

## TEAM COGNITION, COLLECTIVE EFFICACY, AND PERFORMANCE IN STRATEGIC DECISION-MAKING TEAMS

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With the growing use of teamwork for strategic decision making in organizations, an understanding of the teamwork dynamics in the strategic decision-making process is critical for both researchers and practitioners. By conceptualizing team cognition in terms of a transactive memory system (TMS) and collective mind, in this study we explored the relationships among TMS, collective mind, and collective efficacy and the impact of these variables on team performance. Longitudinal data collected from 98 undergraduates were analyzed. Neither the TMS–team performance relationship nor the collective mind–team performance relationship was significant. Collective efficacy was found to play a mediating role in such relationships. We concluded that team cognition with collective efficacy is beneficial for understanding teamwork dynamics in strategic decision making.

*Keywords:* collective efficacy, collective mind, team cognition, team performance, transactive memory system.

Teamwork has become an essential element in most organizations (Tasa, Taggar, & Seijts, 2007). Organizations are increasingly using teamwork for

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effective strategic decision making with the aim of acquiring a sustainable competitive advantage in a rapidly changing business environment.

Strategic decision making requires cooperation among team members (Dooley & Fryxell, 1999). In the strategic decision-making process, team members exchange and process information (Parayitam & Dooley, 2009) and determine appropriate actions and directions for the team (Olson, Bao, & Parayitam, 2007). To achieve effective teamwork, members need to develop team cognition to transact their respective roles and collaborate on a common task in the strategic decision-making process.

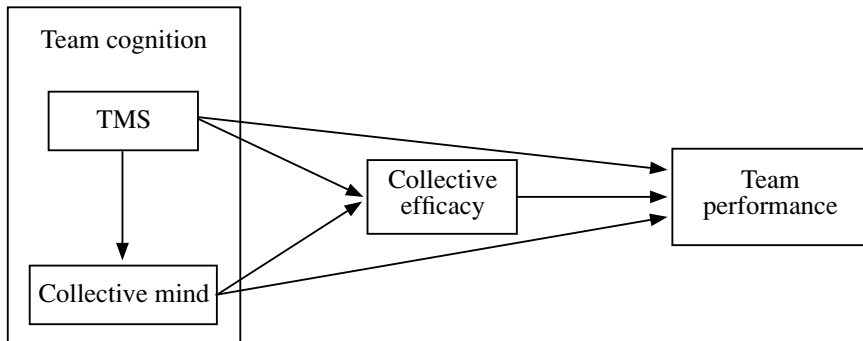


Figure 1. *Conceptual model of relationships among variables.*

The literature indicates that team cognition is a key driver of team performance (DeChurch & Mesmer-Magnus, 2010). Researchers of collective efficacy have also reported that teamwork behavior facilitates the formation of a team's collective efficacy (Tasa et al., 2007), which in turn enhances team performance (Gully, Incalcaterra, Joshi, & Beaubien, 2002). However, few have discussed the relationship between team cognition and collective efficacy, and its impact on team performance, especially in a strategic decision-making context. Therefore, the issue of team cognition in relation to collective efficacy and team performance is worth exploring. In this regard, we have drawn on two types of team cognition – the transactive memory system (TMS) and collective mind – to explore the role of team cognition in a team's collective efficacy and performance in strategic decision making. In this study we describe a conceptual model to study the relationships among the TMS, the collective mind, collective efficacy, and team performance (see Figure 1). This contributes to the literature in several ways. Firstly, drawing on the TMS, the collective mind, and collective efficacy, we explored the antecedents of team performance in a strategic decision-making context. By combining the TMS, the collective mind, and collective efficacy, we provided a richer model of team performance in the strategic decision-making

process. Secondly, in this article we empirically investigated the relationships among the TMS, the collective mind, and collective efficacy and explored the development of collective efficacy.

## Literature Review

### Team Cognition and Team Performance

*Team cognition is the process of understanding how the knowledge that is important to team effectiveness is mentally held and distributed within the team* (DeChurch & Mesmer-Magnus, 2010). Team cognition provides a foundation for team members to jointly coordinate their actions. The TMS and the collective mind are two types of team cognition that can help explain teamwork dynamics. The TMS is a team's collective awareness of who knows what, which provides the team with a cognitive architecture for knowledge (DeChurch & Mesmer-Magnus, 2010). The TMS thus provides a basis for understanding teamwork dynamics in terms of the processing and the exchange of information among team members while team members implement their strategic decision making.

