership initiatives and listen to others adequately for followership (Yukl, 2006).

Project management skills were not found to be related to team shared leadership, implying that aspects of project planning knowledge are at least less important for team shared leadership than aspects of social skills. Moreover, it could be argued that a high level of team members trained in project management leads to a rather impersonal mode of work coordination, that is, team members following pre-established plans and formalized rules with little personal discretion and interaction (Seers, 1996). This would hinder constant creative mutual influence among team members, especially in a volatile context such as a dispersed context, as many new aspects of work might not be addressed (Brinckmann, Grichnik, & Kapsa, 2010). Hence, from this point of view, high levels of team member project management skills could even impede team shared leadership.

6.5.2 Practical Implications for HR Management

Research has shown that high levels of participation and mutual influence among team members are needed in order to attain high performance levels in geographically dispersed teams (e.g. Pearce et al., 2004). This study shows that aspects of team composition affect such crucial shared leadership processes in dispersed teams as team composition influences abilities and motivation processes prevalent in such teams. Therefore, team members should be selected and trained carefully when implementing geographically dispersed teams.

While several demographic team characteristics were related to team shared leadership in this study, one should be careful with respect to interpreting these results in practice. Rather than interpreting these results absolutely (e.g., for female ratio: “the presence of more women in a team is better for team shared leadership”), conclusions should be drawn context-specifically (dispersed teams) and based on the content associated with a demographic variable (e.g., females and participative leadership styles). Thus, in terms of the positive relationship between female ratio and team shared leadership, it is argued that rather than indicating an optimal sex ratio in a team, the results of this study indicate that increasing the number of team members highly competent in participative collaboration and trust-based leadership styles is positive for team shared leadership in dispersed teams. Thus, team members expected to share leadership responsibilities should be either selected upon their ability for participating leadership or trained accordingly. The same holds true for implications drawn from a team’s mean age. Rather than promoting age discrimination, the negative relationship between a team’s mean age and team shared leadership in dispersed teams suggests that team members should either be chosen on account of their high levels of flexibility and skills in terms of dispersed collaboration or be trained in overcoming prior hierarchical structures, adaptability, and handling the characteristics of dispersed teams. Moreover, while age diversity was not related to team shared leadership, national diversity could be shown as marginally positively related to team shared leadership. This implies that managers do not need to hesitate in establishing diverse teams because of potential negative motivational effects on team shared leadership. Managers should rather be confident in hoping for positive, ability-related diversity effects, at least in the context of in dispersed teams that have highly interdependent and challenging tasks, as these aspects rather diminish the negative effects of diversity (Cox et al., 2003; Joshi & Roh, 2009; Kearney & Gebert, 2009; Perry et al., 1999).

In terms of specific and basic skills essential for the evolvement of team shared leadership, this study implies that managers should look for highly socially skilled team members when looking for high levels of team shared leadership in dispersed teams. Social skills facilitate mutual influence processes among all team members through competencies of interpersonal give-and-take (Cox et al., 2003). In contrast, the ability of team members to coordinate themselves via project management routines seems to be less crucial for team shared leadership in dispersed teams. Thus, training initiatives should focus on interpersonal aspects of approaching and understanding others rather than on project guidelines and rules, at least in the highly uncertain environment of dispersed teams.

6.5.3 Limitations and Future Research

This study has several limitations that need to be addressed in future research. First, the characteristics of the sample may reduce the generalizability of the results. A transfer of the results to shared leadership development in face-to-face teams or teams with more standardized tasks might not be possible. Moreover, the sample focused on software project teams because the IT-industry has taken a pioneering role in virtual team collaboration (He, Butler, & King, 2007; Hertel, Konradt, & Orlikowski, 2004; Orlikowski, Hertel, & Konradt, 2004). Although it is not assumed that the results of this research are specific to the task contexts inside of software projects, future research to assess whether the present study's findings could be replicated in dispersed task contexts outside of the software industry is recommended. Second, the cross-sectional design makes it impossible to ascertain any causal directions. While this research demonstrates relationships, a longitudinal research design would be needed to further the knowledge of causality. Third, this research used a rather new measure of team shared leadership that should definitely be tested in more studies and within various contexts in order to confirm its validity and reliability. Fourth, this study measured a team's mean age based on information regarding team members' affiliation to age classes, which is not as precise as calculating this measure by using team members' exact ages. Fifth, in terms of national diversity it could be argued that measures of cultural diversity might be better suited for analyzing diversity effects. In contrast to cultural diversity measures, the Blau (1977) index based on citizenship used in this study (measure of national diversity) does not allow for effects of cultural distances. Therefore, it could not take into account that, for instance, a team equally comprised of Germans and Austrians might face less "diversity" than a team equally comprised of Germans and Chinese as a result of the German and Austrian cultures being more similar to each other than the German

and Chinese cultures. Hence, future research might enhance this study using cultural diversity measures that comprise aspects of cultural distance. Sixth, the current work only provides insights into some demographic team characteristics and skills. As this study showed the basic relevance of this topic for team shared leadership research, more variables of team composition should be addressed in future research.

6.6 Conclusion

Especially in complex team settings, like dispersed teams, team members need to accept shared leadership responsibility in order to reach high performance levels. This research draws upon data in the form of responses collected from different informants in 96 dispersed real work teams that show that HR practices of team composition should be considered in order to gain high levels of shared leadership in dispersed teams. Female ratio, mean age, national diversity, and social skills could be shown to be relevant for sharing leadership, especially due to their effects on a team's ability for shared leadership, thus leading to important implications for HRM in terms of team staffing and employee development.

6.7 References

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7 Concluding Discussion

7.1 Overall Considerations and Findings

7.1.1 Hypotheses

Shared leadership is crucial for dispersed innovation teams as it 1) brings the necessary expertise to handle innovative tasks of all team members to bear and 2) enables a day-to-day mechanism for leadership that is difficult for a single and often remote vertical leader to provide (Muethel & Hoegl, 2010; Orlikowski et al., 2004; Pearce & Conger, 2003; Perry et al., 1999). At the same time, the emergence of shared leadership is especially challenged in such dispersed innovation teams. Challenges for shared leadership emergence arise not only because shared leadership is a voluntary process into which team members cannot be forced to (Conger & Pearce, 2003; Pearce & Manz, 2005), but also because the same two context variables of task innovativeness and geographical dispersion that create the need for shared leadership can also potentially hinder its emergence. Task innovativeness makes it more difficult for team members to identify leadership needs and give adequate guidance. Geographical dispersion hinders mutual actions, like shared leadership, among team members (Cox et al., 2003; Pearce, 2008; Perry et al., 1999).

Despite these challenges, the analyses of this dissertation show that high levels of shared leadership in dispersed innovation teams can be achieved. Within a sample of 96 dispersed real work teams that handled innovative software tasks, the average level of shared leadership was 3.89 (measured with a five-point Likert scale). Several teams were even able to reach team shared leadership levels of greater than 4.5, with a maximum level of shared leadership attained in the sample of 4.62. Hence, this study demonstrates that high levels of shared leadership can be realized in the very challenging context of dispersed innovation teams. However, the findings of this study also show that shared leadership in dispersed innovation teams does not happen at random. Instead, several team characteristics could be theoretically linked to shared leadership involvement and also empirically validated as being related to shared leadership. Thus, the analyses of this dissertation give valuable insights into the team-level antecedents of shared leadership in dispersed innovation teams and answer the main research question of this dissertation: How can we foster high levels of shared leadership in dispersed innovation teams? The according findings are shown in table 7-1, which gives an overview of the proposed relationships discussed in this dissertation and also indicates which hypotheses were confirmed and which hypotheses had to be rejected.

