Article

Management Learning
41(4) 473–491

DOI: 10.1177/1350507610362036
mlq.sagepub.com

Leadership and trust: Their effect on knowledge sharing and team performance

Pauline Lee,[1] Nicole Gillespie,[2] Leon Mann[1] and Alexander Wearing[1]

Abstract

Team leaders who facilitate knowledge sharing and engender trust contribute to team effectiveness. While the separate effects of leadership, trust and knowledge sharing on team performance are well documented, few scholars have investigated the specific links between these factors. This study examines the relationship between the leader as the knowledge builder, trust in the leader and in the team, knowledge sharing and team performance. Surveys were collected from 34 engineering project teams (n=166 team members, 30 team leaders) and 18 managers in a large automotive organization. The results indicate that by building the team's expertise, leaders enhance team members' willingness to rely on and disclose information in the team, which in turn increases team knowledge sharing. Team knowledge sharing significantly predicted leaders' and managers' ratings of team performance. The theoretical and practical implications of the findings are discussed.

Keywords

knowledge sharing; leadership; teams; trust

Introduction

Knowledge sharing in teams has been found to lead to superior team performance (Srivastava et al., 2006). This has been shown in different settings such as new product development teams (Madhavan and Grover, 1998), research and development teams (Bain et al., 2005) and software development teams (Faraj and Sproull, 2000). Over the past 15 years, research into knowledge sharing in teams has identified a variety of determinants including personality traits (Kurt et al., 2008), team communication styles and knowledge sharing attitudes (deVries et al., 2006), interpersonal familiarity (Gruenfeld et al., 1996), structural diversity (Cummings, 2004) and diversity of team member expertise (Stasser et al., 2000), and small team size (Stasser and Stewart, 1992). Of the determining factors, leadership has shown a particularly strong influence on team knowledge sharing (Politis, 2001; Srivastava et al., 2006). Trust, because it underpins a willingness to communicate, is also critical for knowledge sharing in teams (Mooradian et al., 2006). Currently,

[1] The University of Melbourne, Australia
[2] University of Queensland Business School, Australia

Corresponding author:
Pauline Lee, Psychological Sciences, University of Melbourne, Victoria 3010, Australia
Email: paulineann@gmail.com

there is little empirical research on the specific pathways by which leadership and trust together affect knowledge sharing in teams.

Knowledge sharing is defined in this study as the exchange of explicit and tacit knowledge relevant to the team task. This definition is similar to Hansen and Hass's (2007) description of knowledge sharing as the provision or receipt of technical information, know-how and skills. Knowledge sharing involves interaction and communication among team members (Cohen and Bailey, 1997) and includes the implicit coordination of expertise or information about who knows what in the group (Faraj and Sproull, 2000).

The distinction between tacit and explicit knowledge is a much misunderstood relationship. We support Polanyi's (1966) and Tsoukas' (2005) view that tacit and explicit knowledge are not two ends of a continuum but two sides of the same coin. Tacit knowledge consists of knowledge that we do not recognize in ourselves or that is based on the experience of the individual that is not easily shared. For example, it is the ability to ride a bicycle or recognize a face. In contrast, explicit knowledge is easily communicated, codified and is clearly in our awareness. For example, an engineering team might discuss flaws in the product design but remain tacitly unaware of how the team is having the discussion. The team discussion is the exchange of explicit knowledge whereas the processes underpinning the discussion and hunches about flaws are tacit knowledge. The essence of tacit knowledge is encapsulated in Polanyi's phrase 'we know more than we can tell'.

Several aspects of leadership and trust have been examined in relation to knowledge sharing. Research has demonstrated the positive direct effects of leadership (Srivastava et al., 2006) and trust (Dirks, 1999; Kimmel et al.,1980; Renzl, 2008) on team knowledge sharing. Farrell et al. (2005) investigated the joint effects—both direct and indirect—of transformational leadership and senior managers' team trust on knowledge sharing in organizations. However, it is not clear from this study how trust influences leadership and knowledge sharing. Lin (2007) explored the mediating effect of interpersonal trust on justice, cooperativeness, social network ties and knowledge sharing among employees. Chowdhury (2005) found that both affect- and cognition-based trust influences knowledge sharing between members of a dyad.

We build on the previous research by investigating whether leadership role performance has an impact on team knowledge sharing directly, as well as indirectly, through the mediation of trust in the team and trust in the leader. This study differs from previous work in three main ways. First, this study examines the leader's knowledge-building role (Bain et al., 2005) and how it affects knowledge sharing and team performance, whereas the studies cited above mainly examined transformational leadership. Second, this study examines team members' trust in two referents: the leader and the team. It advances our understanding by examining how trust in the leader and trust in the team may mediate the relationship between leadership role performance and knowledge sharing. Third, this study deepens understanding of the pathways to knowledge sharing by examining the effects of leadership on two behavioural expressions of trust: willingness to rely on another (reliance) and willingness to share sensitive information with another (disclosure) (Gillespie, 2003). In this way, our study offers a more precise understanding of how the leader facilitates knowledge sharing in the team.

Conceptual framework

Our conceptual framework draws on the literature in knowledge management, project team leadership, organizational trust and general organizational behaviour theory (Andrews and Delahaye, 2002; Joseph and Winston, 2005; Polanyi, 1966). The framework (see Figure 1) posits that leadership role behaviour (knowledge builder) together with trust in the leader and team have significant

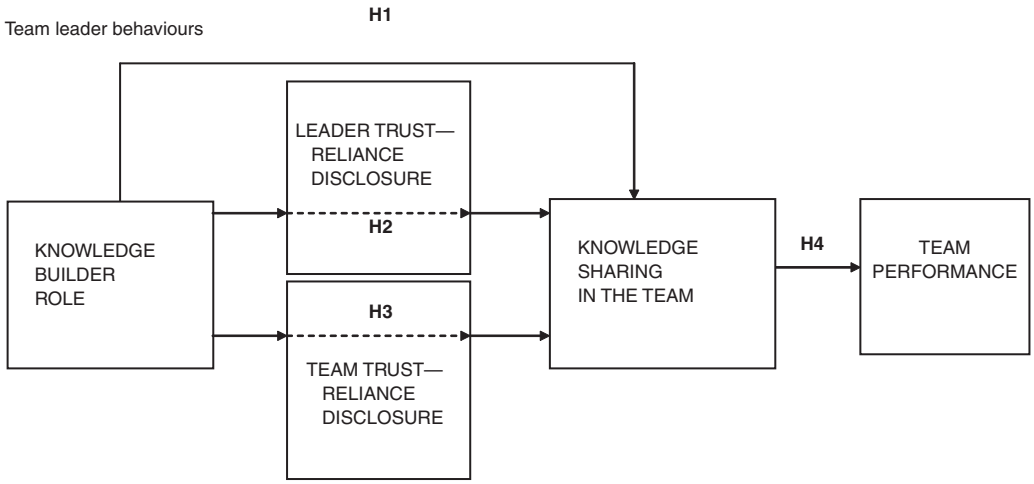

Figure 1. Conceptual framework: Hypothesized relationships between Leadership Behaviours, Trust in Leader, Trust in Team, Knowledge Sharing and Team Performance.

effects on team knowledge sharing, which in turn has a positive effect on team performance. Leadership has an impact on team knowledge sharing directly and indirectly through trust in the team and leader. In the next section we provide the rationale for four hypotheses that together comprise the conceptual framework.