*The collective mind is a social system in which individuals contribute, understand, and coordinate their actions for the good of the team* (Weick & Roberts, 1993; Yoo & Kanawattanachai, 2001). Brockmann and Anthony (1998) pointed out that members of a strategic decision-making team with a collective mind would (1) use shared vocabularies and consensus for strategic means and aims and (2) develop shared beliefs about the organization's environment, strategic position, and prospects. With an effective collective mind, members of a team collectively exhibit intelligent behaviors during group tasks (Crowston & Kammerer, 1998).

Recent researchers have acknowledged that team cognition is related to team motivational-affective states (such as collective efficacy) and team performance (DeChurch & Mesmer-Magnus, 2010). In the following sections we discuss the relationships among the TMS, the collective mind, collective efficacy, and team performance, and propose nine corresponding hypotheses.

### Collective Efficacy and Team Performance

*Collective efficacy refers to group members' shared belief in their ability to achieve a desired result through joint actions* (Bandura, 1997). In general, team members with higher degrees of collective efficacy are likely to devote more effort to performing a task jointly (Bandura, 1997), which in turn leads to better team outcomes. When team members perceive a higher degree of collective efficacy, they are capable of performing collaborative activities well, thus enabling better performance for the team. Given that collective efficacy is a predictor of team performance and that in previous studies it has been revealed

that collective efficacy is critical to group performance in various work group settings (Tasa et al., 2007), we propose the following hypothesis:

**Hypothesis 1:** Team collective efficacy will positively influence team performance.

### **The TMS and Team Performance**

Wegner, Erber, and Raymond (1991) proposed the concept of the TMS to describe the way that individuals treat their coworkers as external memory aids that complement their knowledge. In general, a well-developed TMS is indicative of good teamwork because a team with a better TMS is likely to develop team specialization, thereby allowing team members jointly to perform a given task effectively. For example, Berry (2006) suggests that any organizational decision-making team should include members from interdependent disciplines or functional areas to make such teams capable of processing information and creating synergistic effects from the collaboration of diverse talents.

Yoo and Kanawattanachai (2001) confirmed the positive effect of a TMS on team performance. Michinov and Michinov (2009) investigated the effect of a TMS on the performance of collaborative teams and confirmed that team performance improves when teams have a high TMS indicative of collaborative behaviors. On the basis of previous findings, we propose the following hypothesis to address the relationship between the TMS and team performance:

**Hypothesis 2:** A TMS will positively influence team performance.

### **The Collective Mind and Team Performance**

The term “collective mind” refers to “a pattern of heedful interrelations of actions in a social system” (Weick & Roberts, 1993). According to Weick and Roberts, members of a team with a collective mind demonstrate three behavioral features: contribution, representation, and subordination. Contribution describes team members’ actions, such as participating in social processes and making decisions that contribute to the team’s outcomes. Representation refers to the team development of a collective mental model that provides team members with a clear understanding of how to connect their own actions to the actions of others. Subordination describes how team members coordinate their actions to place team goals ahead of individual goals.

In essence, the collective mind is a social cognitive system (Yoo & Kanawattanachai, 2001) that shares the “understandings of the group’s tasks and of one another that facilitate group performance” (Crowston & Kammerer, 1998). Thus, we propose the following hypothesis to test the impact of the collective mind on team performance:

**Hypothesis 3:** The collective mind will positively influence team performance.

**The TMS and Collective Efficacy**

A TMS is a cooperative cognitive system that enables team members to know which team members have expertise on a particular issue (Prichard & Ashleigh, 2007). Mannix, Griffith, and Neale (2002) suggest that the TMS influences the formation of a team's collective efficacy. According to Kanawattanachai and Yoo (2007), when a team has an effective TMS, its members can locate expertise within the team and build a sense of trust in other members' abilities, which facilitates the efficient processing of knowledge for a given task. Thus, members of a team with a TMS can gain confidence in their teamwork and correctly perceive their team's ability to perform a task. In short, an effective TMS is likely to enhance a team's collective efficacy. Thus, we propose the following hypothesis:

**Hypothesis 4:** A team's TMS will positively influence its collective efficacy.

**The TMS and the Collective Mind**

Akgün, Byrne, Keskin, and Lynn (2006) indicated that the TMS is related to the collective mind. Researchers have shown that an effective TMS can help team members become aware of others' expertise and knowledge domains (Yoo & Kanawattanachai, 2001). Thus, the members of a team with such a TMS can efficiently retrieve necessary information from others and jointly make decisions for performing a given task. In doing so, a team with an effective TMS is capable of developing a global perspective that includes representations of how a given task should be divided, and who should perform each subtask. Accordingly, team members can carefully relate their activities to reaching task goals. This occurrence implies that a well-developed TMS is likely to facilitate the formation of a team's collective mind. Thus, we propose the following hypothesis:

**Hypothesis 5:** A team's TMS will positively influence its collective mind.

**The Collective Mind and Collective Efficacy**

As mentioned previously, a team's TMS is likely to influence its collective mind and collective efficacy. One can reasonably assume that the collective mind relates to the formation of a team's collective efficacy and is likely to mediate the TMS–collective efficacy relationship. With an effective collective mind, a team can develop a global perspective that includes each member's understanding of how his or her actions can maximize overall team performance. Accordingly, team members are likely to enhance the team's belief about their ability to collaborate to accomplish a specific task. Thus, we propose the following hypotheses:

**Hypothesis 6:** A team's collective mind will positively influence its perceived collective efficacy.

**Hypothesis 7:** A team's collective mind will mediate the effect of the TMS on its collective efficacy.

### **Collective Efficacy as a Mediator**

As mentioned earlier, the TMS and the collective mind relate to the formation of a team's collective efficacy, which in turn affects its performance. That is, the TMS and the collective mind may transmit their effects on team performance via the team's collective efficacy, which leads to the formulation of the following hypotheses:

**Hypothesis 8:** A team's collective efficacy will mediate the relationship between the TMS and team performance.

**Hypothesis 9:** A team's collective efficacy will mediate the relationship between the collective mind and team performance.

## **Method**

### **Participants**

The sample was drawn from students enrolled in an undergraduate course at a university in northern Taiwan. At the beginning of the semester, all students were invited to join a team-based experiment. Ninety-eight participants, 46 women (46.94%) and 52 men (53.06%), were randomly assigned to 32 teams, of which 30 teams had three members and two teams had four members. Each team was asked to participate in a business simulation game.

### **Learning Task**

As in the experiment conducted by Yoo and Kanawattanachai (2001), in this study we employed a web-based business simulation game in which each team was asked to perform independently a given strategic decision-making task. The web-based simulation game employed in this study was the Business Operations Simulation System (BOSS) 2008. BOSS 2008 is a popular strategic business game used as a teaching supplement in business schools in Taiwan.

### **Procedures**

During the first week of class, the instructor explained the experimental procedure and the learning task to the participants. In addition to the BOSS 2008 operation manual (see Tao & Hung, 2010), all students were provided with a two-week training program. They were given sufficient opportunity to practice using the business simulation software to ensure they understood how to operate it.

The business game began after the two-week training program and lasted for 10 weeks. During this period, all teams were asked to build a new company using the BOSS 2008 platform. Each member of the 30 3-member teams was assigned to 1 of the 3 top managerial positions: (1) general manager and finance manager, (2) marketing manager and planning manager, or (3) production manager and

procurement manager. The two 4-member teams assigned two members to one of the above three positions and the other two members to the remaining two positions.

Each team member was required to make weekly decisions based on his/her business function and the business information provided by BOSS 2008. While the team's functional managers made weekly decisions, the general managers confirmed and submitted the decisions to the system. The system would generate reports for each team and an interteam business competition report weekly. These reports included industry information, business finance spreadsheets, functional operations results, and the interteam competition report, which ranked the teams' performances. The above reports were announced on the BOSS 2008 platform. Each manager could access all six divisions' detailed weekly reports but could only make decisions for his or her own division. After the completion of the 10-week business game experiment, BOSS 2008 was used to produce a final report on the operations and performance rankings of each business.

