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Abstract
Although both trust and the ability of employees to work in an autonomous manner are often cited as being essential for effectiveness of self-managed teams, little is known on the effect of interpersonal trust on knowledge acquisition of team members, and the consequences for team performance. A survey of 49 self-managing teams (239 individuals) was carried out to investigate the relationship between the dimensions of interpersonal trust, knowledge acquisition, and team performance. Overall, findings support that most of interpersonal trust dimensions are positively related to the variables of knowledge acquisition. Moreover, the results showed that the effects of 'interpersonal trust' on team performance to a large extent are mediated by the intervening variables of knowledge acquisition.

Keywords: Interpersonal trust ♦ knowledge acquisition ♦ self-managing teams ♦ team performance.

1. Introduction

Knowledge has been identified as one of the most important resources that contribute to the competitive advantage of an organisation. It is the chief ingredient of what we buy and sell, the raw material with which we work (Stewart, 1997). Many firms have reached the conclusion that effective management (acquisition) of knowledge is the only way to leverage their core competencies and achieve competitive advantage. On the other hand, the most notable trend of the 1990s that will continue to dominate the work environment of the twenty first century (Manz & Sims, 2001) was the explosion of work teams in manufacturing and service organisations (Cohen, Ledford & Spreitzer, 1996). Moreover, there is extensive research which argues that trust is important and useful in a range of organisational activities such as teamwork, leadership, goal setting, development of labour relations and negotiations, and performance (Morris & Moberg, 1994; O'Shea, 2000).

As *teamwork* grows in popularity (Cohen *et al.* 1996; Manz & Sims, 2001), trust is increasingly taking place within a team context. Proponents of self-managing teams suggest that there is a clear need for trust before team members can respond openly and incorporate new information (knowledge) in order to develop useful decisions (Gruenfeld, Mannix, Williams & Neale, 1996). Therefore, team members must trust their peers and management, thereby, establishing an environment in which acquiring and sharing knowledge is encouraged or even demanded. Current research lacks the empirical evidence to support the relationship between interpersonal trust factors and knowledge acquisition attributes. In particular, there is an interest from academics and practitioners in addressing whether 'interpersonal trust' advances follower's knowledge acquisition and what the consequences are for performance in a self-managing environment.

This is done in the present study by examining the impact of interpersonal trust on employees' perception of knowledge acquisition, and how this affects team performance. The study involves a questionnaire-based survey of members of self-managing teams from a large high-technology, aerospace, manufacturing organisation in Australia.

2. Determinants of knowledge acquisition

Knowledge is about internal 'meaning structures' in people's minds (Bourdreau & Couillard, 1999). Knowledge creation, and translation process is not only based on journals and textbooks (Atkinson, 1995), but also includes 'talks' between colleagues. Transferring knowledge from one person to another requires that tacit knowledge be converted into explicit knowledge through sharing experience, dialogue discussions, know-how 'exteriorisation' and teaching. Tacit knowledge is also transmitted and learned directly as tacit knowledge through observation and practice (Bourdreau & Couillard, 1999). In the literature, knowledge acquisition is defined as "acquiring information directly from domain experts" (Mykytyn, Mykytyn & Raja, 1994: 98). However, one problem of eliciting knowledge from experts is that experts may share only parts of their terminologies and conceptual systems. Experts may use the same term for different concepts, use different terms for the same concept, use the same term for the same concept, or use different terms and have different concepts. This has resulted in questioning where should organisations begin? What enables knowledge acquisition?

A review of the literature reveals that the background, skills, training and traits of knowledge workers (KWs) are most often essential for successful knowledge acquisition (Rolandi, 1986; Mykytyn *et al.*, 1994). Mykytyn and colleagues (1994) revealed 26 behavioural skills and traits (attributes) that are essential for knowledge acquisition. These attributes are presumed to produce six factors namely, communication/problem understanding, personal traits, control, organisation, negotiation and liberal arts/non-verbal communication. However, these factors do not emerge spontaneously or in a vacuum. They evolve out of the context and the history of the organisation and their impact is conditioned by the subjective perceptions of knowledge workers whose experience is ruled by that history.

