

# The Impact of Metacognitive Knowledge and Experience on Top Management Team Diversity and Small to Medium Enterprises Performance

Jo Rhodes, Peter Lok, Zahra Sadeghinejad

**Abstract**—The aim of this study is to determine the impact of metacognition on top management team members and firm performance based on full team integration. A survey of 1500 small to medium enterprises (SMEs) was initiated and 140 firms were obtained in this study (with response rate of 9%). The result showed that different metacognitive abilities of managers [knowledge and experience] could enhance team decision-making and problem solving, resulting in greater firm performance. This is a significant finding for SMEs because these organisations have small teams with owner leadership and entrepreneurial orientation.

**Keywords**—Metacognition, behavioural integration, top management team, performance.

## I. INTRODUCTION

EACH top manager brings his/her own cognition and perspective to contribute to a firm's decision-making and actions. Therefore, an entire team of top managers should collectively provide a better and stronger firm performance [1]. Despite the positive relationship on the collective cognition and perspective of top managers and firm performance in the past [2], [3]; it has been argued that metacognition of team managers could be a better measurement of managers' cognitive contribution [4]-[6] and a significant differentiator that could be expected to have important firm-level implications [7].

Metacognition has been argued as an important cognitive resource useful in the understanding of a wide range of tasks and situations, in particular, uncertain and dynamic ones [4]. Cognition refers to the activities of thinking, knowing, and processing information [6:421]. Metacognition is a higher-level heuristic applied by individuals to process information about their environment [5]. That is, the ability to regulate and control the use of their knowledge and experience in unfamiliar circumstances [8].

It has been argued that metacognition consists of two primary functions: monitoring and control [9], [10]. Metacognitive monitoring refers to "those processes that allow the individual to observe, reflect on, or experience his or her

own cognitive processes" [8, p.4]. Monitoring includes such processes as "identifying the task, checking, and evaluating one's progress, and predicting the outcomes of that progress" [9]. Metacognitive control refers to the "conscious and non-conscious decisions that an individual makes based on the output of his or her monitoring processes". The metacognitive control process is critical in learning, making effective judgments, and the knowledge sharing of individuals [11]. As noted, metacognitive monitoring and control work in tandem and thereby enable an individual to regulate his or her brain information processing, based on the requirements of the task at hand. This self-regulation mechanism requires the use of knowledge and experience as two sources of metacognitive abilities. Therefore, two aspects of cognition which are monitored and controlled by metacognitive processes are 'knowledge' and 'experience' [10].

'Metacognitive knowledge' refers to the part of one's acquired knowledge that has to do with cognitive, or perhaps is better considered as psychological matter [12]. It contains one's total knowledge base that pertains to one's cognitive area as a whole. This knowledge often refers to "one's conscious and cognitive understanding of 1) people, 2) tasks, and 3) strategy" [13, p.222]. 'Metacognitive experience' is conscious experiences that are cognitive and affective [10]. What makes them a metacognitive experience is their relationship with some cognitive endeavor or enterprise, most frequently a current ongoing endeavor. This relates to any affective or cognitively conscious experience that is pertinent to the conduct of intellectual life; often it is directly related to the conduct in an ongoing situation or enterprise. Metacognitive knowledge and experience develop over time and regulate the use of heuristics in making choices [13].

Despite the general understanding that teams often produce better decision and result, it is still inconclusive on team metacognition on firm performance. This study has adopted the Flavell's [12] metacognition diversity of 'knowledge' and 'experience' approach to examine the influence of top management team [TMT] metacognition on firm performance.

Team processes describe team members' interactions guided toward task accomplishment, thus they could describe how team inputs [e.g. diversity] are converted into both team- and firm-level outcomes [14]. Amongst team processes, TMT behavioural integration has been argued to be an important one [15]. TMT behavioural integration is defined as the extent to which TMT members engage in mutual and collective interaction [1]. It captures three important interrelated

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elements of the TMT process, including “a team’s level of collaborative behaviour, quantity and quality of information exchanged, and emphasis on joint decision-making” [16, p. 69]. Past studies [10] showed that more behaviourally integrated TMTs make better-quality strategic decisions than less behaviourally integrated ones, resulting in better firm performance.

The composition, culture, policies and managers’ attributes could be rather different between big corporations and SMEs

(i.e. less than 200 employees). Despite evidence from previous studies that decision making processes by TMT in SMEs is different to large organisations, there is a lack of understanding on the impact of metacognition and decision making of TMT on SME performance. Hence, it is the intention of this study to examine the impact of the TMT metacognitive [knowledge and experience] diversity on SME performance, based on the assumption that TMT behavioural integration may moderate this impact.