### Measurement

The first survey measuring the TMS, collective efficacy, and the collective mind was delivered in Week 5 of the experiment. The second survey was presented in Week 10. Three items measuring the TMS were adopted from Yoo and Kanawattanachai (2001) and have been validated in new product development teams (Akgün et al., 2006) and virtual teams (Yoo & Kanawattanachai, 2001). A sample TMS item was: "Team members know who has specialized skills and knowledge relevant to their work". Four questions from Yoo and Kanawattanachai were refined to measure the collective mind. A sample item was: "Our team members carefully interrelated their actions in this project". *Collective efficacy* is a team's belief in its ability to perform a given task in the team workplace. In this study we adapted four scale items from Salanova, Llorens, Cifre, Martinez, and Schaufeli (2003) to measure collective efficacy in the strategic decision-making context. A sample item was: "I feel confident about the capability of my group to perform the BOSS simulation game very well". Five items from Hoegl and Gemuenden (2001) were adapted to measure team members' perceptions of team performance. A sample item for team performance was: "The project result was of high quality". All scale items for the variables above were measured using 5-point Likert scales ranging from 1 = *strongly disagree* to 5 = *strongly agree*.

### Data Analysis

Because of the small sample size, the partial least squares (PLS) approach exemplified by the SmartPLS 2.0.M3 software package was used to test the present research model. According to Chin, Marcolin, and Newsted (2003), the minimum sample size required for the PLS approach is equal to 10 times the

largest number of structural paths directed at a particular construct. As depicted in Figure 1, the largest number of structural paths was three paths directed at team performance; thus, the required sample size in our proposed model was 30 teams or more. Our study included 32 teams, which exceeded the aforementioned threshold value. Consequently, the PLS approach was suitable to test the proposed hypotheses.

### Data Aggregation

The TMS, the collective mind, collective efficacy, and team performance were analyzed at the team level. Therefore, individual scores for these variables were aggregated within each team to obtain team-level scores. The  $R_{wg}$  coefficient (James, Demaree, & Wolf, 1984), representing interrater reliability, was examined to determine whether team-level scores should be aggregated. The median  $R_{wg(j)}$  scores across teams for the TMS, the collective mind, collective efficacy, and team performance were 0.940 ( $SD = 0.659$ ), 0.960 ( $SD = 0.356$ ), 0.950 ( $SD = 0.716$ ), and 0.950 ( $SD = 0.855$ ), respectively, which exceeded the threshold of 0.7 (George, 1990) and demonstrated highly acceptable levels of interrater reliability. Of the 32 teams, two teams'  $R_{wg}$  scores did not exceed the 0.7 threshold level of reliability. One team's  $R_{wg}$  score for collective efficacy was 0.62, while another team's  $R_{wg}$  score for team performance was 0.56. To maximize our sample size, the aforementioned two teams were kept in the sample.

### Testing the Common Method Effect

Following the recommendations of Podsakoff and Organ (1986), Harman's one-factor test was conducted to verify whether a common method effect existed after the variables had been measured. The basic logic of this technique is that common method variance exists if either a single factor emerges, or the first unrotated factor extracted from the factor analysis containing all variable items, accounts for most of the covariance (Podsakoff & Organ, 1986). All four variables in the proposed research framework, including the TMS, the collective mind, collective efficacy, and team performance, were entered in an exploratory factor analysis. The result of an unrotated principal components factor analysis revealed that six factors with eigenvalues greater than 1 accounted for 74.09% of the total variance. In addition, the first factor accounted for 24.089% of the total variance, which was less than half of 74.09% of the total variance. Consequently, the common method effect was unlikely to confound the interpretation of the subsequent data analysis.

### Testing the Measurement Model

Table 1 contains a list of the parameters of the structural model and depicts the results of the descriptive statistics. To assess the measurement model, we

examined the following values: factor loadings, Cronbach's alpha values, composite reliability, and average variance extracted (AVE).