Leadership roles and knowledge sharing

One approach to understanding leadership in team settings is to conceptualize it as a set of roles involved in managing key tasks and functions essential for team performance (Mintzberg, 1973). Examples of such roles include organizing, envisioning, spanning and social maintenance (Barry, 1991). More recently, in an investigation of leadership in the context of research and development teams, Bain and colleagues (2005) identified four prominent roles performed by team leaders: knowledge builder, team builder, stakeholder liaison and standards upholder.

Of these roles, the knowledge builder is particularly relevant to the study of team knowledge sharing. According to Bain et al. (2005) leaders who act as knowledge builders perform the following behaviours: they provide their own advice on technical issues, develop the team's expertise, scan the environment for new ideas, monitor the quality of the team's work and initiate new approaches to team tasks.

Knowledge sharing in a team is not automatic, and the team's leader has the potential to strongly influence the extent of knowledge sharing (Srivastava et al., 2006). By practising the knowledge builder role, leaders create opportunities and processes that stimulate and encourage knowledge sharing amongst team members. For example, by offering new ideas, challenging technical solutions and stimulating new approaches to work, leaders instigate team discussions and reviews which, by their very nature, lead to team knowledge sharing. By engaging in knowledge builder behaviours, leaders also actively role model knowledge sharing. They are setting the example and signalling that the open sharing of ideas and information is important and valuable for the team. As a result of this role modelling, team members are likely to reciprocate and share their expertise and

knowledge with the team. Thus, we expect that the stronger the leader's performance of the knowledge builder role, the greater the level of knowledge sharing in the team:

Hypothesis 1: The knowledge builder role will have a positive effect on team knowledge sharing.

Trust as a mediator of the relationship between leadership and knowledge sharing

We examine further whether the relationship between leadership role performance and team knowledge sharing is mediated by trust. That is, the team leader's knowledge building engenders the team's trust, which in turn enhances team knowledge sharing.

In their seminal article on trust in organizational settings, Mayer et al. (1995: 712) defined trust as 'the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party'. A recent in-depth qualitative and quantitative study into the structure and measurement of trust in project teams identified reliance on others, and disclosure of sensitive information to others, as two principal dimensions of trust in team contexts (see Gillespie, 2003). Reliance-based trust is defined as a person's willingness to depend on another. Disclosure-based trust is defined as a person's willingness to disclose personal or work-related information to another. This two dimensional model of trust draws on earlier work by Zand (1972), which identified accepting influence and sharing information as behavioural expressions of trust. It is also consistent with the view that people choose to trust in some ways but not in others (e.g. Gabarro, 1978; Lewis and Weigert, 1985). For example, a team member may be willing to discuss personal difficulties affecting his/her work with a sympathetic peer, but unwilling to rely on this peer to complete a job on his/her behalf (Gillespie, 2003). This conceptualization and behaviorally-oriented measure of trust was chosen because it captures the vulnerability and risk that is inherent to trust (see Lewis and Weigert, 1985; Rousseau et al., 1998; Zand, 1972), was specifically designed to measure trust in leader-member and peer relationships in teams, and has been well validated (see Dietz and Den Hartog, 2006).

A mediated relationship between leadership and team knowledge sharing, via trust, requires not only a significant positive relationship between leadership and team knowledge sharing (Hypothesis 1), but also significant relationships between leadership and trust, and trust and knowledge sharing (see Baron and Kenny, 1986). We explain these relationships in turn for our two trust referents: trust in the leader and trust in the team.

Trust in the leader. To date, empirical research on trust and leadership has largely concentrated on transformational leadership (Conger et al., 2000; Kirkpatrick and Locke, 1996; Korsgaard et al., 1995; Podsakoff et al., 1996; Senge, 1990), sometimes with the inclusion of contingent reward (Jung and Avolio, 2000; MacKenzie et al., 2001; Pillai et al., 1999; Podsakoff et al., 1990). In their meta-analysis of empirical research on trust in leaders, Dirks and Ferrin (2002) report a strong, positive association between transformational leadership and trust in the leader.

There has been a paucity of research on how other aspects of leadership style or role relate to trust in the leader, limiting our understanding of the different ways leaders may build trust. To our knowledge, only one study by Gillespie and Mann (2005) has examined and found that team leaders who competently perform the knowledge builder role are more likely to be trusted. We extend this work in the present study by examining the effect of the knowledge builder role on the two different aspects of trust, namely reliance- and disclosure-based trust.

In their influential model of trust, Mayer et al. (1995) propose that perceptions of the leader's trustworthiness, in the form of competence, benevolence and integrity, are the key determinants of

trust in the leader. The extent to which a leader effectively influences others and performs their role (competence), shows genuine concern (benevolence) and acts congruent with their words (integrity), affects the extent to which the leader is trusted. This model has received widespread empirical support (for a recent meta-analysis see Colquitt et al., 2007). For example, Dirks and Ferrin's (2002) meta-analysis of trust in leadership found that leadership practices impact on followers' trust in the leader by providing information about the *character* of the leader (e.g. Is the leader competent? Does s/he have integrity?) or the *relationship* with the leader (e.g. Does the leader show care and concern for the follower? Is s/he open and receptive?).

Drawing on this conceptual and empirical research, we propose that by building the team's knowledge and expertise, leaders engender the trust of their team. We illustrate how the knowledge builder role has distinct associations with reliance-based and disclosure-based trust, respectively. Leaders engaged in knowledge building provide technical expertise and advice and bring timely, cutting-edge knowledge to their team (e.g. disseminate a newly published technical report from a reputable overseas lab). These practices demonstrate the leader's competence, thus increasing the team's willingness to rely on the leader and trust his/her professional knowledge, skills and judgements. That is, these practices build reliance-based trust by positively influencing team members' perceptions of the competent *character* of the leader.

Leaders who excel on knowledge building also monitor the quality of team members' work and initiate new approaches to team tasks, demonstrating their concern for the team to continuously develop and achieve excellence and quality output. These practices signal both the leader's competence (*character*) and the leader's positive intentions for the development and performance of the team (*relationship*). When team members believe their leader is trustworthy, competent and cares about the team's work, they will be more willing to disclose their views and opinions, and share sensitive work-related information with the leader (i.e. disclosure-based trust).

Previous theoretical work and empirical research suggests a direct effect of trust in the leader on team knowledge sharing (Dirks and Ferrin, 2001; Mayer et al., 1995). Zand's (1972) reciprocal model of trust proposes that trust in another is directly positively related to the accuracy, relevance and completeness of information and knowledge shared, as well as the acceptance of others' knowledge and influence. These propositions have received considerable empirical support (Andrews and Delahaye, 2002; Levin and Cross, 2004). For example, Dirks and Ferrin's (2002) meta-analysis found that trust in the leader is positively associated with information exchange. In contrast, when trust breaks down, knowledge sharing declines as people become wary of the intentions and motivations of the distrusted party (Butler et al., 1999; Jones, 2002; Levin et al., 2002), and concerned about how information will be used and whether proper credit and acknowledgment will be given for intellectual property shared. When team members trust their leaders, they feel comfortable sharing their specialized knowledge and expertise in the group, without such fears and suspicions.

Hence, in sum we expect that good performance of the knowledge builder role will enhance team members' trust in their leader, which in turn fosters team knowledge sharing. We propose:

> *Hypothesis 2:* The impact of the leader's knowledge builder role on team knowledge sharing will be mediated by (1) reliance-based trust and (2) disclosure-based trust in the leader.