Dependent Variable: Shared Leadership in Dispersed Innovation Teams	
Sample: 96 Dispersed Software Innovation Teams	
√ = Confirmed Hypothesis	
X = Rejected Hypothesis	
Hypothesis 1 Chapter 4: Ability-Based Trustworthiness is positively related.	X No Relation
Hypothesis 2 Chapter 4: Benevolence-Based Trustworthiness is positively related.	√
Hypothesis 3 Chapter 4: Integrity-Based Trustworthiness is positively related.	√
Hypothesis 1 Chapter 5: Team Reflexivity is positively related.	√
Hypothesis 2 Chapter 5: Team Role Breadth Self-Efficacy positively moderates the Relationship between Team Reflexivity and Shared Leadership.	√
Hypothesis 3 Chapter 5: Team Empowerment positively moderates the Relationship between Team Reflexivity and Shared Leadership.	√
Hypothesis 1 Chapter 6: Female Ratio is positively related.	√
Hypothesis 2 Chapter 6: Mean Age is negatively related.	√
Hypothesis 3a Chapter 6: Age Diversity is negatively related.	X No Relation
Hypothesis 3b Chapter 6: National Diversity is negatively related.	X Marg. pos. Relation
Hypothesis 4 Chapter 6: Social Skills are positively related.	√
Hypothesis 5 Chapter 6: Project Management Skills are positively related.	X No Relation

Table 7-1: Overview of Confirmed and Rejected Hypotheses in this Dissertation

Overall, twelve hypotheses were made throughout this dissertation. At a level of significance of $p < .05$, eight hypotheses were confirmed. Three hypotheses (ability-based trustworthiness, age diversity, and project management skills) had to be rejected on account of no relationship to shared leadership being found. One hypothesis (national diversity) had to be rejected on account of empirical results showing a relationship opposite to the proposed relationship at a level of significance of $p < .10$. In sum, six team-level antecedents that demonstrate a positive relationship to shared leadership and thus act as facilitators of shared leadership could be identified: benevolence-based trustworthiness, integrity-based trustworthiness, team reflexivity, female ratio, social skills, and national diversity (only marginal significant). Moreover, team role breadth self-efficacy and team empowerment were found to be moderators of the relationship between team reflexivity and shared leadership, and mean age was validated as an inhibitor of shared leadership.

Looking at these overall results, the question might arise of which one of the nine team-level antecedents found to have an empirical relationship to shared leadership ($p < .10$) had the strongest effect on it and thus can be regarded as the most important team-level antecedent of team shared leadership. Usually such an analysis is done by comparing the standardized beta-coefficients of all variables in a model. The analyses of this dissertation are spread over three different models, though. Thus, direct and detailed comparisons of all standardized beta-coefficients are not possible. Nevertheless, it can be noted that one variable stands out in terms of its standardized beta-coefficient, namely, social skills. Social skills were empirically tested as a team composition aspect in model three. Social skills had by far the highest standardized beta-coefficient out of all variables in this dissertation, with a value of .44. The variables of all other significant relationships in this dissertation (including the only marginal relationship of national diversity) had standardized beta-coefficients between .20 and .29 (absolute values). While this finding clearly points to social skills as the most effective team composition aspect analyzed, it might also give some implication that social skills are in principle a main driver of shared leadership in dispersed innovation teams. At a minimum, social skills are validated by this dissertation as being very strongly related to team shared leadership in dispersed innovation teams.

This finding is quite surprising when compared to the findings of previous research on team-level antecedents of shared leadership. Even though previous research acknowledged the importance of general ability aspects for shared leadership involvement (see chapter 1-2 and table 1-1), concrete arguments for social skills were rarely made (Cox et

al., 2003; Fletcher & Kaeufer, 2003). Most prior researchers who discussed ability focused on task ability as being important for shared leadership (Conger & Pearce, 2003; Mayo et al., 2003; Pearce & Sims, 2000; Perry et al., 1999). Accordingly, the only empirical study on ability made by Ziegert (2005) investigated task ability. Thereby, Ziegert (2005) received partial support for a positive relationship between task ability and shared leadership in his sample of 39 fast-food restaurant teams (see chapter 1.2 and table 1-2).

This previous focus on task ability is even more interesting when considering that this dissertation also investigated task ability aspects and found that they had no relationship with shared leadership. While the analyses of this dissertation have so far not explicitly focused on task ability, the items used in chapter 4 to measure ability-based trustworthiness in fact considered ability in terms of task ability. A sample item used in chapter 4 is, "Team members had much knowledge about the work that needed to be done." Thus, implications of the non-existent relationship between ability-based trustworthiness and shared leadership can be drawn not only from a trust perspective (like it was done in chapter 4) but also from a pure ability perspective, thus stressing that it was task ability (and not just ability-based trustworthiness) that was not related to shared leadership. From this perspective, the expectation would have been that a high level of team task ability (does not only lead to team members having trust in others and thus willingness for shared leadership as argued in chapter 4 but also) enables team members (themselves) to take technical guidance and initiate reasonable influence (Conger & Pearce, 2003; Pearce & Sims, 2000; Perry et al., 1999; Ziegert, 2005). As previously noted, this assumed positive relationship was not confirmed as task ability (-based trustworthiness) was found to have no relationship with shared leadership. This missing empirical relationship is surprising and might well be because of the high level of this variable in the sample. In fact, task ability (-based trustworthiness) had by far the highest mean (4.27) out of all team-level antecedents measured in this dissertation with a five-point Likert scale and a below-average standard deviation (0.69) in comparison to the other team-level antecedents measured in this dissertation with a five-point Likert scale. Thus, two conclusions are possible. On the one hand, it could be argued that the level of task ability in this sample was too high to be a constraining factor, thus, a significant relationship could not be found even though task ability is in general an important factor for shared leadership in dispersed innovation teams. On the other hand, it could be argued that high levels of task ability can be assumed for most dispersed innovation teams as such teams are often particularly set up to bring together

highly educated experts from different locations (Gibson & Gibbs, 2006; Kayworth & Leidner, 2000). Following this argument, the results of this study would support the idea that task ability is generally not a crucial factor for dispersed innovation teams since it is unlikely to be a constraining factor in such teams. Instead, other skills and variables should be focused on in order to foster shared leadership involvement. Further studies investigating task ability in dispersed innovation teams are needed to clarify this discussion. Thereby, focus should be drawn not only to empirical relationships but also to the level of task ability.

In sum, this dissertation not only enhances research on antecedents of shared leadership by context specifically and empirically investigating twelve team characteristics using a sound theory base and an adequate sample, it also indicates that social skills might be a main driver and a thus far underestimated team-level antecedent of shared leadership, while task ability's relationship to shared leadership might have been overrated in prior research, at least in the context of dispersed innovation teams.

7.1.2 Motivation-Opportunity-Ability Framework

Besides investigating several team-level antecedents of shared leadership, this dissertation also introduced a theoretical framework for how to structure team-level antecedents of shared leadership according to their mode of functioning. As such, this dissertation made two specific arguments for the first time. First, to establish high levels of team shared leadership, the basic dimensions of motivation, opportunity, and ability for shared leadership should be addressed. Second, team-level antecedents of shared leadership can be put into four antecedent categories: factors that primarily affect motivation, factors that primarily affect opportunity, factors that primarily affect ability for shared leadership, and structural team properties that potentially affect multiple MOA dimensions. In support of these basic notions rooted in MOA theory (Blumberg & Pringle, 1982), antecedents providing motivation, opportunity, and ability for shared leadership as well as structural team properties were operationalized and validated as being positively related to team shared leadership.

Motivation. In chapter 4, trustworthiness was argued as a facilitator of the motivation to engage in risky shared leadership actions based on the perspective of shared leadership in dispersed innovation teams as a risk-taking behavior. This argumentation, based on trust theory (e.g., Mayer et al., 1995; McAllister, 1995), was supported by empirical results showing that team member trustworthiness in terms of benevolence and integrity (focusing

on its reliability aspects) was positively related to team shared leadership. The proposed positive relationship between ability-based trustworthiness and shared leadership could not be confirmed. As already noted, it is assumed that this is due to the high level of ability-based trustworthiness in the sample.