This draws attention among other things (i.e., the organisational process and mechanisms of knowledge creation) to the roles played by management and peers (co-workers) in developing and linking these factors for successful knowledge acquisition. It is being argued that in practise knowledge management (KM) is the combination of human resource management and information management, and thus related to all processes that are combined with the identification, *acquisition*, creation, distribution and use of both information and knowledge (Iivonen & Huotari, 2000). Therefore, human factors are essential components for effective *knowledge acquisition* and must be taken into account. But, trust belongs to the area of human factors in KM.

In organisations trust supports and enables collaboration and knowledge sharing which are processes related to effective knowledge acquisition (Iivonen & Huotari, 2000). In a self-managing environment in particular, collaboration and knowledge sharing are based on team's trust (Gruenfeld *et al.* 1996) which can either support or prevent them. Since trust is important to facilitate a favourable team culture to strengthen collaboration and knowledge sharing, trust dimensions are hypothesised to be the predictive variables for the determinants of knowledge acquisition and team performance. This functional relationship is shown in the schematic diagram of Figure 1.

3. Interpersonal trust

The concept of trust in organisations has been studied extensively by a number of management researchers and practitioners (Atwater, 1988; Kramer & Tyler, 1996). As the interest in the area of trust developed, researchers formulated their own definitions of the term. Among the earlier trust theorists, Rotter (1967) defined interpersonal trust "as an expectancy held by an individual

or a *group* that the word, promise, verbal or written statement of another individual or *group* can be relied upon" (p. 651).

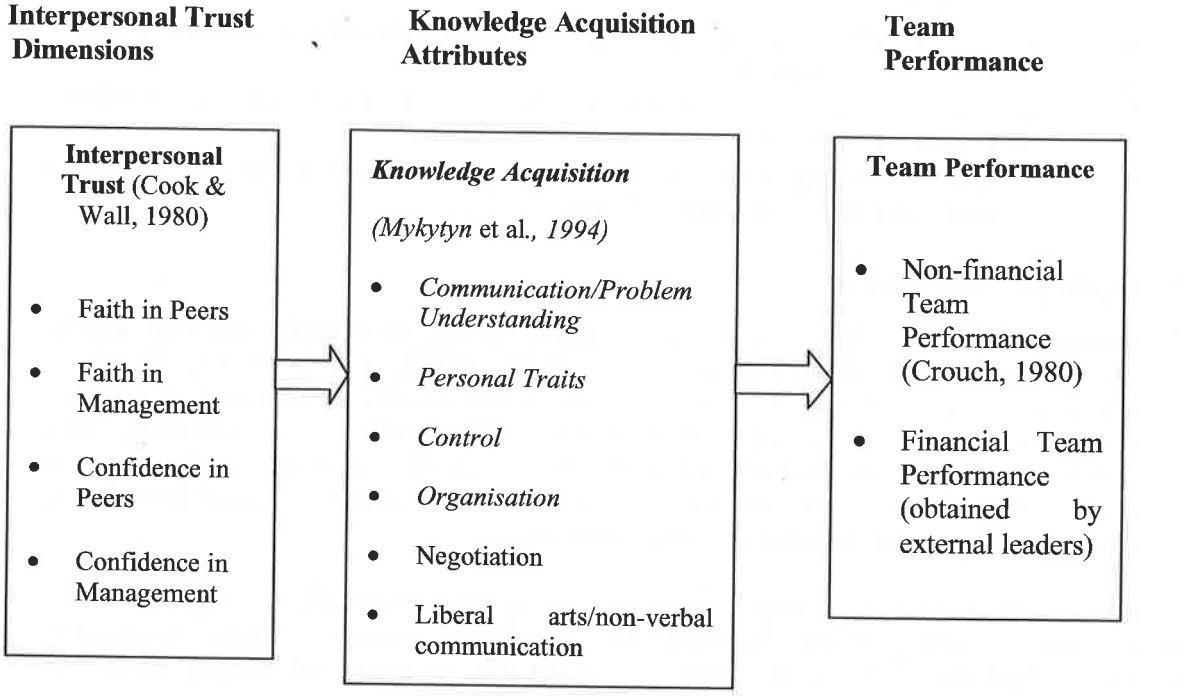

Figure 1: Summary of variables used in the paper

The recent emergence of self-managing teams (*groups*) has increased the interest in the study of trust (Mayer, Davis & Schoorman, 1995; O'Shea, 2000). Despite this interest, very little information exists in examining the effect of *interpersonal trust* on the dimensions of knowledge acquisition and what the consequences are for performance in a self-managing environment. In that respect, Cook and Wall (1980) have distinguished two components of dyadic or *interpersonal trust*, faith and confidence. In the work place, trust is been viewed as faith and confidence in peers (that is, co-worker trust), as well as faith and confidence in management (that is, trust in both the supervisor and top management). The definitions of faith and confidence have been adopted from Cook and Wall (1980: 40).