Trust in the team. So far we have discussed trust targeted toward the leader. However, it is also important that the team leader develops trust between members of the team. Trust in the team is of great importance for project work because team members are often equally or more reliant on their colleagues than on the leader for performance and satisfaction (Costa et al., 2001). Knowledge sharing in a team context is also likely to be affected by team members' beliefs and feelings about

each other, particularly their trust in each other. Indeed, trust in the team has been associated with greater levels of knowledge sharing (Levin et al., 2002). Politis (2003) found that confidence in peers and greater certainty encourages members to share knowledge. Other studies show that trust creates emotional openness (Chowdhury, 2005) and enhances the extent to which people listen to and absorb others' knowledge (Levin and Cross 2004; Mayer et al., 1995), and accept influence and share relevant knowledge (Andrews and Delahaye, 2002; Zand, 1972). Of particular note, in an experimental study of managerial problem-solving groups Zand (1972) found that high trust groups were more open, shared more relevant information and identified more creative, higher quality solutions, than low trust groups.

Despite its importance, the relationship between specific leadership behaviours, team members' trust in the team, and knowledge sharing, has received little empirical attention. We posit that by performing the role of building the team's knowledge, leaders foster trust in the team. In support of this view, Farris et al. (1973) found that leaders who maintain open communication enhance perceptions of trust in the team. Examples of how the knowledge builder role builds the two aspects of reliance- and disclosure-based trust in the team follow. Leaders who share their expertise and develop the expertise of the team, and initiate innovative practices in the team, will in turn increase the team's confidence in its competence and capability, and hence members' willingness to rely on the team. These behaviours affect team members' overall perceptions about the knowledge resources available in the team and the extent to which the team is dependable. Having confidence in the capability and expertise of the team also increases team members' willingness to disclose their ideas, beliefs and feelings about the project (i.e. disclosure-based trust) for the greater good of the team. When the team is viewed as highly capable, members will be more motivated to invest personally in the team and voluntarily disclose personal and work-related information to enhance its functioning.

Therefore, we propose that the relationship between the knowledge builder role and team knowledge sharing is mediated not only by team members' trust in the leader, but also by team members' trust in the team:

> *Hypothesis 3:* The impact of the leader's knowledge builder role on team knowledge sharing will be mediated by (1) reliance-based trust and (2) disclosure-based trust in the team.

Knowledge sharing and team performance

The final hypothesis examines the effect of knowledge sharing on team performance. Knowledge sharing in the team leads to better team performance for three reasons: improved decision making (Davenport et al., 1996), better problem solving (Kogut and Zander 1992; Salisbury, 2001) and enhanced creativity (Nonaka and Takeuchi, 1995). Increased knowledge sharing helps team members to consider more options, to learn from the experiences of others and to better use the knowledge within the team, leading to improved decision making. Knowledge sharing can help with problem solving because the problem at hand can be better understood, potential issues can be surfaced earlier and more diverse alternatives to the problem can be explored. Finally, Nonaka and Takeuchi (1995) suggest that the process of creativity starts when team members meet to share knowledge in a given area, much of which is tacit. Tacit knowledge may include insights into customer needs, hunches about what might fix an intractable problem, lessons learned from previous experience, how others have approached similar problems and information about new technologies. Sharing such tacit knowledge creates a flow of novel ideas that contribute to successful outcomes, such as new products, processes and patents. Numerous studies support the view that knowledge

sharing is critical for team performance (Ancona and Caldwell, 1992; Faraj and Sproull, 2000; Hong et al., 2004; Hoopes and Postrel, 1999). Accordingly, we predict:

Hypothesis 4: Team knowledge sharing will be positively associated with team performance.

Method

Sample and data collection

We studied teams in the engineering department of a large Australian automotive company. The teams were responsible for developing specific vehicle components (e.g. engine, body structure, door) but varied in degree of challenge and expertise necessary to perform their tasks. Teams were selected where knowledge sharing was important to accomplish team tasks. In these teams, tasks were complex, highly interdependent and non-routine, and team members were required to interact frequently to share explicit knowledge (e.g. produce technical drawings according to specification) and tacit knowledge (e.g. ideas about how to build a new prototype).

Survey questionnaires were sent to 34 product development teams, comprising 34 team leaders and 269 team members, inviting them to participate in the study. Of 303 questionnaires distributed, 62 percent of team members (n = 166), and 85 percent of team leaders (n = 30), returned fully completed surveys. The teams ranged from 3–19 members, with an average size of eight members. Team leaders had an average of three years in the leadership role and team members also had been on their teams an average of three years. The length of time project teams had been together ranged from 2–12 years, with a mean of three years.

The respondents' length of employment in the company ranged from 1–16 years. The sample was almost entirely male with only seven female respondents, and ranged in age from 20–65 years (most in the 20–35 year age range). Most respondents had completed post-secondary education.

The researchers gave each team member a survey, along with an envelope to return it directly to the researchers. Surveys were distributed to all participants over a period of one week. Team member participation was voluntary and the questionnaire cover page guaranteed individual and team level confidentiality.

Questionnaire measures

Two versions of the questionnaire were administered—one for team leaders and one for team members.

Knowledge builder role. The five-item Knowledge Builder scale from the Project Leadership Questionnaire (PLQ) (Bain and Mann, 1997) was used to measure self-reported and other reported leader performance in building team knowledge and expertise. The items are: 'How well does your team leader provide technical expertise to the team?'; 'How well does your team leader advise on technical issues to the team?'; 'How well does your team leader scan the environment inside or outside the organization for ideas and expertise?'; 'How well does your team leader monitor the quality of team members' work?'; and 'How well does your team leader initiate new strategies or approaches to team tasks?'. Bain and Mann (1997) report good psychometric properties and validity for the PLQ and for the knowledge builder scale in studies of R&D organizations (Bain et al., 2005). A seven-point response scale was used (1= *not at all well* to 7 = *extremely well*).

Team knowledge sharing. Faraj and Sproull's (2000) four-item instrument was used to measure perceptions of knowledge sharing by team members. A sample item is: 'Members in my team share their special knowledge and expertise with one another'. Each item was rated on a seven-point response scale (1 = *to a very small extent* to 7 = *to a great extent*).

Trust in the leader and trust in the team. Trust was measured using the Behavioral Trust Inventory (BTI) (Gillespie, 2003). The BTI measures two dimensions of trust: willingness to rely on another's work-related skills, abilities and knowledge (reliance), and willingness to disclose sensitive work or personal information to another (disclosure). The BTI has good psychometric properties and a stable factor structure. Two versions of the BTI were used: one where the trust referent was the team leader (or manager for team leaders), and one where the referent was the team as a whole. A sample item is: 'How willing are you to rely on your leader's task-related skills and abilities?'. The full scale is published in Dietz and Den Hartog (2006). A seven-point rating scale was used (1 = *not at all willing* to 7 = *completely willing*).

Team performance. Four items from the Team Effectiveness scale (Faraj and Sproull, 2000) were used to measure the team's ability to meet project goals, efficiency of team operations, work quality and reputation for work excellence. An additional question was asked about the team's ability to meet the expectations of their internal customers. This five-item scale corresponds to Ancona and Caldwell's (1992) two dimensions of team performance: efficiency and effectiveness. A sample item is: 'How well does your team produce quality work?'. A seven-point scale was used (1 = *well below average* to 7 = *well above average*). Team members and leaders rated all items with reference to their team. To obtain more objective performance data 18 senior managers evaluated all 34 teams. Nine of the senior mangers rated more than one team.

Interviews

Interviews were conducted with 28 of the 30 team leaders participating in the study. The other two leaders were not available for interview at the time. Leaders were asked about the role of leadership and trust in knowledge sharing and the impact of knowledge sharing on team performance. Transcripts were content analysed for ideas and comments relevant to the key variables and their relationships. The qualitative data are reported in the following Results section to support the quantitative findings.