The factor loading analysis for TMS, collective mind, collective efficacy, and team performance revealed that all factor loadings on the corresponding constructs exceeded the threshold of 0.7. The values of Cronbach's alpha also exceeded the threshold of 0.7 for all of the constructs (Nunnally, 1978). The values of composite reliability all exceeded the threshold of 0.6 (Fornell & Larcker, 1981). These results indicate that the present measurement model attains acceptable internal reliability for each construct.

The AVE values measuring convergent validity are shown in Table 1, and all were above the threshold of 0.5 (Fornell & Larcker, 1981). Thus, the convergent validity of the measurement model is acceptable. The values of the square root of AVE in each construct can be seen in Table 1, and all are larger than their corresponding interconstruct correlations. Such results indicate that the discriminant validity of the measurement model is also acceptable (Fornell & Larcker, 1981). In sum, data analysis confirms the validity of the measurements proposed in the present research model.

Table 1. *Interconstruct Correlations and Parameters of the Structural Model*

|                        | 1            | 2            | 3            | 4            |
|------------------------|--------------|--------------|--------------|--------------|
| 1. TMS                 | <b>0.877</b> |              |              |              |
| 2. Collective efficacy | 0.706        | <b>0.886</b> |              |              |
| 3. Collective mind     | 0.680        | 0.651        | <b>0.871</b> |              |
| 4. Team performance    | 0.235        | 0.454        | 0.273        | <b>0.932</b> |
| Composite reliability  | 0.909        | 0.936        | 0.926        | 0.971        |
| AVE                    | 0.770        | 0.786        | 0.758        | 0.869        |
| Mean                   | 3.875        | 4.182        | 4.418        | 3.941        |
| Standard deviation     | 0.395        | 0.433        | 0.363        | 0.680        |
| Cronbach's alpha       | 0.852        | 0.908        | 0.894        | 0.962        |

Note:  $N = 32$  teams; the **bold** values on the diagonal are the square root of AVE.

### Testing the Structural Model

The statistical significance of the structural paths depicted in Figure 2 was assessed using the SmartPLS 2.0.M3 bootstrap procedure, with 500 resamples. As shown in Figure 2, all except Hypotheses 2 and 3 were supported. Collective efficacy had a positive significant impact on team performance ( $\beta = .563, p < .01$ ), which supported Hypothesis 1 and was consistent with the result gained by Gully et al. (2002). The path coefficient ( $\beta = -.183, p > .05$ ) from the TMS to team performance was not significant; therefore, Hypothesis 2 was not supported. The path coefficient ( $\beta = .031, p > .05$ ) from the collective mind to team performance was not significant; thus, Hypothesis 3 was not supported. The

confirmation of Hypothesis 1 and the refutation of Hypotheses 2 and 3 indicate that, compared with the TMS and the collective mind, only collective efficacy had a significant direct influence on team performance.

The TMS was found to be positively associated with collective efficacy ( $\beta = .490, p < .01$ ), thereby validating Hypothesis 4. The results confirmed those gained by Gully et al. (2002) and Mannix et al. (2002), indicating that a team's TMS is related to its efficacy.

The TMS was found to influence a team's collective mind positively ( $\beta = .680, p < .01$ ), thus confirming Hypothesis 5. The collective mind had a positive impact on collective efficacy ( $\beta = .318, p < .01$ ), thereby supporting Hypothesis 6. The results suggest that a greater TMS enhances the collective mind, which in turn leads to greater collective efficacy.

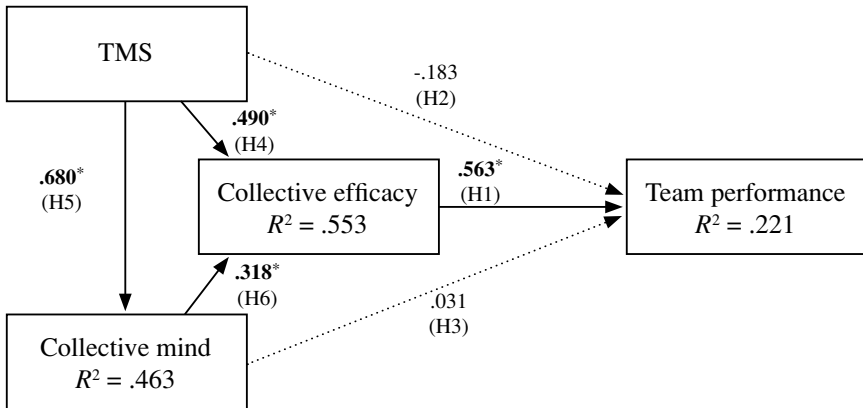


Figure 2. The path coefficients for the research model.