Opportunity. In chapter 5, team reflexivity was discussed as providing the opportunity and thus room for shared leadership to evolve. Team reflexivity gives team members in the complex and constantly changing environment of dispersed innovation teams a clear information basis, thus making leadership needs identifiable. In support of this argumentation based on goal setting theory and shared mental model theory (Klimoski & Mohammed, 1994; Locke & Latham, 2002), team reflexivity was found to be positively related to team shared leadership. Furthermore, this relationship between team reflexivity and shared leadership could be shown to be even stronger under conditions of high team role breadth self-efficacy and high team empowerment.

Ability. In chapter 6, social skills and project management skills were argued as basic and complementary skills needed for the capacity to share leadership in dispersed innovation teams. This argument was based on socio-technical systems theory (Cummings, 1978). Underscoring the importance of interpersonal competence, the empirical analysis showed that social skills were positively related to team shared leadership. Project management skills were shown not to be related to team shared leadership. It is assumed that this might be because project management skills could also lead to high levels of standardized team processes, thus rather hindering proactive mutual influence among team members (Brinckmann, Grichnik, & Kapsa, 2010; Seers, 1996). In addition, task ability was empirically investigated in chapter 4 (even though it was discussed from a trustworthiness perspective rather than from a task ability perspective; see discussion above). As previously noted, no relationship between task ability and shared leadership in dispersed innovation teams was found.

Structural Team Properties. Moreover, chapter 6 discussed structural team properties as potentially affecting several dimensions of the MOA framework (especially ability and motivation). What is striking about the results of this chapter is that all confirmed relationships were attributed to ability-related arguments, while motivation-based arguments were not confirmed. Female ratio was successfully argued as positively relating to shared leadership based on women's ability for integrative and trust-based leadership styles

(Fenwick & Neal, 2001; Gardiner & Tiggemann, 1999). Thus, arguments on decreased motivation for shared leadership due to gender stereotypes were empirically refuted (Joshi & Roh, 2009). Mean age was proposed and confirmed as negatively relating to shared leadership due to a less adequate ability set for shared leadership in dispersed innovation teams with a higher mean age of team members. Age diversity was found to be unrelated to shared leadership, while national diversity was found to be marginally positively related. Thus, negative motivational effects of diversity due to social categorization processes (Tajfel, 1982; Turner, 1987) and the homophily paradigm (e.g., Byrne, 1971; Lazarsfeld & Merton, 1954) could not be found, but information and decision-making theories that argue a positive effect of diversity due to a broader range of abilities could be slightly confirmed (Ely, 2004; Kearney et al., 2009). Thereby, it is argued that these findings regarding diversity might be due to the challenging context of dispersed innovation teams in this sample that focused team members on goal attainment rather than on mutual differences (Joshi & Roh, 2009). Table 7-1 gives an overview of the results of this dissertation analogous to the proposed MOA framework.

<p style="text-align: center; font-size: 2em; font-weight: bold;">M</p> <p style="text-align: center;">Motivation</p>	<p>Mode of Functioning: Willingness for Team Shared Leadership</p> <p>Antecedents analyzed: Team Trustworthiness (TW) in terms of Ability, Benevolence, and Integrity</p> <p>Underlying Theory: Trust Theory</p> <p>Empirical Result: Ability based TW - no Relationship Benevolence based TW - pos. Relationship Integrity based TW - positive Relationship</p>
<p style="text-align: center; font-size: 2em; font-weight: bold;">O</p> <p style="text-align: center;">Opportunity</p>	<p>Mode of Functioning: Room for Team Shared Leadership</p> <p>Antecedent analyzed: Team Reflexivity moderated by Team Role Breadth Self-Efficacy (TRBSE) and Team Empowerment (TE)</p> <p>Underlying Theory: Goal Setting and Mental Models Theory</p> <p>Empirical Result: Team Reflexivity - positive Relationship TRBSE and TE - positive Moderation</p>
<p style="text-align: center; font-size: 2em; font-weight: bold;">A</p> <p style="text-align: center;">Ability</p>	<p>Mode of Functioning: Capacity for Team Shared Leadership</p> <p>Antecedent analyzed: Social Skills, Project Management Skills, and Task Ability</p> <p>Underlying Theory: Socio-Technical Systems Theory</p> <p>Empirical Result: Social Skills - positive Relationship Project Manag. Skills - no Relationship Task Ability - no Relationship</p>
<p style="writing-mode: vertical-rl; transform: rotate(180deg); text-align: center; font-weight: bold;">Structural Team Properties</p>	<p style="text-align: center; font-size: 2em; font-weight: bold;">M O A</p> <p>Mode of Functioning: Multiple MOA Dimensions</p> <p>Antecedent analyzed: Female Ratio, Mean Age, Age Diversity, and National Diversity</p> <p>Underlying Theory: E.g., Social Identity Theory</p> <p>Empirical Result: Female Ratio - positive Relationship Mean Age - negative Relationship Age Diversity - no Relationship National Div. - marg. pos. Relationship</p>

Figure 7-1: Summary of Study Results analogous to MOA Theory

The four antecedent categories presented in this dissertation were tested in three different models. Social skills, project management skills, and structural team properties were combined into a discussion on team composition aspects in chapter 6. Comparing the three different models, the model discussing motivation for shared leadership (team trustworthiness) had an adjusted R^2 of .17, the model discussing opportunity for shared leadership (team reflexivity) had an adjusted R^2 of .08 (and of .11 and .12, respectively, when each of its two moderators is considered), and the model discussing team composition aspects had an adjusted R^2 of .18. As the adjusted R^2 provides information about the goodness of fit of a model when the number of variables in the model is considered, the results of this study point to team composition aspects as especially important for team shared leadership evolution. Thus, this study implies that one of the most important aspects for the evolution of high levels of shared leadership in dispersed innovation teams requiring careful consideration is how to compose and staff a team. This implication stresses that shared leadership should be at best prepared and fostered from the very beginning of a project, even before the team is recruited. Moreover, two points should be noted. First, within this model of team composition, social skills had the strongest standardized beta-coefficient. Second, all found relationships between structural team properties and shared leadership were argued based on ability aspects. Hence, the overall results of this dissertation underline the importance of the MOA dimension ability for shared leadership evolution. Thereby, especially team abilities relating to interaction processes (social skills and female ratio), new work modes (mean age), and information variety (national diversity) seem to be important, while project management skills and task ability could not be shown as being relevant.

The results of this dissertation support existing MOA research not only by demonstrating that all dimensions of MOA can be theoretically and empirically related to shared leadership emergence, but also by demonstrating that motivation, opportunity, and ability, although being distinguishable from one another, are still related (Siemsen et al., 2008). MOA theory argues that motivation, opportunity, and ability can be clearly separated as each dimension has a different mode of functioning (Blumberg & Pringle, 1982). Nevertheless, it also acknowledges that cross-relationships exist (Siemsen et al., 2008). This research acknowledges this latter instance by arguing that task ability can be seen from a pure ability perspective (stressing that high levels of team ability are needed to enable certain behaviors) and also from a motivational perspective (stressing that high levels of team ability

also increase the trust and thus the willingness of team members to perform certain behaviors). Hence, it should again be noted that the proposed structure of team-level antecedents of shared leadership is meant as a general guideline to capture variables' differing, overriding impacts on shared leadership rather than as a statement that particular antecedents only and exclusively operate in terms of motivation, opportunity, or ability.