Results

Discriminant validity

To examine the discriminant validity between the variables, the measurement model for Knowledge Builder, Trust in the Leader and Team Knowledge Sharing was factor analysed using principal components analysis with an oblimin rotation. Four factors emerged which replicated the existing scales. There was one cross-loading of 0.36 (item 3 from the disclosure-based Trust in the Leader loading onto Knowledge Builder). As this cross-loading only marginally exceeded the 0.32 recommended cut-off (see Tabachnik and Fidell, 1996) it was retained. The factor analysis was repeated for Trust in the Team, and the same four factors were found with no cross-loadings exceeding 0.30. Overall, these results support the discriminant validity between the variables.

Table 1. Team aggregation statistics for team member data (k = 34)

Variable	Random effects ANOVA	ICC (1)	ICC (2)
Trust in Team (Disclosure)	F (32, 132) = 1.71*	13%	0.41
Trust in Team (Reliance)	F (32, 132) = 1.9**	15%	0.47
Trust in Leader (Disclosure)	F (32, 132) = 1.59*	11%	0.37
Trust in Leader (Reliance)	F (32, 132) = 1.94**	16%	0.48
Knowledge Builder	F (32, 132) = 3.49***	33%	0.71
Team Knowledge Sharing	F (32, 132) = 2.45***	22%	0.60
Team Performance	F (32, 130) = 2.17**	19%	0.54

*$p < .05$, **$p < .01$, ***$p < .001$. *Note*: ICC = Intraclass correlations.

Data aggregation

To assess whether it was statistically justifiable to aggregate individual level team member data to the team level, we conducted random effects ANOVAs and calculated interclass correlation coefficients (ICC). Both types of interclass correlation coefficients were computed. ICC (1) scores estimate inter-rater reliability as well as the amount of variance in individual level responses that can be explained by group level properties (Bliese, 2000). These scores are not influenced by group size or by the number of groups (Bliese, 2000). ICC (2) estimates the reliability of group means.

A series of random effects ANOVAs were conducted with Knowledge Builder, Trust in the Leader and in the Team, Team Knowledge Sharing and Team Performance as the dependent variables, and Team as the random variable. The results are displayed in Table 1. These analyses indicate that there were significant differences between teams in members' ratings on each of the dependent variables. The ICC (1) scores further indicate that between 11 percent and 33 percent of the variance of each dependent variable can be attributed to differences between teams. On average, 18 percent of the variance in the dependent variables can be accounted for by group level factors. While there is no agreed guideline on the cut-off value for acceptable ICC scores, James (1982) found that the mean reported by a number of published studies was 12 percent. The average of 18 percent in this study therefore compares favourably.

The ICC (2) values ranged from .37 to .71, indicating good reliability of group means for the knowledge builder variable, but low reliability for the other variables. Simons and Peterson (2000) note that this statistic is too conservative when the majority of members in the group are sampled (as in this study), as it supposes a sub-sample from an infinite pool of potential raters. ICC (1) and ICC (2) are also related to each other as a function of group size. The greater the ICC (1) and the larger the team size, the more reliable the group mean (Bliese, 2000). Hence, the low reliability scores partially reflect the small team sizes.

Overall, the results indicate that a significant proportion of the variance in the dependent variables is influenced by team specific factors, providing sufficient justification to aggregate the variables to the team level. Therefore, we test the hypotheses at the team level of analysis.

Descriptive statistics

The means, range, standard deviations, reliabilities and intercorrelations for all measures are reported in Table 2. These are based on the team member data only (no team leader data was included).

Table 2. Inter-correlations for team level ratings of Trust in Team, Trust in Leader, the Knowledge Builder role, Team Knowledge Sharing and Team Performance (k = 34)

Variable	M	Range	SD	Alpha (indiv. level)	Alpha (team level)	1	2	3	4	5	6	7
Trust in Team (Disclosure)	4.64	2.80–6.20	.79	.85	.88							
Trust in Team (Reliance)	5.29	3.36–6.33	.71	.93	.95	.31						
Trust in Leader (Disclosure)	4.69	3.10–6.33	.84	.91	.89	.75	.43					
Trust in Leader (Reliance)	5.47	3.44–6.90	.82	.95	.94	.36	.66	.65				
Knowledge Builder	4.76	2.60–6.15	.92	.98	.89	.36	.65	.52	.84			
Team Knowledge Sharing	5.28	3.50–6.50	.86	.94	.96	.49	.77	.51	.56	.67		
Team Performance	5.05	4.05–6.13	.64	.91	.90	.40	.64	.56	.57	.61	.77	

Note: Correlations are aggregated to the team level using team member ratings (k = 34). Correlations above r = .36 are significant at the 0.05 level (1-tailed).

The Cronbach alpha levels across variables equal or exceed $\alpha = .88$, indicating good internal consistency. There was a good range in ratings for all factors, indicating that some teams rated very highly on the leader's performance as knowledge builder, and in levels of team trust, trust in the leader and knowledge sharing, while some teams rated poorly. The wide range suggests that the items and the rating scales are sensitive to differences and therefore restriction in range is not a concern for examining the inter-relationships between variables.

Hypothesis testing

Regression analyses were used to test each of the hypotheses. The Baron and Kenny (1986) procedure was used to examine the extent to which the relationship between the Knowledge Builder role and Team Knowledge Sharing was mediated by Trust in the Leader (reliance and disclosure). For a variable to be considered a mediator of an outcome, four specific conditions must be met: (1) the independent variable must significantly affect the dependent variable, (2) the independent variable must significantly affect the mediator, (3) the mediator must significantly affect the dependent variable, and (4) the direct effect of the independent variable (Knowledge Builder) on the dependent variable (Team Knowledge Sharing) is weakened when the mediator (Trust in the Leader) is present.

Table 3 shows the series of regression analyses performed to test Hypotheses 1 and 2. As shown in Step 1, the Knowledge Builder role significantly predicted Team Knowledge Sharing ($\beta = .67$, $p < .001$), supporting Hypothesis 1. As shown in Step 2, Knowledge Builder was also significantly associated with both reliance-based and disclosure-based Trust in the Leader, and as shown in Step 3, both indicators of Trust in the Leader were significantly associated with Team Knowledge Sharing.

Together these results indicate that the first three conditions are met for a mediated relationship. However, in Step 4, when the indicators of Trust in the Leader were entered into the regression together with the Knowledge Builder role, neither reliance- nor disclosure-based Trust in the Leader significantly predicted Team Knowledge Sharing ($\beta = -.21$ and $\beta = .28$, $p > .05$ respectively). These results indicate that Trust in the Leader does not significantly mediate the relationship between Knowledge Builder and Team Knowledge Sharing (Hypothesis 2).