Note: \*  $p < .01$ .

### Testing the Mediating Effect

The Sobel test (Sobel, 1982) was used to evaluate the mediating effects of Hypotheses 7, 8, and 9. Four independent PLS models (Model 1, Model 2, Model 3, and Model 4) were developed following the testing mediating procedure of Neufeld, Dong, and Higgins (2007) by using bootstrapping with 500 resamplings to yield  $t$  test values for the Sobel test. In Table 2, Model 1 included the path from the TMS to the collective mind ( $t = 16.520$ ), and Model 2 included the path from the collective mind to collective efficacy ( $t = 15.314$ ). Taking Models 1 and 2 together, the  $z$  value of the Sobel test was significant ( $z = 11.231, p < .001$ ). The results indicate that the collective mind mediates the influence of the TMS on collective efficacy. Hypothesis 7 was therefore supported.

In Table 2, Model 3 included the path from the TMS to collective efficacy ( $t = 5.915$ ) and the path from the collective mind to collective efficacy ( $t = 4.170$ ). Model 4 included the path from collective efficacy to team performance ( $t = 9.022$ ). The corresponding  $z$  values of the Sobel test were all significant, confirming that collective efficacy not only mediated the impact of the TMS on team performance ( $z = 4.947, p < .001$ ) but also influenced the effect of the collective mind on team performance ( $z = 3.785, p < .001$ ). Thus, Hypotheses 8 and 9 were supported.

Table 2. *The Results for Testing Mediating Effect*

| Model 1  |        | Model 2 |        | Sobel test | $p$        |
|----------|--------|---------|--------|------------|------------|
| Path     | $t$    | Path    | $t$    |            |            |
| TMS → CM | 16.520 | CM → CE | 15.314 | 11.231     | 0          |
| Model 3  |        | Model 4 |        | Sobel test | $p$        |
| Path     | $t$    | Path    | $t$    |            |            |
| TMS → CE | 5.915  | CE → TP | 9.022  | 4.947      | 7.6e-7     |
| CM → CE  | 4.170  | CE → TP | 9.022  | 3.785      | 0.00015357 |

Notes: TMS = transactive memory system; CM = collective mind; CE = collective efficacy; TP = team performance.

## Discussion

In this study we incorporated the TMS and the collective mind to conceptualize how team cognition is shaped and contributes to collective efficacy. The results from the data analysis confirm all except Hypotheses 2 and 3. Contrary to the findings gained in previous studies, in our research we did not find support for the hypothesis that the TMS and the collective mind are causally linked to team performance. Rather, our research results indicate that collective efficacy carries the impacts of the TMS to team performance. In addition, the collective mind mediates the effect of the TMS on collective efficacy.

The insignificant TMS–team performance relationship may be due to the confidence level among team members; if there is overconfidence among team members, it will hinder the TMS–team performance relations. The rationale is that if team members are overconfident in other members' expertise, they may overemphasize the capability of team members and fail to acknowledge the corresponding weaknesses, which would result in poor team performance. On the other hand, the team members' knowledge levels could provide another plausible explanation for the insignificant TMS–team performance relationship. When an individual member's knowledge level is insufficient, he or she cannot provide other members with an adequate knowledge source for effective strategic

decision making. This occurrence may hinder their coordinated efforts to enhance team performance.

By conceptualizing team cognition in terms of the TMS and the collective mind, we have investigated the relationship among the TMS, the collective mind, collective efficacy, and team performance. Several important findings were revealed. Firstly, we found that the TMS affects the collective mind, which in turn influences collective efficacy. Therefore, integrating the TMS with the collective mind can provide a clearer understanding of how collective efficacy develops in team processes. Secondly, collective efficacy not only influences team performance but also serves as a mediator. That is, the TMS and the collective mind will help foster the team's collective efficacy, which in turn affects team performance.