Moreover, it should be noted that chapter 5 discussed team reflexivity as being especially beneficial for the evolvement of shared leadership under the presence of high levels of team role breadth self-efficacy and team empowerment, which are both motivational constructs (Bandura, 1982; Kirkman, Rosen, Tesluk, & Gibson, 2004). As such, opportunity-related aspects and motivational aspects were discussed in chapter 5, showing that opportunity and motivation can also interact in order to foster certain behaviors. Thereby, it is important to realize that team role breadth self-efficacy and team empowerment were discussed as moderators of the effects of team reflexivity and not as team-level antecedents of shared leadership, that is, team role breadth self-efficacy and team empowerment were argued and validated as variables that motivate the implementation of leadership needs identified through team reflexivity and not as independent, single variables that are positively related to shared leadership. Thus, the discussion of these two motivational aspects should not be confused with the proposed MOA structure for team-level antecedents of shared leadership that only structures (direct) team-level antecedents of shared leadership. Moreover, it should be noted that while a theoretical discussion of team-role breadth self-efficacy and team empowerment as motivational (direct) antecedents of shared leadership would surely be possible and is even suggested by some authors (Bligh et al., 2006; Carson et al., 2007; Houghton et al., 2003), the empirical results of chapter 5 do not necessarily point in such a direction, as neither team role breadth self-efficacy nor team empowerment was found to have a direct significant relationship with team shared leadership ($p < .05$, tested also without interaction terms).

7.1.3 Additional Insights

Beyond the major findings of this dissertation relating to its hypotheses and proposed MOA framework, several additional insights that can be drawn from this study are discussed in the following pages. One insight refers to the definition of shared leadership. Shared leadership is defined as “a dynamic, interactive influence process among individuals of a group for which the objective is to lead one another to the achievement of group or organizational goals or both” (Pearce & Conger, 2003, p. 1). Hence, shared leadership, like

any leadership process, has two important characteristics (Stogdill, 1974). First, it is an interaction process among individuals and thus clearly has a social, affective, and interpersonal element (Northouse, 2001; Stogdill, 1974). Second, shared leadership is a clearly focused, goal-directed behavior and thus also has a cognitive and rational side (Northouse, 2001; Pearce & Conger, 2003). This study shows that both sides of the shared leadership process are important and should be addressed. As such, the results of this study can also be used to emphasize shared leadership's definition as an interpersonal and goal-directed process (Pearce & Conger, 2003). The notion of team shared leadership as an affective, interpersonal process is supported by this study because benevolence as an affect-based source of trust was found to be clearly related to team shared leadership. Thus, mutual care for each other was identified as a driver of shared leadership. Moreover, social skills had a very high standardized beta-coefficient, also pointing to shared leadership as a highly interpersonal process. In addition, female ratio positively related to shared leadership, further implying that shared leadership is a social process as women's leadership styles are linked to rather integrative behaviors (Gardiner & Tiggemann, 1999; Northouse, 2001; Sun, Wiedenbeck, Chintakovid, & Zhang, 2007). Nevertheless, the notion of shared leadership as a cognitive and goal-driven process is also supported, especially by the positive relationship between team reflexivity and shared leadership. Team reflexivity is a clearly cognitive and goal-directed process within teams as it means the regular review and thinking through of the team's objectives, strategies, and processes (West, 1996). Moreover, even though task ability (-based trustworthiness) was not related to shared leadership, integrity, which is also seen by literature as a rational reason to trust, was related to shared leadership (McAllister, 1995). In addition, mean age and national diversity were found to be empirically related to team shared leadership. Both are argued as related to team shared leadership based on cognitive ability- and information-based arguments (Joshi & Roh, 2009; Kearney et al., 2009). Thus, the results of this dissertation stress the point that the process of team shared leadership in dispersed innovation teams has two sides: an interpersonal side that is characterized by affective and social elements and a cognitive side that relies on a clear, reliable, and fruitful information basis (Cox et al., 2003). Future definitions and conceptualizations of shared leadership should therefore always consider both the interpersonal and the cognitive goal-driven aspects of team shared leadership.

When looking at the findings of this dissertation, it should again be noted that the empirical findings of this study might not be transferable to face-to-face teams or teams with

highly standardized processes due to routine tasks. While the MOA framework for team-level antecedents of shared leadership is applicable to every context, the empirical results of this dissertation have to be interpreted context specifically. Trustworthiness probably matters less in teams that are co-located or have more routine tasks as control is higher and uncertainty is lower (Gibson & Gibbs, 2006). Team reflexivity might also matter less as leadership needs can be assumed to be clearer in such teams, even without constant team reflection processes (West, 1996, 2000). Social skills might be less crucial due to decreased demands on interactions in less challenging contexts (Cox et al., 2003). Moreover, age might matter less as tasks are less dependent on electronic means and less fast paced (Gibson & Gibbs, 2006). And national diversity often does not even occur in more regular team settings. Female ratio, in contrast, might be an equally interesting variable for face-to-face teams or teams with more standardized tasks as this variable is less bound to the context of dispersed innovation teams. Females can be expected to have different influencing styles than men that are beneficial to shared leadership independent from the environment in which they act (Northouse, 2001). Task ability (-based trustworthiness) in turn might become a constraining and thus even more important factor in less demanding environments as such teams are less often composed especially of experts with very high technical abilities, thus, such teams probably have higher variances in terms of ability (Gibson & Gibbs, 2006; Kayworth & Leidner, 2000). On the other hand, such teams with lower task ability levels might get along as environment and tasks are less challenging. These considerations underscore the importance of context-specific research on team-level antecedents of shared leadership. As such, it is even more surprising that previous research did not address the topic of team-level antecedents against the background of important context variables. This study clearly recommends context-specific research on team-level antecedents of shared leadership and is thus in line with current calls of leadership research (Porter & Laughlin, 2006).

Reflecting on the empirical results of this study, it is also noticeable that several controls used in the analyzed models did not have the expected relationship with team shared leadership. In fact, most controls did not affect team shared leadership at all. This is surprising as especially team size, project length, and dispersion have clearly been argued in past research as facilitators or inhibitors of shared leadership (e.g., Conger & Pearce, 2003; Cox et al., 2003; Pearce & Sims, 2000).

Team size showed a marginal negative effect on shared leadership in this dissertation (see regression results in chapters 4 and 5). Additional regression analysis testing for a curvilinear relationship did not yield any significant results. Thus, neither a positive relationship between team size and shared leadership due to increased leadership potential in a team nor the predominantly argued curvilinear effect (inverted u-shape) could be validated in this study (Conger & Pearce, 2003; Cox et al., 2003; Pearce & Sims, 2000; Seers et al., 2003). Only the notion of team size as negatively relating to shared leadership due to hindered collaboration processes was slightly supported (Conger & Pearce, 2003; Cox et al., 2003; Pearce & Sims, 2000; Perry et al., 1999; Seers et al., 2003). Thus, some marginal support for social impact theory that explains negative effects of team size on shared leadership due to a dilution effect is provided (Chidambaram & Lai Lai, 2005; Latané, 1981). Thereby, it should be noted that team size in this study mainly ranged from four to twelve employees (mean = 8.3; standard deviation = 4.1). Team sizes beyond this range might have a stronger effect on team shared leadership.

Despite existing arguments that project length could matter for the evolvement of shared leadership processes (Conger & Pearce, 2003; Cox et al., 2003; Pearce, 2004; Pearce & Sims, 2000), project length could not at all be validated as relevant for the development of shared leadership, even though variance was relatively high in the sample (mean = 14.4 months, standard deviation = 9.5 months). None of the models found project length to have a significant relationship with shared leadership. Thus, the results of this dissertation cannot support the notion that longer projects are advantageous for shared leadership processes due to higher familiarity levels (Conger & Pearce, 2003; Cox et al., 2003; Pearce, 2004; Pearce & Sims, 2000). Moreover, the notion of Conger and Pearce (2003) that there might be a negative relationship between project length and shared leadership resulting from an increased chance for single, dominant emergent leaders could also not be validated. In sum, this study points to project length as less important for team shared leadership evolvement, at least in the context of dispersed innovation teams, than has been suggested by previous research. One explanation might be that these two effects proposed by prior research cancelled each other out. Another explanation could be that physical distance within dispersed innovation teams prevented both effects. In dispersed innovation teams, the level of familiarity might not substantially increase with increased project length due to the physical distance that keeps team members from getting to know each other better. The

emergence of single, strong leaders might also be hindered as distance prevents individual team members from dominating other, often remote peers.