- Trust refers to the "faith in the trustworthy intentions of others".
- Trust refers to the "confidence in the ability of others, yielding ascriptions of capability and reliability".

Empirical evidence has shown that collaborative problem solving in complex organisations presupposes interpersonal trust (Atkinson, 1995; Davenport & Prusak, 1998), and specifically co-worker trust. Co-workers – members of self-managing teams – are assumed to operate without direct control and intervention from management in a self-managing work environment. Considering an autonomous and self-managing environment, Mayer et al. (1995) argued, "in the use of self-directed teams, trust must take the place of *supervision* because direct observation of employees becomes impractical" (p. 710). But recent studies suggested that leadership (*supervision*) is positively related to the skills and traits that are essential for knowledge acquisition (Politis (2001a; 2001b). It is therefore reasonable to hypothesise that the factors representing interpersonal trust will be predictive factors of knowledge acquisition.

- ***H1***: Faith in peers will be positively related to knowledge acquisition attributes (behavioural skills and traits) of KWs.
- ***H2***: Faith in management will be positively related to knowledge acquisition attributes (behavioural skills and traits) of KWs.
- ***H3***: Confidence in peers will be positively related to knowledge acquisition attributes (behavioural skills and traits) of KWs.
- ***H4***: Confidence in management will be positively related to knowledge acquisition attributes (behavioural skills and traits) of KWs.

4. Team performance

Performance is of considerable importance for quality of life, for national economies and for increasing organisational competitiveness in the rapidly changing global economy. Due to its importance, the issue of measuring team performance has received a great deal of scientific attention in the last twenty years (Cohen & Bailey, 1997). Despite the general utility of the performance concept, Lent, Aurbach and Levin (1971) complained about the absence of an adequate framework to account for what it is exactly that researchers should be trying to measure when they attempt to measure team performance.

In the decision of what to measure, it is being argued that performance measures, *related to human factors* (non-financial), determine the productivity outcomes, *related to financial measures* (Lemmink & Mattsson, 1998). Following this argument, we adopted instruments measuring both financial and non-financial dimensions of team performance.

In relation to financial dimensions, a number of performance indicators were chosen which were used by the participating organisation to monitor and report teams' performances. Each team was rated by its team leader on three 'target indicators' (schedule, quality and profit). Team leaders were asked to report the team's performance in terms of what it had achieved over the previous six months, as a percentage of the agreed target values for each of the three 'target indicators'. In relation to non-financial dimensions, we adopted a scale measuring perceptions of team performance. The scale was developed by Crouch (1980) and consists of five items that used a seven-point Likert-type response (*1 = definitely disagree, 7 = definitely agree*). Individual team members assessed their own group performance by indicating the degree of agreement or disagreement on each of the statements in the scale.

Over the years numerous authors argued that knowledge is today's driver for company life and the wealth-creating capacity of the company is based on the knowledge and capabilities of its people (Savage, 1990). This means that knowledge assets are fundamental strategic levers in order to manage business performance and the continuous innovation of a company (Quinn, 1992; Guthrie, 2001). As for knowledge, it is suggested that knowledge is considered a key property ascribed to so-called knowledge-intensive firms (Alvesson, 1995). Such companies, including its knowledge workers (KWs), are characterised by frequent problem solving; creativity; reliance of individuals; high educational levels and high degree of professional employees. The KWs of these companies were found to demonstrate flexibility, initiative, entrepreneurial intentions and strong job performance (Stewart, 1997; Davenport & Prusak, 1998). In that regard, it is expected that significant correlations will be found between knowledge acquisition attributes of KWs and the factors of team performance.

- ***H5:*** Knowledge acquisition attributes (behavioural skills and traits) of KWs will be positively related with perceived (non-financial) team performance.
- ***H6:*** Knowledge acquisition attributes (behavioural skills and traits) of KWs will be positively related with financial team performance.