In conclusion, with the aid of team cognition in terms of the TMS and the collective mind, the current study contributes to the literature by empirically clarifying the impact of team cognition on collective efficacy and team performance in a strategic decision-making context. Team cognition should therefore be acknowledged as an effective mechanism to facilitate collective efficacy and team performance. Exploring team cognition in relation to collective efficacy and team performance is beneficial in capturing teamwork dynamics in strategic decision making.

This study has several important implications for business managers. Firstly, it is important to develop a TMS because it facilitates the team's development of a collective mind and collective efficacy. The findings suggest that a TMS and a collective mind alone are not enough to achieve better team performance. It is the team's collective efficacy that facilitates team performance. When recruiting team members, managers should consider each member's specialized role to avoid any redundancy and help initiate TMS development. Furthermore, the literature suggests that interpersonal trust affects TMS development (Akgün, Byrne, Keskin, Lynn, & Imamoglu, 2005). Managers should endeavor to create a climate of interpersonal trust to leverage a team's TMS. Finally, Tasa et al. (2007) pointed out that teamwork behaviors are positively related to collective efficacy. Given the importance of collective efficacy on improving a team's performance, team leaders should train team members to acquire teamwork skills that facilitate collective efficacy development.

This study has a few limitations that should be addressed. Firstly, because the participants were university students, the findings cannot be generalized to other team settings. Future researchers should increase the sample size to analyze the data at the team level with the structural equation modeling (SEM) method. Secondly, the team size in this study was limited to three or four members, which does not reflect the variety of team sizes found in real organizational contexts. Finally, role assignment and team composition in the current study

were randomly conducted, which also did not reflect real-life organizational situations. In future studies, team size and team member diversity should be used as control variables and their impacts on the TMS and team performance should be scrutinized.

## References

- Akgün, A. E., Byrne, J. C., Keskin, H., & Lynn, G. S. (2006). Transactive memory system in new product development teams. *IEEE Transactions on Engineering Management*, *53*, 95-111. <http://doi.org/g46>
- Akgün, A. E., Byrne, J. C., Keskin, H., Lynn, G. S., & Imamoglu, S. Z. (2005). Knowledge networks in new product development projects: A transactive memory perspective. *Information & Management*, *42*, 1105-1120. <http://doi.org/g47>
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: Freeman.
- Berry, G. R. (2006). Can computer-mediated asynchronous communication improve team processes and decision making? Learning from the management literature. *Journal of Business Communication*, *43*, 344-366. <http://doi.org/g48>
- Brockmann, E. N., & Anthony, W. P. (1998). The influence of tacit knowledge and collective mind on strategic planning. *Journal of Managerial Issues*, *10*, 204-222. Accessed at <http://www.jstor.org/stable/40604193>
- Chin, W. W., Marcolin, B. L., & Newsted, P. R. (2003). A partial least squares latent variable modeling approach for measuring interaction effects: Results from a Monte Carlo simulation study and an electronic-mail emotion/adoption study. *Information Systems Research*, *14*, 189-217. <http://doi.org/fmswns>
- Crowston, K., & Kammerer, E. E. (1998). Coordination and collective mind in software requirements development. *IBM Systems Journal*, *37*, 227-245. <http://doi.org/g49>
- DeChurch, L. A., & Mesmer-Magnus, J. R. (2010). The cognitive underpinnings of effective teamwork: A meta-analysis. *Journal of Applied Psychology*, *95*, 32-53. <http://doi.org/bbdc2f>
- Dooley, R. S., & Fryxell, G. E. (1999). Attaining decision quality and commitment from dissent: The moderating effects of loyalty and competence in strategic decision-making teams. *The Academy of Management Journal*, *42*, 389-402. <http://doi.org/bvtmbx>
- Fornell, C., & Larcker D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, *18*, 382-388. <http://doi.org/cwp>
- George, J. M. (1990). Personality, affect, and behavior in groups. *Journal of Applied Psychology*, *75*, 107-116. <http://doi.org/g5b>
- Gully, S. M., Incalcaterra, K. A., Joshi, A., & Beaubien, J. M. (2002). A meta-analysis of team-efficacy, potency, and performance: Interdependence and level of analysis as moderators of observed relationships. *Journal of Applied Psychology*, *87*, 819-832. <http://doi.org/bcfc2f>
- Hoegl, M., & Gemuenden, H. G. (2001). Teamwork quality and the success of innovative projects: A theoretical concept and empirical evidence. *Organization Science*, *12*, 435-449. <http://doi.org/bcbj7f>
- James, L. R., Demaree, R. G., & Wolf, G. (1984). Estimating within-group interrater reliability with and without response bias. *Journal of Applied Psychology*, *69*, 85-98. <http://doi.org/g5c>
- Kanawattanachai, P., & Yoo, Y. (2007). The impact of knowledge coordination on virtual team performance over time. *MIS Quarterly*, *31*, 783-808. Accessed at <http://aisel.aisnet.org/misq/vol31/iss4/81>