In terms of dispersion, neither number of sites nor temporal dispersion was found to have a significant impact on shared leadership. This is surprising as several researchers clearly proposed a negative effect of increasing dispersion on shared leadership due to more difficulties collaborating across distance (Conger & Pearce, 2003; Cox et al., 2003; Pearce & Sims, 2000; Perry et al., 1999). Regarding number of sites, the missing relationship might be due to the fact that only teams with at least two sites were analyzed in this study. As such, this study suggests that the degree of dispersion beyond two sites does not significantly influence shared leadership in dispersed innovation teams. Nevertheless, it might make a difference for shared leadership involvement if all team members are located within one building and can easily walk to each other (i.e., face-to-face teams) versus team members with a minimum dispersion of at least two different sites (i.e., dispersed teams as defined in this study). Pointing to such strong effects of even small distance levels, prior research has found that the probability of communication already decreases markedly with team members not located within one office (Allen, 1977).

Also in terms of temporal dispersion, no effect on shared leadership could be found even despite existing literature pointing to the clearly negative influences of different time zones on mutual processes in teams (Boutellier, Gassmann, Macho, & Roux, 1998; Tabaka, 2006). While the sample was comprised of 36 teams that faced temporal dispersion and 60 teams that did not face temporal dispersion, one explanation might be that the overall level of temporal dispersion was still too low in this sample (mean = 0.7 hours) to find significant results (O'Leary & Cummings, 2007).

7.2 Managerial Implications and Checklist for Team Leaders

The concept of shared leadership does not suggest that there is no designated vertical team leader in addition to team members performing shared leadership behaviors (Ziegert, 2005). Instead, the vertical leader is seen as an additional source of shared leadership and also as an important facilitator of the shared leadership process (Cox et al., 2003; Hoegl & Muethel, 2008; Houghton et al., 2003; Pearce, 2004; Ziegert, 2005). As such, team leaders are expected to establish, maintain, and foster shared leadership in a team (Cox et al., 2003; Hoegl & Muethel, 2008; Houghton et al., 2003; Pearce, 2004).

This dissertation gives important implications for the answer to the question of how team leaders can meet this expectation of facilitating shared leadership in dispersed innovation teams by identifying important areas of influence, namely, motivation, opportunity, and ability for shared leadership, as well as concrete team-level antecedents that can be shaped by team leaders, like team reflexivity, for instance. More specifically, this dissertation suggests that team leaders in dispersed innovation teams need to establish a willingness for shared leadership in teams by reaching high levels of team trustworthiness. In addition, team leaders need to implement team reflexivity processes to give team members the opportunity to realize leadership needs. The effects of such an opportunity should be increased by team leaders through the establishment of high levels of team role breadth self-efficacy and team empowerment. Team leaders also need to furnish their teams adequately in terms of ability and must consider structural team properties that could affect team shared leadership evolution.

It is argued that team leaders should address these areas of influence throughout the natural life cycle of a team project, which consists of three main stages. First, teams undergo a team establishment stage in which team members are selected and the team is established (Greenberg, Greenberg, & Antonucci, 2007). Second, teams face their forming stage in which team members get to know each other and the project (Tuckman, 1965). Finally, teams move into the performing stage in which the actual work outcomes must be produced (Tuckman, 1965). The following pages describe the means by which team leaders can adequately address, along the team's life cycle, the team-level antecedents identified in this dissertation as being crucial for shared leadership to occur, thus enabling team leaders to adequately address the motivation, opportunity, and ability needed for the evolution of shared leadership in dispersed innovation teams.

Establishment Stage. In a first step, team leaders who are put in charge of a new dispersed innovation project must select their team members in order to establish a project team (Greenberg et al., 2007). Thus, aspects of team composition aiming to select the right team members become relevant (Dubé & Robey, 2009; Greenberg et al., 2007). Managerial implications for the establishment stage can especially be drawn from chapter 6. First, the results in chapter 6 indicate that team leaders should select employees who are good at participative leadership styles based on trust and integration. This is implied by the positive relationship between female ratio and team shared leadership. Therefore, employees with a rather autocratic and directive leadership style should be avoided. Second, the positive

relationship between team member mean age and shared leadership points to the case, that team leaders should select team members who are less accustomed to traditional hierarchical structures, familiar with flexible and fast-paced work modes, and competent in the newest ways of virtual collaboration. Thus, the advantages possessed by older team members in terms of deep industry knowledge and increased practical experience cannot be recommended as selection criteria for dispersed innovation teams. Third, based on the results of this research, team leaders can be urged to be open to team diversity in terms of age and nationality. Against expectation, both kinds of diversity were not found to be negatively related to shared leadership in dispersed innovation teams. In fact, age diversity was found not to be related to team shared leadership at all and national diversity was found to be even marginally positively related to team shared leadership, suggesting that teams with high national diversity have advantages for shared leadership development. Nevertheless, based on this study, strong effects of demographic diversity on shared leadership cannot be assumed. Hence, team leaders should not invest too much time into matters of demographic diversity.

Fourth, it is suggested that team leaders should look for team members who are highly competent in terms of social skills. Team leaders should note that among all analyzed variables in this study, the level of social skills in a team was one of the strongest predictors of shared leadership behaviors in dispersed innovation teams. This importance of social skills becomes even more crucial when considering that social skills also foster benevolence in teams, which has also been shown in this study to positively relate to shared leadership (Fletcher & Kaeufer, 2003; Sun et al., 2007). Thus, when composing their teams, team leaders should focus on team members who possess high social skills. Fifth, a focus on project management skills cannot be recommended as this study could not find a relationship between project management skills and shared leadership. Sixth, in terms of task ability, team leaders should notice the result in chapter 4. Team task ability could not be validated as being positively related to shared leadership in dispersed innovation teams. Seventh, team leaders should note that, even though this relationship was not strong, this study suggests that a small team size is rather beneficial for high levels of team shared leadership to occur. Finally, team leaders should realize that the results of this study indicate that physical dispersion beyond two sites of a company, temporal dispersion, and project length are not crucial for the evolvement of team shared leadership in dispersed innovation teams. Thus,

team shared leadership can be comparatively implemented in teams that are less or more dispersed or are assigned to shorter or longer projects.

In order to be able to select adequate team members, team leaders rely on their companies to recruit and develop employees according to their above discussed needs. Hence, this dissertation also gives implications for HRM on a corporate level regarding employee recruitment and development strategies. As such, it is recommended that recruitment strategies and training systems focus on integrative leadership skills, employee flexibility and skills on virtual team collaboration, as well as social skills. In addition, the finding of diversity's rather weak effects on the evolvement of shared team leadership is especially interesting to HRM at a corporate level. While demographic diversity might be beneficial within companies to promote general fairness and for political reasons, HRM practitioners should note that this study found (national) diversity to only have a slightly positive effect on shared leadership behaviors in dispersed innovation teams (Benschop, 2001). Thus, companies that face increasing diversity in terms of age (through aging workforce demographics and the upcoming war for young talents) and nationality (through increased globalization) can be encouraged to accept such increasing diversity in their work teams as this study suggests no negative effects. However, a specific focus on fostering demographic diversity through according recruitment strategies (that might be costly) cannot be suggested from a team performance perspective as effects of age and national diversity on shared leadership in dispersed innovation teams were not found to be strong.