5. Subjects and procedure

5.1 Sample

The sample was drawn from a large high-technology, aerospace, manufacturing organisation operating in Sydney, Australia. The sample consisted of members of self-managing teams from 49 teams, together with 36 team leaders of 36 of these 49 teams. The size of all teams was approximately the same, with an average team size of 9 members. The team leaders had been with team members for at least 6 months. They were what are commonly termed 'external' team leaders as they were not directly involved in the functions/operations of their groups. All teams had been engaged in the process of teamwork for more than 5 years and team members had received training covering core team skills, new administrative skills, new technical skills and interpersonal skills.

All respondents were full-time unionised employees and volunteered to participate in the study. A questionnaire containing items measuring interpersonal trust, knowledge acquisition attributes and team performance was distributed to 280 self-managing employees. A total of 239 employees (85.4 per cent individual response rate) returned usable questionnaires. Eleven incomplete questionnaires were excluded from the final sample. Our final sample contained data from 49 self-managing teams, for a team response rate of 89 percent.

5.2 Analytical procedure

The Analysis of Moment Structures (AMOS) was used for the factor analysis (measurement model) and for the regression analysis (path model). Following the recommendations of Sommer, Bae and Luthans (1995), we first developed the measurement model and then, with this held; a path model is developed. Using confirmatory factor analysis (CFA) we first assess the validity of the measurement model of the variables used in the paper. Given adequate validity of those measures, we reduced the number of indicators in the model by creating a composite scale for each latent variable. A mixture of fit-indices was employed to assess the overall fit of the measurement and path models. The ratio of Chi-square to degrees of freedom (χ^2/df) has been computed, with ratios of less than 2.0 indicating a good fit. However, since absolute indices can be adversely affected by sample size (Loehlin, 1992), four other relative indices (GFI, AGFI, TLI, and CFI) were computed to provide a more robust evaluation of model fit (Tanaka, 1987; Tucker – Lewis, 1973). For the GFI, AGFI, TLI, and CFI, coefficients closer to unity indicate a good fit, with acceptable levels of fit being above 0.90 (Marsh, Balla & McDonald, 1988). The analytical procedure (steps), to calculate the regression coefficient λ_i and measurement error θ_i of each variable, used in this paper is detailed in Politis's (2001a) study. The parameters of λ_i and θ_i were used as fix parameters in the path model.

6. Measurement models

As shown in Figure 1, the variables that we measure on the survey are: faith in peers, faith in management, confidence in peers, confidence in management (as rated by team members),

employees' (KWs) behavioural traits and skills that are essential for knowledge acquisition and team performance obtained from the responses of team members (non-financial) and the external leaders (financial).

6.1 Independent variables

Interpersonal trust measures were assessed using Cook and Wall's (1980) 12-item questionnaire. The theory posits four dimensions of interpersonal trust (Faith in Peers, Faith in Management, Confidence in Peers, Confidence in Management). Based on the results of a CFA supporting three factors, these items were used to create three scales: Faith in Peers (three items, $\alpha = 0.86$), Confidence in Peers (four items, $\alpha = 0.76$), and Confidence in Management (three items, $\alpha = 0.86$). Two items were dropped due to cross loading.

6.2 Dependent variables

Knowledge acquisition attributes (behavioural skills and traits) made up of the subcategories of communication/problem understanding, personal traits, control, organization, negotiation, and liberal arts/nonverbal communication. These categories were assessed using the Mykytyn, et al's. (1994) 26-item instrument. Based on the results of the CFA five factors were supported: communication/problem understanding (seven items, $\alpha = 0.87$), personal traits (three items, $\alpha = 0.75$), control (four items, $\alpha = 0.85$), organisation (five item, $\alpha = 0.86$), and negotiation (three items, $\alpha = 0.90$). Four items were dropped due to cross loading not supporting factor six (that is, liberal arts/non-verbal communication).

Team performance was assessed using both non-financial and financial measures. The non-financial measures were assessed using Crouch's (1980) 5-scale of Crouch's Behavioural Inventory instrument. The four-item scale resulting from the CFA of this study showed a good internal reliability coefficient ($\alpha = 0.90$). (One item was dropped due to poor loading.)