- Mannix, E. A., Griffith, T., & Neale, M. A. (2002). The phenomenology of conflict in distributed work teams. In P. J. Hinds & S. Kiesler, (Eds.), *Distributed work* (pp. 213-233). Cambridge, MA: MIT Press.
- Michinov, N., & Michinov, E. (2009). Investigating the relationship between transactive memory and performance in collaborative learning. *Learning and Instruction, 19*, 43-54. <http://doi.org/g5d>
- Neufeld, D. J., Dong, L., & Higgins, C. (2007). Charismatic leadership and user acceptance of information technology. *European Journal of Information Systems, 16*, 494-510. <http://doi.org/g5f>
- Nunnally, J. C. (1978). *Psychometric theory* (2nd ed.). New York: McGraw-Hill.
- Olson, B. J., Bao, Y., & Parayitam, S. (2007). Strategic decision making within Chinese firms: The effects of cognitive diversity and trust on decision outcomes. *Journal of World Business, 42*, 35-46. <http://doi.org/g5g>
- Podsakoff, P. M., & Organ, D. W. (1986). Self-reports in organizational research: Problems and prospects. *Journal of Management, 12*, 531-544. <http://doi.org/czv>
- Parayitam, S., & Dooley, R. S. (2009). The interplay between cognitive and affective conflict and cognition- and affect-based trust in influencing decision outcomes. *Journal of Business Research, 62*, 789-796. <http://doi.org/g5h>
- Prichard, J. S., & Ashleigh, M. J. (2007). The effects of team-skills training on transactive memory and performance. *Small Group Research, 38*, 696-726. <http://doi.org/g5j>
- Salanova, M., Llorens, S., Cifre, E., Martinez, I. M., & Schaufeli, W. B. (2003). Perceived collective efficacy, subjective well-being and task performance among electronic work groups: An experimental study. *Small Group Research, 34*, 43-73. <http://doi.org/g5k>
- Sobel, M. E. (1982). Asymptotic confidence intervals for indirect effects in structural equations models. In S. Leinhardt (Ed.), *Sociological methodology* (pp. 290-312). San Francisco, CA: Jossey-Bass.
- Tao, Y. H., & Hung, K. C. (2010). Who performs better in business simulation game learning? A case study of a college general course. In N. Mastorakis, V. Mladenov, & Z. Bojkovic (Eds.), *The 10th World Scientific and Engineering Society International Conference on Applied Informatics and Communications* (pp. 471-476). Taipei: WSEAS Press. Accessed at <http://www.wseas.us/e-library/conferences/2010/Taipei/AIBE-78.pdf>
- Tasa, K., Taggar, S., & Seijts, G. H. (2007). The development of collective efficacy in teams: A multilevel and longitudinal perspective. *Journal of Applied Psychology, 92*, 17-27. <http://doi.org/g5m>
- Wegner, D. M., Erber, R., & Raymond, P. (1991). Transactive memory in close relationships. *Journal of Personality and Social Psychology, 61*, 923-929. <http://doi.org/g5n>
- Weick, K. E., & Roberts, K. H. (1993). Collective mind in organizations: Heedful interrelating on flight decks. *Administrative Science Quarterly, 38*, 357-381. <http://doi.org/d43gfp>
- Yoo, Y., & Kanawattanachai, P. (2001). Developments of transactive memory systems and collective mind in virtual teams. *The International Journal of Organizational Analysis, 9*, 187-208. <http://doi.org/dggwmv>