Forming Stage. After team establishment, teams usually undergo a forming stage in which team members get to know each other and the project (Furst et al., 2004; Tuckman, 1965). In dispersed innovation teams, it is especially important for team leaders to actively manage this stage as team members often hardly know each other, lack common ground, and have less of a chance to naturally overcome these difficulties through regular, personal team interactions (Cramton, 2001, 2002). In order to overcome this challenge of dispersed team settings, team leaders should spend considerable time in this stage of the project establishing a solid basis for high team trustworthiness, team reflexivity, team role breadth self-efficacy, and team empowerment. An intense face-to-face project kick-off meeting, for instance, should be used to allow team members to get to know one another personally, thus directly fostering benevolence-based trustworthiness due to stronger personal relationships among team members (Cohen & Bailey, 1997; Dubé & Robey, 2009; Monalisa, Daim, Mirani, Dash, Khamis, & Bhusari, 2008). Team leaders might also want to integrate special team

building activities into such a kick-off meeting, especially if problems in terms of benevolence are likely (e.g., due to former personal conflicts among single team members). If a personal kick-off meeting is not possible, managers should still invest considerable time in enabling team members to learn more about their teammates (Greenberg et al., 2007; Majchrzak, Malhotra, Stamps, & Lipnack, 2004). Specific virtual team exercises should be implemented so that team members can bond with each other even across distance (Greenberg et al., 2007; Henttonen & Blomqvist, 2005). An example of such an exercise would involve team members “interviewing” other team members and then introducing them to the rest of the team via telephone (Greenberg et al., 2007). It should be noted that existing research heavily suggests a personal kick-off meeting (even more than subsequent face-to-face meetings) for dispersed teams, arguing that such an initiating personal meeting is efficient overall even despite potentially high costs (Dubé & Robey, 2009; Monalisa et al., 2008).

Moreover, communication norms should be discussed at the beginning of a project to allow for the establishment of high levels of integrity, in terms of reliability, in a dispersed team setting (Nemiro, 2004). Communication norms specifically in terms availability (e.g., team members must check their email once per day and respond within two hours) and commitment (e.g., if team members agree upon a new work method, this work method needs to be followed) ensure that team members become reliable (Malhotra, Majchrzak, & Rosen, 2007; Nemiro, 2004). At best, team leaders should initiate a process in which team members develop their own communication rules in order to increase identification with those rules and thus the probability of rule adherence. Team leaders should also make sure that communication norms are documented (e.g., in a team’s virtual workspace) and that adequate processes are in place for norm violation (Malhotra et al., 2007). In addition, benevolence and reliability should be fostered by setting a common project language for all team members (Monalisa et al., 2008). The use of multiple languages can lead to feelings of exclusion as some team members might not be able to follow what others are saying, thus putting benevolence at risk. The use of multiple languages can also lead to misunderstandings, putting reliability as risk.

During a team’s forming phase, team leaders should also commence initial discussions on a team’s goals, division of work, and milestones, thus enabling the identification of leadership needs from the start (Dubé & Robey, 2009; Warkentin & Bernek, 1999). Ideally, such a first team reflection should be made through a face-to-face kick-off

meeting (Malhotra et al., 2007). If a personal meeting of all team members is not possible, time should be spent at the beginning of a project to discuss the teams' objectives and next steps via synchronous communication means (e.g., telephone- or videoconferencing). Moreover, as it is shown in this study that team reflexivity is especially strongly related to team shared leadership under high levels of team role breadth self-efficacy and team empowerment, team leaders should foster both instances beginning in the forming stage. As such, team leaders should encourage team members to expect a lot from themselves and to expand their traditional roles in order to foster high levels of team role breadth self-efficacy. One possible way to do this is by directly expressing that team members are expected to take over responsibilities and that the team was accordingly composed of highly skilled team members who can do so. Team empowerment can be facilitated by team leaders by showing the project's meaningfulness and impact within the company (Kirkman & Rosen, 1999; Kirkman et al., 2004). For instance, inviting important stakeholders to the kick-off meeting provides a feeling of impact and is likely to empower team member right away. Finally, team leaders should use the forming stage of a team to check if team members have the skills expected from them to attain high levels of team shared leadership (Beranek, Broder, Reinig, Romano, & Sump, 2005). At the beginning of a project, adjustments to overcome ability-related weaknesses in a team can often still be made with manageable effort, for instance, through training courses or team leader coaching (Warkentin & Bernek, 1999).

Performing Stage. After the forming stage of a team is complete, team leaders should move their teams into the final stage of the project, the performing stage. In this stage, delivery of work outcomes takes first priority rather than team establishment or getting to know the team members and team task (McQuaig, 2006; Tuckman, 1965). In this phase, team benevolence and thus team shared leadership should be further fostered by regular face-to-face meetings that strengthen personal bonds among team members (Malhotra et al., 2007; Monalisa et al., 2008). Moreover, team leaders should encourage team members to express their appreciation of each other's contributions and steadily communicate social and emotional information to reach even higher benevolence levels (Greenberg et al., 2007; Monalisa et al., 2008). Personal conflicts should be handled quickly by the team leader or be avoided in the first place through adequate conflict management (Kankanhalli, Tan, & Kwok-Kee, 2006; Tekleab, 2009). One way to avoid personal conflicts in a dispersed team setting is, for instance, to make sure team members suffer equally from the team's distribution by rotating meeting times and locations (Malhotra et al., 2007). In terms of

integrity-based trustworthiness, team leaders need to make sure that the communication norms are adjusted as necessary and that any violation of the communication norms is punished (Dubé & Robey, 2009; Malhotra et al., 2007). One possible solution to violated norms is to demand an apology and clarification from the unreliable team member (Ferrin, Kim, Cooper, & Dirks, 2007; Kuwabara, 2006). Such clarification should explicitly state the reasons for not being consistent and should be offered soon after the violation has occurred, as this signals that the team member recognizes his or her deviant behavior (Kuwabara, 2006; Lewicki & Bunker, 1996).

In terms of high levels of team reflexivity, team leaders should implement regular team meetings during which team members collectively discuss their team goal, team task, environmental changes, and current challenges (Beranek et al., 2005; Dubé & Robey, 2009). Previous studies have shown that such regular meetings were in fact “the glue that held the team together” (Dubé & Robey, 2009). During such team meetings, all team members regardless of location and position should have a say. As such, during meetings, team leaders should ensure through “check-ins” that everyone is engaged and heard from as especially in virtual meetings team members can easily be unintentionally neglected (Malhotra et al., 2007). The aim should be to get each team member’s input as only then can adequate team reflection happen (Dubé & Robey, 2009). Moreover, agendas should help team members to focus on the most important team- and team task-related issues. Thereby, it should be noted that even though past research has shown the importance of face-to-face team reflections (Chidambaram & Lai Lai, 2005), regular telephone- and video meetings have also been shown to be beneficial (Majchrzak et al., 2004). This is important to note as despite their importance for dispersed team success, holding face-to-face meetings on a regular basis can be expensive, time consuming, and even disruptive if team members realize inefficiencies (Dubé & Robey, 2009). Therefore, an appropriate balance between remote and co-located team reflections should be found and the frequency, timing, as well as purpose of face-to-face reflections should be thought through (Dubé & Robey, 2009). To increase positive effects of team reflexivity on shared leadership, team reflection meetings should also be used to further encourage team members to believe in their capabilities and to celebrate the interim achievements of the team. While encouragement is crucial for team role breadth self-efficacy, achievement celebration can be expected to especially foster team empowerment as team members get a sense of team potency and team task meaningfulness (Kirkman et al., 2004). Moreover, to enhance team empowerment, team leaders should make team progress

explicit through balanced scorecard measurements that are posted in the team's virtual workspace or sent via email to all team members (Malhotra et al., 2007).

Thereby, it is argued that each stage of a team's life cycle should have a different focus (Tuckman, 1965). Team composition aspects clearly matter most at the very beginning of a project, when a team is established. Team trustworthiness is especially crucial during a team's forming phase as trust that is not established or is even violated at the beginning of a project is hard to attain and repair, especially across physical distance (Kim, Dirks, & Cooper, 2009; Kuwabara, 2006). Team reflection meetings are most important in the performing stage of a team's life cycle after trust could be built in the forming stage. In this stage, constant and repeated reflection on team goals and tasks is crucial to adequately identify leadership needs and also to hold the team together. Figures 7-2 to 7-4 depict the managerial implications of this dissertation for each stage of a team's life cycle, thus providing a checklist for team leaders of dispersed innovation teams that want to foster high levels of shared leadership.