Finally, the financial measures of team performance were assessed using a composite scale made up from schedule and profit (two items, $\alpha = 0.82$). The measure of quality was dropped due to poor loading. (Note: the external team leaders of the self-managing teams reported the level of performance for each indicator—schedule, quality and profit—.)

7. Path modelling

Using the analytical procedure outlined in Politis's (2001a: 358-359) study, we then calculated the parameters in the path model (i.e., λ_i and θ_i). Table 1 contains the means, SDs, reliability estimates, λ_i and θ_i, estimates.

Once these parameters—regression coefficients (λ_i) which reflect the regression of each composite variable on its latent variable, and the measurement error variances (θ_{ii}) associated with each composite variable—were calculated, we built this information into the path model to examine the relationships among the latent variables.

The model of Figure 2 contains three interpersonal trust dimensions (i.e., faith in peers, confidence in peers, confidence in management), five knowledge acquisition variables (communication/problem understanding, personal traits, control, organization, and negotiation), and two team performance variables: non-financial and financial. (It should be noted that one of the four interpersonal trust dimensions (faith in management) was not supported from the CFA

results. Moreover, the sixth factor (liberal arts/non-verbal communication) of knowledge acquisition was not supported by the data of this study.)

Table 1. Descriptive statistics, reliabilities, λ_i and θ_i estimates

				Reliability estimate	Loading	Error variance
Variable	**Mean**	**SD (σ)**	**α**	$\lambda = \sigma\sqrt{\alpha}$		$\theta = \sigma^2(1-\alpha)$
Interpersonal trust						
Faith in peers	5.53	1.24	.86	1.15		.215
Confidence in peers	5.23	1.20	.76	1.05		.345
Confidence in management	4.61	1.61	.86	1.49		.362
Knowledge acquisition attributes						
Communication/Problem understanding	4.00	0.98	.87	0.92		.126
Personal traits	4.53	1.19	.75	1.03		.356
Controls	4.14	1.12	.85	1.04		.190
Organisation	4.37	1.16	.86	1.07		.189
Negotiation	4.59	1.30	.90	1.23		.169
Team performance						
Non-financial	5.38	1.19	.90	1.13		.142
Financial	87.6	16.6	.82	15.0		50.5

The analysis revealed that the structural model of Figure 2 fit the data fairly well, with $\chi^2 = 86.8$; df = 27; (χ^2/df =3.21); GFI = 0.94; AGFI = 0.90; TLI = 0.88; CFI = 0.91; RMR = 0.149; and RMSEA = 0.097. Figure 2 displays the results of structural equations modelling.

7.1 Hypotheses testing

Figure 2 indicates the estimated path coefficients (γ values) obtained from the AMOS analysis and the associated significant levels for each path. As predicted by *H1*, there were significant positive relationships between faith in pees and two component dimensions of knowledge acquisition. *Faith in peers* is strongly and positively related to *organisation* ($\gamma_3 = 0.43$, $p < 0.01$) and *communication/problem understanding* ($\gamma_1 = 0.32$, $p < 0.05$). Contrary to our prediction, the standardised path from *faith in peers* to the dimension of *personal traits* although it was significant ($p < 0.05$), was weak and negative ($\gamma_2 = -0.10$). The expected influence, however, of Standardised path estimates (γs) are provided to facilitate comparison of regression coefficients. (It should be noted that all standardised path coefficients given in the AMOS output are reported in Figure 2.) Alternative models were examined with either paths added, reversed or removed, but all led to significantly worse model fit.