Table 4 shows the series of regression analyses performed to test Hypothesis 3, that Trust in the Team mediates the relationship between Knowledge Builder and Team Knowledge Sharing. Step 1 shows that Knowledge Builder is significantly related to Trust in the Team (reliance and disclosure), and Step 2 shows that Trust in the Team (reliance and disclosure) is significantly related to Team

Table 3. Regression statistics for the effect of Trust in Leader as a mediator between the Knowledge Builder Role and Team Knowledge Sharing (Team Level, k = 34)

Regression	Independent variable	Dependent variable	R^2	B	β
1	Knowledge Builder	Team Knowledge Sharing	.44	.62	.67***
2a	Knowledge Builder	Leader Reliance	.70	.74	.84***
2b	Knowledge Builder	Leader Disclosure	.27	.48	.52**
3a	Leader Reliance	Team Knowledge Sharing	.30	.58	.55**
3b	Leader Disclosure	Team Knowledge Sharing	.26	.52	.51**
4	Knowledge Builder	Team Knowledge Sharing	.49	.65	.70**
	Leader Reliance			−.22	−.21
	Leader Disclosure			.29	.28

**$p < .01$, ***$p < .001$.

Table 4. Regression statistics for the effect of Trust in Team as a mediator between the Knowledge Builder Role and Team Knowledge Sharing (Team Level, k = 34)

Regression	Independent variable	Dependent variable	R^2	B	β
1a	Knowledge Builder	Team Reliance	.42	.50	.65**
1b	Knowledge Builder	Team Disclosure	.13	.31	.36*
2a	Team Reliance	Team Knowledge Sharing	.59	.93	.77***
2b	Team Disclosure	Team Knowledge Sharing	.24	.53	.49**
3	Knowledge Builder	Team Knowledge Sharing	.69	.20	.22
	Team Reliance			.67	.55***
	Team Disclosure			.26	.24*

*$p < .05$, **$p < .01$, ***$p < .001$.

Knowledge Sharing. Step 3 indicates that reliance-based and disclosure-based Trust in the Team fully mediates the relationship between the Knowledge Builder role and Team Knowledge Sharing. Once these indicators of Trust in the Team were entered into the regression, the Knowledge Builder role no longer significantly predicts Team Knowledge Sharing ($\beta = .22$, $p > .05$). Together, the Knowledge Builder role and Trust in the Team (reliance and disclosure) account for 69 percent of the variance in Team Knowledge Sharing.

To summarize, as shown in Figure 2, the results suggest that the leader's performance as a knowledge builder significantly enhances knowledge sharing in the team *indirectly* by enhancing team members' trust in the team.

The finding that the knowledge builder role is pivotal to team knowledge sharing is reinforced by the interviews with team leaders. A content analysis of these interviews indicated that most (82%) team leaders talk about how their knowledge building role fosters knowledge sharing in their teams. Leaders facilitate knowledge sharing by:

1. challenging team members and encouraging them to try new approaches: 'I try to encourage them to challenge each team member's input into the design work and not just accept what they're being told. I try and bring to the table different ways for them to look at things and to look outside their functions ... that gets them talking';
2. initiating processes to develop and share the team's expertise (e.g. mentoring relationships): 'I get people to share knowledge by pairing up the more experienced people in the team with the inexperienced ones … to give them additional guidance and input'; and

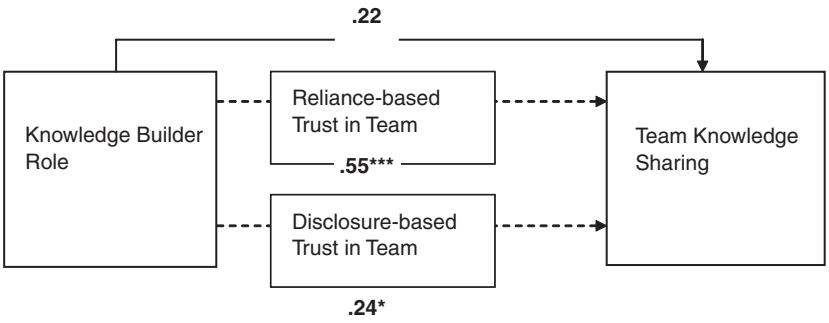

Figure 2. Standardized beta weights representing the mediated relationship between the Knowledge Builder role and Knowledge Sharing in the Team, via Reliance- and Disclosure-based Trust in Team.
*$p < .05$, ***$p < .001$.

3. scanning the environment and bringing in outside expertise: 'I try to bring in suppliers to give the engineers an update on the latest technologies and what is happening in the supplier industry. Otherwise engineers working on a new program will be disadvantaged if they are not up to speed'.

To test whether team knowledge sharing predicts team performance (Hypothesis 4), we conducted a standard regression analysis. To reduce the effects of same-source bias, team knowledge sharing was rated by team members, whereas team performance was rated by the 18 senior managers and the 30 team leaders. As predicted team knowledge sharing significantly predicted team performance ($\beta = .45$, $p < .01$), demonstrating the importance of open exchange of ideas and information between members for the effectiveness of product development teams.

The team leader interviews further illustrated the importance of knowledge sharing to team performance. Example quotes are:

> Knowledge sharing has positioned us well for the future … we know what each other's capabilities are ... it's like the one brain thinking together which leads to more efficient work…and we are actually very innovative and cost effective.

> It has resulted in a lot of cost reduction ideas because we talk daily at lunch and we know what each person is doing. We go to each other's meetings and I would go into another person's engineering subsystem just to see what they were doing and bring that knowledge back to the team.

Discussion

A major aim of this article was to advance understanding of how leaders can foster the sharing of knowledge within their teams. This study extends the previous literature by examining how the leadership role of knowledge builder and two aspects of trust (reliance and disclosure) in the leader and in the team, play a role in fostering team knowledge sharing and, in turn, team performance. While previous research has explored how forms of trust in dyads are associated with dyadic knowledge sharing (Chowdhury, 2005), we know little about the pathways that link leadership and trust to knowledge sharing in teams.

Both the statistical analyses and qualitative data show that by performing the knowledge builder role well, leaders enhance team knowledge sharing. As predicted, the effect of the knowledge builder role on team knowledge sharing was fully mediated by reliance-based and disclosure-based trust in the team (Hypothesis 3). Interestingly, and contrary to prediction (Hypothesis 2), the relationship was not significantly mediated by trust in the leader. This suggests that leaders who are knowledge builders enhance team knowledge sharing *indirectly* by building the willingness of all team members to rely on and disclose ideas and information to the team. The knowledge builder role is about providing and eliciting expertise and knowledge. As the team builds respect for each other's knowledge and expertise, the willingness to rely on each other is reinforced. The knowledge builder role is also about tapping into tacit knowledge. This involves the leader setting an example by conveying to the team his/her candid insights and experiences, concerns about the project, personal beliefs and lessons learned, as well as facilitating opportunities for the team to share. These behaviours in turn encourage members to feel safe to freely share their personal beliefs, hunches, insights, concerns and problems, as well as task-related knowledge (i.e. disclosure-based trust).

It is surprising that the knowledge builder role does not significantly enhance team knowledge sharing by engendering trust in the *leader*. Presumably mediation occurs at the team level because the knowledge builder role is essentially about building the team's knowledge and the focus of sharing knowledge is the team itself. This set of mediation findings suggests that to foster team knowledge sharing, leadership practices that build trust in the team are more important than practices focused on building trust in the leader.

The findings provide insight into how trust in the leader and team each contribute to an understanding of knowledge sharing, once the influence of leadership is taken into account. The results suggest that trust in the team is a better predictor of team knowledge sharing than trust in the leader. This important finding highlights that leaders can enhance team knowledge sharing by focusing on building team members' trust in each other as a collective team.

The finding that trust in the team significantly predicts team knowledge sharing supports Zand's (1972) observation from executive decision-making teams that trust shown by team members is associated with openness and accuracy of information and knowledge shared. In our study, both the willingness to rely on the team and the willingness to disclose to the team had a significant positive influence on team knowledge sharing, however willingness to rely was a stronger predictor than the willingness to disclose. This likely reflects the more professional and task-orientation nature of reliance-based trust compared to the more personal and affective nature of disclosure-based trust (Gillespie, 2003). It is reasonable to expect that reliance-based trust is established prior to disclosure-based trust: few people will share work- and task-related confidences with colleagues they consider unreliable or incompetent. This pattern is consistent with Chowdhury's (2005) findings that cognition-based trust in dyads has a stronger influence on knowledge sharing than affect-based trust.