<p>Establishment Stage</p> <p>Team Members are selected</p>	<p>Focus Suggested: Team Composition (-> Ability and Structural Team Properties)</p> <p>Criteria for Team Member Selection</p> <ul style="list-style-type: none"> - Integrative and trust-based Leadership Skills (indic. by Female Ratio) - Less used to traditional Work Structures, Familiarity with flexible and fast-paced Work Modes, and Competence in newest Ways of Virtual Collaboration (indic. by Mean Age) - National Diversity is rather positive (weak Relationship) - Most important: Social Skills <p>Additional Things to note</p> <ul style="list-style-type: none"> - Task Ability could not be validated as relevant - Age Diversity could not be validated as relevant - Project Management Skills could not be validated as relevant - Team Size should be rather small - Project Length, Number of Sites, and Temporal Dispersion could not be validated as relevant
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Figure 7-2: Checklist for Team Leaders in the Establishment Stage

<p>Forming Stage</p> <p>Team Members get to know each other and the Project</p>	<p>Focus Suggested: Building Benevolence- and Integrity-Based Trustworthiness</p> <p>Measures Suggested</p> <ul style="list-style-type: none"> - Face-to-Face Project Kick-Off Meeting (-> Benevolence and Team Reflexivity) - Alternatively if face-to-face Kick-Off is not possible or in addition if needed: <ul style="list-style-type: none"> • Virtual bonding Events (-> Benevolence) • Virtual Team Reflections via synchronous Communication Means (->Team Reflexivity) - Agreement on Communication Norms (-> Integrity) - Set a common Project Language (-> Benevolence and Integrity) - Encouragement to expand Work Role (-> Team Role Breadth Self-Efficacy) - Stressing Meaningfulness and Importance of the Team Task; e.g., Inviting important Stakeholders to Project Kick-Off Meeting (-> Team Empowerment) - Check Ability Base and take according Adjustments (-> Ability and Structural Team Properties)
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Figure 7-3: Checklist for Team Leaders in the Forming Stage

<p>Performing Stage</p> <p>Team Members need to deliver Work Outcomes</p>	<p>Focus Suggested: Team Reflexivity</p> <p>Measures Suggested</p> <ul style="list-style-type: none"> - Team Meetings (-> Benevolence and Team Reflexivity) - Advices for Meetings: Finding right balance between face-to-face and virtual team meetings (costs vs. outcomes) Regularity Clear Purpose and Agenda Inclusion of all Team Members/Locations Celebrate interim Achievements (-> Team Reflexivity and Team Empowerment) - Encourage the Exchange of positive Feedback and social Information (-> Benevolence) - Avoidance of personal Conflicts; e.g., rotate Meeting Times according to Time Zones (-> Benevolence) - Adaption and Enforcement of Communication Norms; e.g., Consequences for Rule Violation (-> Integrity) - Constant Coaching and Encouragement toward Work Role Extension (-> Team Role Breadth Self-Efficacy)
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Figure 7-4: Checklist for Team Leaders in the Performing Stage

7.3 Future Research

This dissertation shows that several team characteristics can be argued and empirically validated as being important team-level antecedents of shared leadership in dispersed innovation teams, thus giving important insights on team shared leadership involvement in dispersed innovation teams. Nevertheless, this dissertation also points to some unanswered questions of shared leadership emergence that should be addressed by future research.

Several open issues directly arise from the “non-findings” of this study. The surprising result that task ability (-based trustworthiness) was not positively related to team shared leadership calls for more research on this topic, especially empirically. The assumption that the missing relationship was due to the high levels of this kind of ability in the sample and that this might apply to most dispersed innovation teams should be tested in further empirical studies. In terms of project management skills, it should be investigated if high levels of project management skills lead to more rigid team processes that hinder creative, mutual exchanges among team members and thus shared leadership, as it is assumed to do by this research. Age and national diversity should be clarified as unrelated (in terms of age diversity) and positively related (in terms of national diversity) to shared leadership by analyzing these variables within other samples, maybe changing the software industry context of this study. Moreover, in terms of diversity, it might be interesting to also analyze questions of educational and functional diversity and also questions of diversity in terms of experience. Such forms of diversity are called task-related forms of diversity whereas age and national diversity are called surface level forms of diversity (Kearney et al., 2009). As this research assumed a certain level of task-related variety as accompanying demographic diversity (e.g., variety in experience with age diversity), it might make sense to directly address task-related diversity in future research. Such an approach might be useful to better understand the influence of team diversity on shared leadership in dispersed innovation teams.

This dissertation also provided results regarding team size, project length, and dispersion that were not consistent with prior research and thus call for more future research. Team size should be further investigated in samples with higher variances regarding the number of team members, focusing on the question of whether team size, like indicated in this study, is negatively related or indeed curvilinear related (inverted u-shape) to shared

leadership like most researchers assume (Conger & Pearce, 2003; Cox et al., 2003; Pearce & Sims, 2000; Seers et al., 2003). Project length should also be further investigated to clarify if it is related to shared leadership in dispersed innovation teams. As this study found that the number of sites beyond two sites across which a team is dispersed did not relate to shared leadership, researchers should conduct studies comparing team shared leadership involvement in face-to-face teams and teams with minimal dispersion in order to find out if minimal dispersion affects team shared leadership. Moreover, more research seems to be needed on the topic of temporal dispersion in dispersed innovation teams. The surprising result that temporal dispersion did not affect team shared leadership should be further analyzed within a sample with higher variance regarding temporal dispersion (than the sample used in this dissertation).

By elaborating on team reflexivity under conditions of high and low team role breadth self-efficacy and team empowerment, this dissertation points to interesting interaction effects within team shared leadership development. In fact, it could be shown that team reflexivity with low levels of team-oriented motivation is by far less related to team shared leadership than it is with high levels of team-oriented motivation. Prior research hardly analyzed such interaction effects. Only Carson et al. (2007) investigated the interaction between internal team environment and external coaching, finding a moderation effect. Thus, future researchers of team shared leadership should integrate interaction effects much more into their research. Especially for practice it is helpful to realize that the effectiveness of certain antecedents critically depends upon further variables as only with knowing such relationships can practitioners adequately pursue shared leadership strategies.

The aim of this study has been to elaborate on team-level antecedents of shared leadership in dispersed innovation teams in detail and on a sound theoretical basis. However, obviously not all possible team-level antecedents of shared leadership in dispersed innovation teams could be elaborated upon. While most previously mentioned team-level antecedents were considered in this research, some variables could not be addressed. A team's level of self-leadership, for instance, could not be included in this dissertation as the operationalizability of this construct is highly difficult, especially within the team-level investigation setting used in this dissertation (which asked respondents to evaluate the properties of the team as a whole). A common self-leadership strategy is, for instance, somebody rewarding himself through mentally focusing on rather pleasant work aspects (Manz & Neck, 1998). Such an instance is hardly assessable for other team members,

though. Thus, a team-level item like, “All team members mentally focused on rather pleasant work aspects” does not really make sense. Future research might want to fill in this research gap by using alternative research designs that collect data on an individual level. Thereby, it should be noted that an investigation on the team-level using a referent shift model was chosen due to the clear advantages of such an approach (as opposed to some disadvantages like, for instance, dropping self-leadership from the analysis). The main advantage of this approach is that it enables the collection of real work team data. Individual data of members on real work teams, in contrast, is rarely available for collection as companies and work councils usually prevent the collection of such data.