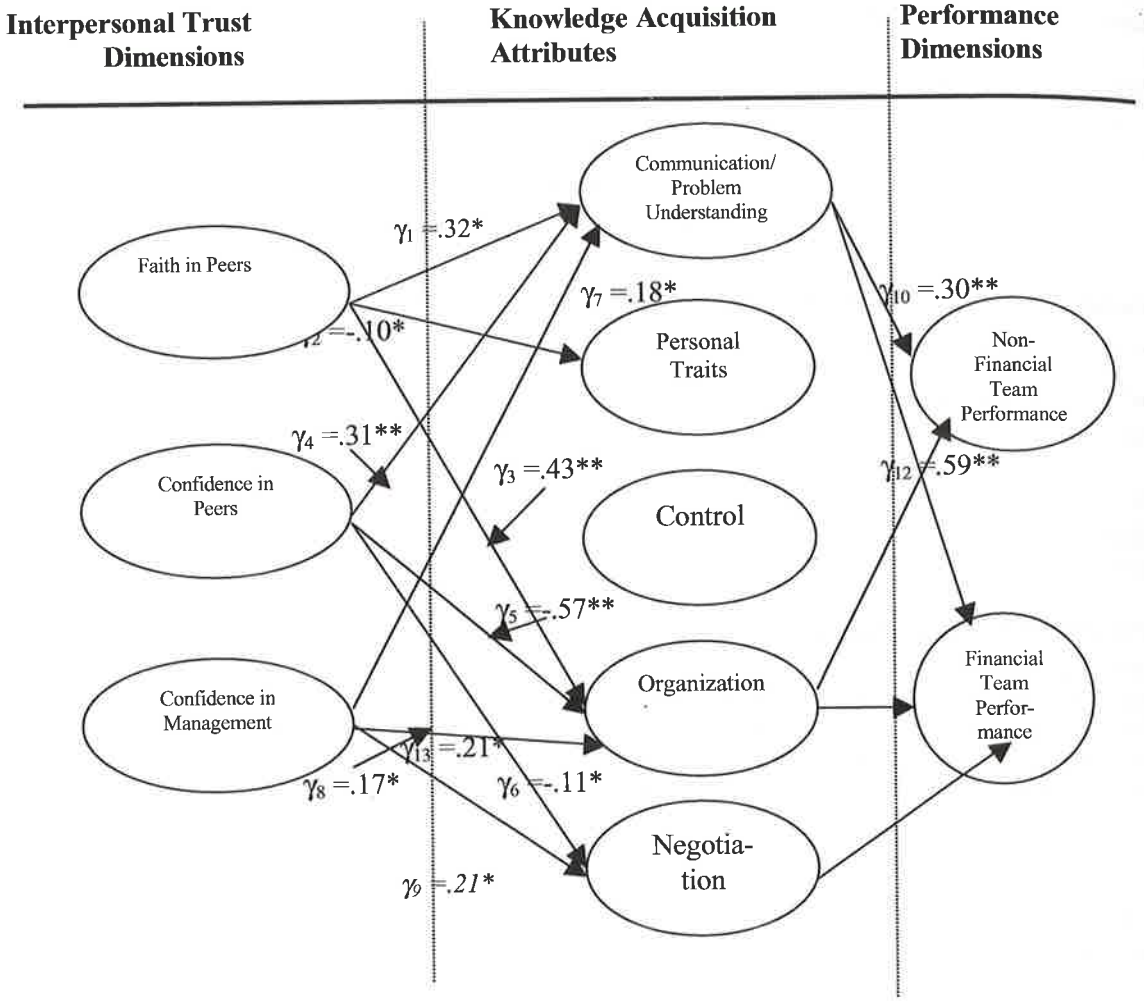

Figure 2: Structural estimates of the hypothesised model [α]

Note: [α] Standardised path coefficients N = 49 self-managing teams *p < 0.05; ** p < 0.01; *** p < 0.001

faith in peers on the other two component dimension of knowledge acquisition (*control and negotiation*) was not supported by the data of this study.

H3 proposed that confidence in peers will be positively related to knowledge acquisition attributes (behavioural skills and traits) of knowledge workers. This hypothesis was partially supported by the data of this study (see Figure 2), in that *confidence in peers* was positively and significantly related to *communication/problem understanding* ($\gamma_4 = 0.31$, $p < 0.01$). Contrary to our prediction, the effect of *confidence in peers* on the dimensions of *organisation* and *negotiation*, was negative and significant (γ_5 = -0.57, $p < 0.01$ and γ_6 = -0.11, $p < 0.05$, respectively). Moreover, no effect of the component dimension *confidence in peers* on *personal traits* and *control* was found by the data of this study.