As expected, team knowledge sharing (as rated by team members) was a significant predictor of team performance, as rated by team leaders and project managers (Hypothesis 4). When team members share knowledge, their team was better able to meet project goals, achieve quality, meet customers' expectations and achieve efficiency. These findings are consistent with previous research on the positive relationship between knowledge sharing and team performance (see Faraj and Sproull, 2000; Hong et al., 2004).

Several limitations of the study can be noted. First, the results are based on subjective ratings rather than objective data. However, we controlled partially against same source response bias by collecting data from team leaders and managers on the key measure of team performance—and

both sources (i.e. team member ratings versus leader and manager ratings) yielded similar findings. As interview data was collected only from team leaders, it has limitations for supporting the quantitative data. It is recommended that future studies include team member interview data to strengthen the qualitative research and gain insights from their perspective on how the leader and all team members work together to build and share explicit and tacit knowledge.

Second, the study sample came from one company in one industry, raising a question about the generalizability of our findings. However, the key factors we investigated have been identified as important predictors of knowledge sharing and team performance in previous research conducted in a range of organizational settings.

Finally, the study of these project teams was a 'snap shot' in time. Our sample of 34 teams had been together on average for three years. Leadership behaviours, trust and knowledge sharing are dynamic processes that change across time in accord with stages of team development, membership changes and project life cycle (Gersick, 1988; Mann, 2004; Pirola-Merlo and Mann, 2004; Tuckman and Jensen, 1977). Almost all teams during the project life cycle have to clarify objectives and priorities, establish norms, respond to obstacles and setbacks, solve problems, and deal with strains and conflicts, while moving toward task completion (Mann, 2004). The considerable range in ratings found in this study for trust and knowledge sharing (see Table 2) indicates differences between teams in cohesion and communication and possibly in stage of team development and project life cycle. Future research using a longitudinal research design with a sample of teams at different stages of development and life cycle is called for to investigate consistency of the relationship between variables, feedback loops and direction of causality between leadership, components of trust, knowledge sharing and team performance.

The findings of this study have several important implications for practice and future research. Most leadership development efforts are focused on developing the capability of leaders in transformational, transactional and empowering styles and roles. Our research indicates a need to broaden the range of team leadership behaviours developed to include a focus on knowledge-building behaviours, such as skills in scanning the environment for new ideas, developing knowledge networks, sharing technical expertise, bringing outside expertise into the team, providing feedback and overseeing the quality of work. These knowledge- building skills engender trust in the team and foster knowledge sharing. In addition, the findings have implications for the recruitment and selection of team leaders. The candidate's record as a 'team player' who generously conveys information and seeks exchange of expertise and ideas should be a key part of the selection criteria.

Several practical implications can be drawn from the finding that the leader's knowledge builder role enhances team knowledge sharing by engendering trust in the *team*, but not trust in the *leader*. The clear implication is that, when the goal is to enhance team knowledge sharing, leadership practices that build trust in the *team* are more important than practices focused on building trust in the *leader*. This finding further suggests that training and development efforts should not focus solely on the leader, but also extend to the team as a whole. It highlights the importance of traditional team building exercises and the development of all members' team skills, as well as a focus on more specialized capabilities such as trust building and repair (see Lewicki and Bunker, 1996), so that all team members understand how they can contribute to a safe and positive team climate, and avoid behaviour that undermines the trust of their colleagues. The central mediating role of team trust further suggests that serious consideration should be given to 'team fit' when selecting new team members, and that interventions may be warranted for teams characterized by high distrust (e.g. trust repair efforts, reconfiguring team membership, etc.).

Our findings further point to the idea of distributing leadership to increase trust and knowledge sharing. Shared or distributed leadership is a team process where leadership behaviors are carried out by a variety of capable team members, rather than residing solely in the person who holds the position of team leader (Ensley et al., 2006). Practically, distributed leadership of the knowledge builder role could be achieved by rotating the role amongst team members (e.g. all team members are given responsibility to organize for the team a skills workshops in their particular areas) or by inviting team members to give background briefings and presentations at crucial team meetings (e.g. when scoping a new project). Indeed, all team members could engage in leadership development activities focused on knowledge-building skills, to deepen the team's ability and confidence in knowledge building and in turn boost team trust and facilitate knowledge sharing.

As knowledge sharing is crucial for good team performance, team development should also be directed at learning practical ways of sharing knowledge effectively. Knowledge fairs, mentoring, shared databases, project reviews and new ideas presentations are practical ways to share knowledge.

Our findings highlight several directions for future research. Much of the research to date has investigated the role of the formally designated leader on team knowledge sharing. We are not aware of research on the relationship between shared leadership in the team and knowledge sharing. It would be interesting to investigate whether shared team leadership of the knowledge builder role is superior for team knowledge sharing compared to a formal top- down leader model.

Additional research is called for to test the casual relationship between trust and knowledge sharing. Our study complements existing approaches, which treat trust as an antecedent to knowledge sharing (Usoro et al., 2007). However, future research should also consider potential reciprocal effects between trust and knowledge sharing. Another question is whether there is a threshold level of team trust at which point useful knowledge sharing breaks down or does not happen. Or is it that team trust and knowledge sharing are sensitively linearly related, such that a small increase or decrease in trust has an associated direct effect on knowledge sharing? Finally, we can expand the set of indicators of team performance associated with knowledge sharing. Research is needed to investigate the relationship between knowledge sharing and team performance outcomes such as team learning and team satisfaction, knowledge transfer by the team from project to project, and readiness to share knowledge *between* teams in the organization.

Recently, there has been a wave of research examining the links between leadership and organizational learning. In particular, transformational leadership has been shown to positively create a learning culture by using vision to inspire learning processes, by stimulating the creative ideas of individuals and groups, and by encouraging team members to approach old problems in new ways (Nemanich and Vera, 2009; Vera and Crossan, 2004). We suggest extending this line of research further by incorporating the knowledge builder role and considering the influence of trust processes: Does the leader as a knowledge builder affect organizational learning? Does a climate of trust facilitate organizational learning? To what extent might trust mediate or moderate the influence of leadership on organizational learning?

Finally, the study dealt with knowledge sharing within teams in an organization that relies on new product development, research, technical improvement and innovation for business performance. Such learning organizations benefit from readiness to share knowledge *between* teams and from the efficient capture and management of knowledge for use by new teams with new projects. Collective learning is like a dance that is an inherently collaborative process, requiring the engagement of the whole person (i.e. sharing of cognitive and emotional content) and widespread participation (Rowe, 2008). Teams that transcend formal team boundaries to engage in dialogue and share knowledge create true organizational learning. Recently Newell et al. (2006) found that informal

dialogue (or person to person knowledge sharing) is more effective than technology for the transfer of learning between project teams. Given the importance of project team learning for subsequent organizational learning (Crossan et al., 1999), future research is required to extend the study of knowledge sharing within teams to encompass the management of knowledge sharing *between* teams, and specifically to explore the role of team leadership and trust in facilitating organizational learning and knowledge sharing across teams.

References

Ancona, D. G. and Caldwell, D. F. (1992) 'Demography and Design: Predictors of New Product Team Performance', *Organizational Science* 3(3): 321–41.

Andrews, K. M. and Delahaye, B. L. (2002) 'Influences of Knowledge Processes in Organizational Learning: The Psychosocial Filter', *Journal of Management Studies* 37(6): 797–810.