Another important area of future research should be the role of the team leader within shared leadership development. As already discussed, team leaders are expected to integrate themselves into the team as an additional source and receiver of shared leadership and to additionally act as an important facilitator of the shared leadership process (Cox et al., 2003; Hoegl & Muethel, 2008; Houghton et al., 2003; Pearce, 2004). This position of a team leader within the shared leadership process might be difficult in practice though, as on teams with high levels of team shared leadership, team leaders might fear that they appear to have insufficient competence and little assertiveness (Houghton et al., 2003). Thus, in practice, team leaders, the ones who should actually facilitate shared leadership, might often be the ones who rather hesitate to implement shared leadership as it appears to decrease their status (O’Toole, Galbraith, & Lawler, 2003). And even if team leaders are not status-oriented, they might feel that other benefits, like promotion, for instance, are threatened by sharing leadership responsibilities (Houghton et al., 2003). This is because career paths within organizations are still mainly built on tournament models of competition based on images of autonomy, self-promotion, and the goal of differentiating oneself from others (Fletcher & Kaeufer, 2003). This notion is even more critical when another aspect is considered, namely, that team leaders have already made substantial career steps in a company. Otherwise, they would not have been designated to lead a team. Thus, they have already differentiated themselves from others through individual achievement. But now, once they have reached the top, they are also expected to have developed the relational skills necessary to enable, empower, and contribute to the development of others (Fletcher & Kaeufer, 2003). Obviously the practical question arises of whether vertical team leaders are likely to be able to facilitate shared leadership. These difficulties surrounding the issue of vertical leadership as a potential antecedent of shared leadership point to the need to further analyze vertical

leadership behaviors within shared leadership processes. Vertical leadership behaviors should be further specified and also empirically investigated.

Moreover, future researchers might want to elaborate on team-level antecedents of shared leadership within other contexts. While shared leadership itself has been investigated in various contexts (e.g., Eisenhardt & Bourgeois, 1988; Ensley et al., 2006; Pearce & Sims, 2002), this study is the first research explicitly linking context-specific aspects to the relationship between shared leadership and its antecedents. Thereby, researchers who want to analyze antecedents context specifically should keep in mind that shared leadership should be relevant in the analyzed context. This means that studying antecedents of shared leadership in a specific context only makes sense if shared leadership has been shown to be positively related to team performance in that context. Besides the context of dispersed innovation teams, researchers have demonstrated shared leadership's effectiveness especially for complex and creative tasks (Pearce, 2004; Pearce & Manz, 2005). As such, another context that might be interesting to look at is the context of entrepreneurial teams. Accordingly, Ensley et al. (2006) showed that entrepreneurial teams rely heavily upon shared leadership for team performance. But are the team-level antecedents of shared leadership in such new venture teams similar to the factors identified in this dissertation? And how can such teams implement important antecedents considering that such teams usually operate without previously existing management and organizational structures? These questions should be addressed by future researchers to help entrepreneurial teams reach high levels of shared leadership.

Finally, it should be noted that this dissertation focused on team-level antecedents of shared leadership. Antecedents stemming from other levels might also be interesting to look at, though. On an organizational level, organizational culture or organizational reward systems might influence shared leadership in dispersed innovation teams (Pearce, 2004; Pearce & Manz, 2005). In terms of organizational culture, a flexible, open-minded, and participative culture could be positively related to shared leadership involvement. And in terms of rewards structures, prior research especially recommends team-based reward systems in order to foster shared leadership (Pearce, 2004). While these assumptions intuitively make sense, empirical studies on these potential relationships between organizational culture, reward systems, and team shared leadership do not exist. Hence, to draw a more complete picture on how to foster team shared leadership in dispersed

innovation teams, future research should complement this dissertation by elaborating on antecedents of shared leadership on various levels.

7.4 Limitations

Despite its clear contributions, some limitations of this dissertation should be noted. First, in terms of empirical results the sample used in this dissertation may reduce the generalizability of the results. The sample focused on software project teams because the IT-industry has taken a pioneering role in virtual team collaboration with a focus on innovative tasks like new software developments (He et al., 2007; Hertel, Konradt, & Orlikowski, 2004; Orlikowski et al., 2004). Although it is not assumed that the results of this research are specific to the context found inside of software projects, future research to assess whether the present study's findings can be replicated in dispersed innovation teams outside of the software industry is recommended. Second, the cross-sectional design of this dissertation makes it impossible to ascertain any causal directions. For example, it was argued that team reflexivity fosters shared leadership. But team shared leadership may instead, or in addition, also foster team reflexivity, as mutual influence processes often arouse further explanations and discussions among team members. Hence, while this research demonstrates relationships, a longitudinal research design would be needed to further the knowledge of causality. Third, this dissertation used a rather new measure of team shared leadership. Even though this new measure created by Hoegl and Muethel was verified with various quality measures as being in line with classical test theory and yielded good results (Hair et al., 2006; Nunnally & Bernstein, 1994), it should still be tested within more studies in order to confirm its validity and reliability. Fourth, besides measures on structural team properties, all variables analyzed in this study were assessed through latent social constructs that used subjective judgments of individuals as a basis (Faure, 2008). Such subjective assessment can be biased. Nevertheless, it should be noted that classical test theory was used to validate all used measures (Churchill, 1979; Hair et al., 2006; Nunnally & Bernstein, 1994). Fifth, in contrast to qualitative studies but similar to all quantitative researches, this dissertation is limited in its findings. As such, only the team-level antecedents hypothesized could be confirmed or not confirmed being team-level antecedents of dispersed innovation teams. Completely new approaches or processes that foster team shared leadership could not be found within this study due to its quantitative approach.

7.5 Conclusion and Outlook

Dispersed innovation teams rely upon committed team members who share leadership responsibilities (Muethel & Hoegl, 2010; Pearce et al., 2004). Shared leadership helps to successfully handle task innovativeness as it brings the expertise of all team members to bear (Pearce, 2004; Pearce & Conger, 2003). Through mutual social influence among team members, it also helps to overcome the limited social influence of a single leader due to geographical (Muethel & Hoegl, 2010; Orlikowski et al., 2004; Pearce & Conger, 2003). This dissertation shows that, despite the challenges they face in doing so, dispersed innovation teams can in fact establish high levels of shared leadership. This dissertation further demonstrates that shared leadership in dispersed innovation does not happen at random, but rather is the result of certain team processes and team composition aspects that can be actively managed. Thereby, motivation, opportunity, and ability for shared leadership are revealed as basic conditions of shared leadership evolvment based on MOA theory (Blumberg & Pringle, 1982). More specifically, benevolence-based trustworthiness and integrity-based trustworthiness are empirically validated as drivers of the motivation to share leadership. Team reflexivity is confirmed as a provider of the opportunity to share leadership. Social skills are shown as being a key ability necessary for shared leadership evolvment, and female ratio, mean age, and national diversity are shown as being influential team composition aspects that also affect ability for shared leadership.

Overall, this research underscores the benefits of shared leadership in today's demanding environment and gives valuable insights into ways to reach high levels of shared leadership responsibility in dispersed innovation teams. Thereby, against the background of corruption scandals brought about by power concentration on single individuals (like Enron and WorldCom), and a global financial crisis that is often argued to be rooted in a systemic "diffusion of responsibility" (Lenz, Frey, & von Rosenstiel, 2010; Pearce et al., 2008; Taleb & Triana, 2008), this research might also draw attention to the general topic of responsibility distribution in today's business context. This dissertation focused on establishing high levels of shared leadership in teams, as teamwork has become increasingly complex and virtual within the last years, calling for structures of a shared responsibility for overall goals (Hoegl & Muethel, 2007; Pearce & Conger, 2003). But not only team environments have become increasingly complex and virtual, whole organizations and financial markets also face these challenges and thus struggle with questions of an optimal distribution of power and influence among participants (Lenz et al., 2010; Pearce et al., 2008). Thus, this dissertation might also

spark more general research on influence distribution at many different levels of today's economic system. Researchers might want to investigate how to reach higher levels of shared responsibility at executive management levels and whole markets in order to provide more checks and balances, more accountability, and thus less scope for corruption and irresponsible actions (Pearce et al., 2008). A greater emphasis on shared leadership approaches, both in research and practice, may well offer not only ways for higher performance levels in dispersed innovation teams but also the potential to find ways to better protect today's business world against future corruption scandals and crises (Pearce et al., 2008).

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