As predicted, *confidence in management* had positive effect on three out of five knowledge acquisition attributes, largely supporting *H4*: Specifically, *confidence in management* is positively related to *communication/problem understanding* (γ_7 = 0.18, p < 0.05), and

organisation ($\gamma_8 = 0.17$, $p < 0.05$). It had also positive effect on *negotiation* ($\gamma_9 = 0.21$, $p < 0.05$). *H2* was not tested because the component dimension of interpersonal trust – faith in management – was not supported from the CFA results. On the right-hand side of the model, the results showed that two of the five dimensions of knowledge acquisition attributes (communication/problem understanding and organisation) were positively and significantly related to team performance, partially supporting *H5* and *H6*. Specifically, the relationship between the constructs of *communication/problem understanding* and *non-financial team performance* was positive and significant ($\gamma_{10} = 0.30$, $p < 0.01$), followed by similar relationship with the construct of *financial team performance* ($\gamma_{11} = 0.23$, $p < 0.05$). Moreover, the relationship between the component dimension of *organisation* and *non-financial team performance* was strong, positive and significant ($\gamma_{12} = 0.59$, $p < 0.01$), followed by similar relationship with the construct of *financial team performance* ($\gamma_{13} = 0.21$, $p < 0.05$).

Contrary to our prediction, the effect of *negotiation* on the dimensions of *financial team performance*, was negative and significant ($\gamma_{14} = -0.16$, $p < 0.05$). No other paths were significant between non-financial and financial team performance with the dimensions of knowledge acquisition. Furthermore, adding direct paths from interpersonal trust to team performance has also led to significantly worse model fit. Alternative models were examined with either paths added, reversed or removed, but all led to significantly worse model fit.

8. Discussion

The overall pattern of relationships between independent and dependent variables in the structural equation model to a large extent is consistent with the hypotheses. Fourteen of 25 tested paths between independent and dependent variables were significant. Of the fourteen significant paths, ten were found positive while the other four were negative. The findings from the current study suggest that the component dimensions associated with Cook and Wall's (1980) interpersonal trust model are essential in the process of strengthening collaboration (Schrage, 1990) and knowledge sharing (Zotz, 1995) between members of self-managing teams. Specifically, the relationships between confidence in management and communication/problem understanding, organisation, and negotiation were positive and significant, indicating that the confidence in the ability of managers yields ascriptions of capability and reliability in a self-managing environment. In other words, the results suggest that not only limited groups (read Alvesson, 1995) are regarded as knowledge workers, but supervisors and top managers should be involved in the learning and creation of new knowledge through becoming an 'insiders' of self-managed teams (Brown & Duguid, 1991). That is, not their acquiring explicit and formal 'expert knowledge' is important, but their embodied ability to behave as team members, is essential for knowledge acquisition and knowledge sharing. Furthermore, the results suggest that the interpersonal trust dimension of faith in peers is a key property ascribed for facilitating the communication/problem understanding and organisation in self-managing teams. It is the 'trustworthy' intention of co-workers that encourages and facilitates the communication, the understanding of work-related problems, and organising the dissemination of knowledge. Such 'trustworthy' intention among co-workers is the chief ingredient for knowledge acquisition and knowledge sharing.

Moreover, the strong relationship between confidence in peers and communication/problem understanding suggests that it is the 'confidence' and ability of co-workers that encourage members of self-managing teams to gather new information and knowledge in order to develop useful decisions in relation to problem solving. Contrary to our prediction, confidence in peers resulted in a negative, not positive, effect on organisation and negotiation suggesting that,

confidence in peers has an adverse effect in the process of organising the dissemination of knowledge in self-managing teams. Finally, the findings of the study clarify which of the knowledge acquisition attributes *best* predict team performance. In particular, communication/problem understanding and organisation are fundamental levers of both, non-financial and financial team performance. (It is interesting to note that communication/problem understanding is the only factor that was strongly and positively influenced by all three dimensions of interpersonal trust.)

A brief mention of some limitations of this study should be made to place the results in proper perspective. Although from an analytical perspective Structural Equation Modelling has a number of advantages in testing causal relationships, some caution should be noted. First, given the cross-sectional nature of the study, causality cannot be tested directly, although the hypotheses imply causation. So experimental or longitudinal data are needed for more definite results. Although the cross-sectional nature of the study renders it vulnerable to problems typically associated with survey research (common method variance), an attempt was made to collect data using more than a single technique. Team performance for example, was assessed with both non-financial measures (employees rated their own group performance) and financial measures (external team leaders rated team's performance on schedule, quality and profit). However, the lack of measures from multiple sources of the other variables represents a limitation to the study. Therefore, future researchers should include financial measures across supervisory and team samples, and data for interpersonal trust and knowledge acquisition should be collected from multiple sources.

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