Bain, P. G. and Mann, L. (1997) *The Project Leadership Questionnaire: Validation and Preliminary Norms*. Melbourne: University of Melbourne.

Bain, P. G., Mann, L., Atkins, L. and Dunning, J. (2005) 'R&D Project Leaders: Roles and Responsibilities', in L. Mann (ed.) *Leadership, Management, and Innovation in R&D Project Teams*, pp. 49–70. Westport, CT: Praeger.

Baron, R. M. and Kenny, D. A. (1986) 'The Moderator-Mediator Variable Distinction in Social Psychological Research: Conceptual, Strategic, and Statistical Considerations', *Journal of Personality and Social Psychology* 51(6): 1173–82.

Barry, D. (1991) 'Managing the Bossless Team: Lessons in Distributed Leadership', *Organizational Dynamics* 20(1): 31–47.

Bliese, P. D. (2000) 'Within-group Agreement, Non-independence, and Reliability: Implications for Data Aggregation and Analysis', in K. J. Klein ands S. W. J. Kozlowski (eds) *Multilevel Theory, Research and Methods in Organizations*, pp. 349–466. San Francisco, CA: Jossey-Bass.

Butler, J. K. Jnr, Cantrell, R. S. and Flick, R. J. (1999) 'Transformational Leadership Behaviors, Upward Trust, and Satisfaction in Self-managed Work Teams', *Organization Development Journal* 17(1): 13–28.

Chowdhury, S. (2005) 'The Role of Affect- and Cognitions-based Trust in Complex Knowledge Sharing', *Journal of Managerial Issues* 17(3): 310–26.

Cohen, S. G. and Bailey, D. E. (1997) 'What Makes Team Work: Group Effectiveness Research from the Shop Floor to the Executive Suite', *Journal of Management* 23(3): 239–90.

Colquitt, J. A., Scott, B. A. and LePine, J. A. (2007) 'Trust, Trustworthiness, and Trust Propensity: A Meta-analytic Test of their Unique Relationships with Risk Taking and Job Performance', *Journal of Applied Psychology* 92(4): 909–27.

Conger, J. A., Kanungo, R. N. and Menon, S. T. (2000) 'Charismatic Leadership and Follower Effects', *Journal of Organizational Behaviour* 21(7): 747–67.

Costa, A. C., Roe, R. A. and Taillieu, T. (2001) 'Trust within Teams: The Relation with Performance Effectiveness', *European Journal of Work and Organizational Psychology* 10(3): 225–44.

Crossan, M., Lane, H. W. and White, R. E. (1999) 'An Organizational Learning Framework: From Intuition to Institution', *Academy of Management Review* 24(3): 522–37.

Cummings, J. N. (2004) 'Work Groups, Structural Diversity, and Knowledge Sharing in a Global Organization', *Management Science* 50(3): 352–64.

Davenport, T. H., Jarvenpaa, S. L. and Beers, M. (1996) 'Improving Knowledge Work Processes', *Sloan Management Review* 37(4): 53–66.

deVries, R. E., Hoof, R. E. and Ridder, D. (2006) 'Explaining Knowledge Sharing. The Role of Team Communication Styles, Job Satisfaction and Performance Beliefs', *Communication Research* 33(2): 115–35.

Dietz, G. and Den Hartog, D. N. (2006) 'Measuring Trust Inside Organizations', *Personnel Review* 35(5): 557–88.

Dirks, K. T. (1999) 'The Effects of Interpersonal Trust on Work Group Performance', *Journal of Applied Psychology* 84(3): 445–55.

Dirks, K. T. and Ferrin, D. L. (2001) 'The Role of Trust in Organizational Settings', *Organization Science* 12(4): 450–67.

Dirks, K. T. and Ferrin, D. L. (2002) 'Trust in Leadership: Meta-analytic Findings and Implications for Research and Practice', *Journal of Applied Psychology* 87(4): 611–28.

Ensley, M. D., Hmieleski, K. M. and Pearce, C. L. (2006) 'The Importance of Vertical and Shared Leadership within New Venture Top Management Teams: Implications for the Performance of Startups', *Leadership Quarterly* 17(3): 217–31.

Faraj, S. and Sproull, L. (2000) 'Coordinating Expertise in Software Development Teams', *Management Science* 46(12): 1554–68.

Farrell, J. B., Flood, P. C., MacCurtain, S. and Hannigan, A. (2005) 'CEO Leadership, Top Team Trust and the Combination and Exchange of Information', *Irish Journal of Management* 26(1): 22–40.

Farris, G., Senner, E. and Butterfield, D. (1973) 'Trust, Culture and Organizational Behaviour', *Industrial Relations* 12(2): 144–57.

Gabarro, J. J. (1978) 'The Development of Trust Influence and Expectations', in A. G. Athos and J. J. Gabarro (eds) *Interpersonal Behaviour: Communication and Understanding in Relationships*, pp. 290–303. Englewoods Cliffs, NJ: Prentice Hall.

Gersick, C. J. (1988) 'Time and Transition in Work Teams: Toward a New Model of Group Development', *Academy of Management Journal* 31(1): 9–14.

Gillespie, N. (2003) 'Measuring Trust in Work Relationships: The Behavioural Trust Inventory', paper presented at the Academy of Management Annual Meeting, Seattle, USA, 1–6 August.

Gillespie, N. and Mann, L. (2005) 'How Trustworthy is Your Leader? Implications for Leadership, Team Climate and Outcomes in R&D Teams', in L. Mann (ed.) *Leadership, Management and Innovation in R&D project teams*, pp. 93–122. Westport, CT: Praeger.

Gruenfeld, D. H., Mannix, E. A., Williams, K. Y. and Neale, M. A. (1996) 'Group Composition and Decision Making: How Member Familiarity and Information Distribution Affect Process and Performance', *Organizational Behaviour and Human Decision Processes* 67(1): 1–15.

Hansen, M. and Haas, M. R. (2007) 'Different Knowledge, Different Benefits: Toward a Productivity Perspective on Knowledge Sharing in Organizations', *Strategic Management Journal* 28(11): 33–53.

Hong, P., Doll, W. J., Nahm, A. Y. and Li, X. (2004) 'Knowledge Sharing in Integrated Product Development', *European Journal of Innovation Management* 7(2), 102–12.

Hoopes, D. G. and Postrel, S. (1999) 'Shared Knowledge Glitches, and Product Development Performance', *Strategic Management Journal* 20(9): 837–65.

James, L. R. (1982) 'Aggregation Bias in Estimates of Perceptual Agreement', *Journal of Applied Psychology* 67(2): 219–29.

Jones, S. (2002) 'Employee Rights, Employee Responsibilities and Knowledge Sharing in Intelligent Organizations', *Employee Responsibilities and Rights Journal* 14(2/3 September): 69–78.

Joseph, E. E. and Winston, B. E. (2005) 'A Correlation of Servant Leadership, Leader Trust and Organizational Trust', *Leadership and Organization Development Journal* 26(1): 6–22.

Jung, D. I. and Avolio, B. J. (2000) 'Opening the Black Box: An Experimental Investigation of the Mediating Effects of Trust and Value Congruence on Transformational and Transactional Leadership', *Journal of Organizational Behavior* 21(8): 949–64.

Kimmel, M., Pruitt, D. G., Magenua, J., Konar-Golband, E. and Carnevale, P. (1980) 'Effects of Trust, Aspiration, and Gender on Negotiation Tactics', *Journal of Social Psychology* 38(1): 9–22.

Kirkpatrick, S. A. and Locke, E. A. (1996) 'Direct and Indirect Effects of Three Core Charismatic Leadership Components on Performance and Attitudes', *Journal of Applied Psychology* 81(1): 36–51.

Kogut, B. and Zander, U. (1992) 'Knowledge of the Firm, Combinative Capabilities and the Replication of Technology', *Organization Science* 3(3): 383–97.

Korsgaard, M. A., Schweiger, D. M. and Sapienza, H. J. (1995) 'Building Commitment, Attachment, and Trust in Strategic Decision Making Teams—The Role of Procedural Justice', *Academy of Management Journal* 38(1): 60–84.

Kurt, M., Birgit, R., Muller, J., Herting, S. and Mooradian, T. A. (2008) 'Personality Traits and Knowledge Sharing', *Journal of Economic Psychology* 29(3): 301–13.

Levin, D. Z. and Cross, R. (2004) 'Perceived Trustworthiness of Knowledge Sources: The Moderating Impact of Relationship Length', in the 2004 Best Papers Proceedings of the Academy of Management Annual Meeting, New Orleans, USA, 6–11 August.

Levin, D. Z., Cross, R., Abrams, L. C. and Lesser, E. L. (2002) 'Trust and Knowledge Sharing: A Critical Combination', IBM Institute for Knowledge-Based Organizations, URL (consulted May 2004): http://www-935.ibm.com/services/au/

Lewicki, R. and Bunker, B. B. (1996) 'Developing and Maintaining Trust in Work Relationships', in R. M. Kramer and T. R. Tyler (eds) *Trust in Organizations: Frontiers of Theory and Research*, pp. 114–39. Thousand Oaks, CA: Sage.

Lewis, J. D. and Weigert, A. (1985) 'Trust as a Social Reality', *Social Forces* 63(4): 967–85.

Lin, C.-P. (2007) 'To Share or not to Share: Modelling Tacit Knowledge Sharing, its Mediators and Antecedents', *Journal of Business Ethics* 70(4): 411–28.

MacKenzie, S. B., Podsakoff, P. M. and Rich, G. A. (2001) 'Transformational and Transactional Leadership and Salesperson Performance', *Journal of the Academy of Marketing Science* 29(2): 115–34.

Madhavan, R. and Grover, R. (1998) 'From Embedded Knowledge to Embodied Knowledge: New Product Development as Knowledge Management', *Journal of Marketing* 62(4): 1–12.

Mann, L. (2004) *Leadership, Management, and Innovation in R&D Project Teams*. Westport, CT: Praeger.

Mayer, R. C., Davis, J. H. and Schoorman, F. D. (1995) 'An Integrative Model of Organizational Trust', *Academy of Management Review* 20(3): 709–34.

Mintzberg, H. (1973) *The Nature of Managerial Work*. New York: Harper & Row.

Mooradian, T., Renzl, B. and Matzler, K. (2006) 'Who Trusts? Personality, Trust and Knowledge Sharing', *Management Learning* 37(4): 523–40.

Nemanich, L. A. and Vera, D. (2009) 'Transformational Leadership and Ambidexterity in the Context of an Acqusition', *Leadership Quarterly* 20(1): 19–33.

Newell, S., Bresnen, M., Edelman, L., Scarbrough, H. and Swan, J. (2006) 'Sharing Knowledge across Projects: Limits to ICT-led Project Review Practices', *Management Learning* 37(2): 167–85.

Nonaka, I. and Takeuchi, H. (1995) *The Knowledge Creating Company*. Oxford: Oxford University Press.

Pillai, R., Schriesheim, C. A. and Williams, E. S. (1999) 'Fairness Perceptions and Trust as Mediators for Transformational and Transactional Leadership: A Two-sample Study', *Journal of Management* 25(6): 897–933.

Pirola-Merlo, A. and Mann, L. (2004) 'The Relationship between Individual Creativity and Team Creativity: Aggregating across People and Time', *Journal of Organizational Behaviour* 25(2) 235–57.

Podsakoff, MacKenzie, S. B. and Bommer, W. H. (1996) 'Transformational Leader Behaviors and Substitutes for Leadership as Determinants of Employee Satisfaction, Commitment, Trust and Organizational Citizenship Behaviors', *Journal of Management* 22(2): 259–98.

Podsakoff, MacKenzie, S. B., Moorman, R. H. and Fetter, R. (1990) 'Transformational Leader Behaviors and their Effects on Followers' Trust in Leader Satisfaction and Organizational Citizenship Behaviors', *Leadership Quarterly* 1(2): 107–42.

Polanyi, M. (1966) *The Tacit Dimension*. New York: Anchor Day.

Politis, J. (2001) 'The Relationship of Various Leadership Styles to Knowledge Management', *Leadership and Organization Development Journal* 22(8): 354–64.

Politis, J. (2003) 'The Connection between Trust and Knowledge Management: What Are its Implications for Team Performance', *Journal of Knowledge Management* 7(5): 55–66.

Renzl, B. (2008) 'Trust in Management and Knowledge Sharing: The Mediating Effects of Fear and Knowledge Documentation', *International Journal of Management Science* 36(2): 206–20.

Rousseau, D. M., Sitkin, S. B., Burt, S. R. and Camerer, C. (1998) 'Not so Different after all: A Cross-discipline View of Trust', *Academy of Management Review* 23(3): 393–404.

Rowe, A. (2008) 'Unfolding the Dance of Team Learning: A Metaphorical Investigation of Collective Learning', *Management Learning* 39(1): 41–56.

Salisbury, M. (2001) 'An Example of Managing the Knowledge Creation Process for a Small Work Group', *Management Learning* 32(3): 305–19.

Senge, P. M. (1990) *The Fifth Discipline*. New York: Doubleday.

Simons, T. L. and Peterson, R. S. (2000) 'Task Conflict and Relationship Conflict in Top Management Teams: The Pivotal Role of Intragroup Trust', *Journal of Applied Psychology* 85(1): 102–11.

Srivastava, A., Bartol, K. M. and Locke, E. A. (2006) 'Empowering Leadership in Management Teams: Effects on Knowledge Sharing, Efficacy, and Team Performance', *Academy of Management Journal* 49(6): 1239–51.

Stasser, G. and Stewart, D. D. (1992) 'The Discovery of Hidden Profiles by Decision Making Groups: Solving a Problem Versus Making a Judgement', *Journal of Personality and Social Psychology* 63(3): 426–34.

Stasser, G., Vaughan, S. I. and Stewart, D. D. (2000) 'Pooling Unshared Information: The Benefits of Knowledge how Access to Information is Distributed among Group Members', *Organizational Behaviour and Human Decision Processes* 82(1): 102–16.

Tabachnik, B. G. and Fidell, L. S. (1996) *Using Multivariate Statistics* (3rd edn). New York: Harper Collins.

Tsoukas, H. (2005) *Complex Knowledge: Studies in Organizational Epistemology.* Oxford: Oxford University Press.

Tuckman, B. and Jensen, M. A. C. (1977) 'Stages of Group Development Revisited', *Group and Organization Studies* 2(4): 419–27.

Usoro, A., Sharratt, M. W., Tsui, E. and Sandhya, S. (2007) 'Trust as an Antecedent to Knowledge Sharing in Virtual Communities of Practice', *Knowledge Management Research and Practice* 5(3): 199–212.

Vera, D. and Crossan, M. (2004) 'Strategic Leadership and Organizational Learning', *Academy of Management Review* 29(2): 222–40.

Zand, D. E. (1972) 'Trust and Managerial Problem Solving', *Administrative Science Quarterly* 17(2): 229–39.