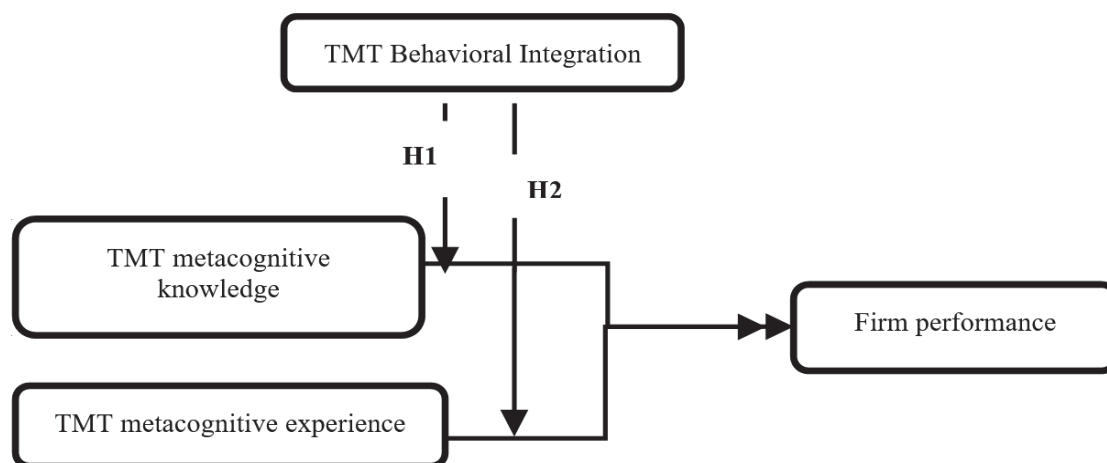


Fig. 1 The Interaction between TMT Metacognitive Knowledge and Experience Diversity and Behavioral Integration on SMEs’ Performance

## II. CONCEPTUAL FRAMEWORK AND HYPOTHESES DEVELOPMENT

The conceptual framework for this study is presented in Fig. 1. A behaviourally integrated TMT can be expected to see the value in each person’s different types of knowledge and experience [10] [17] and allow team members to fully leverage their knowledge and experience to perform the tasks [18]. A behaviourally integrated team is more likely to value each others’ metacognitive ability which in turn is reflected in the team’s understanding, assessments, and decisions. This allows team members to fully leverage their metacognitive ability to make decisions, resulting in more effective actions. This is particularly important for SMEs who often depend primarily on their top team’s ability to perform [18], [19]. Thus:

- Hypothesis 1. TMT metacognitive knowledge diversity will positively enhance the performance of SMEs when the team is behaviourally integrated.
- Hypothesis 2. TMT metacognitive experience diversity will positively enhance the performance of SMEs when the team is behaviourally integrated.

## III. RESEARCH METHODS

The list of SMEs and their individual contacts were collected from Dun and Bradstreet, Australia. Dun and Bradstreet is the world’s leading and longest-established business information company. This study drew a random sample of 1,500 SMEs from this database. These firms, from the main Australian sectors such as manufacturing,

construction, wholesale as well as retail trades, and professional, scientific, and technical services, were sent the survey questionnaire. An informed consent letters and postage-paid return envelopes, were addressed directly to the managing director or director of the randomly selected firms.

A quantitative approach based on Structured Equation Model is used in this study. Independent variables are TMT metacognitive knowledge and TMT metacognitive experience. Moderating variable is TMT Behavioural integration. Dependent variable is Firm performance (as in Fig. 1). To measure metacognitive knowledge and experience, Haynie and Shepherd’s [20] scale was applied (reliability of 0.74). Performance was measured as the average of nine financial, marketing, and operational indicators [21]. TMT members (including CEOs) were asked to rate their firm’s performance on a five-point scale (much worse to much better) relative to their main competitors over the last three years. To measure TMT behavioural integration, the nine items developed by Simsek et al. [16] were employed (reliability index of 0.85).

The questionnaires, along with the informed consent letters and postage-paid return envelopes, were addressed directly to the managing director (CEO) or director of the firms (data provided by Dun and Bradstreet). This study identified CEOs as the people who are most knowledgeable about their fellow top managers. They were then asked to distribute the questionnaires to their top team members. In order to ensure confidentiality and anonymity, postage-paid return envelopes were provided for team members [22], [23], thus the responses were sent back directly without CEO oversight.

To prevent any possible mismatch, firms were first coded and then, according to the codes, envelopes were numbered for each firm. Respondents were asked to identify whether they were CEO or senior executives. A pilot study was conducted to test the questionnaire's overall design, ambiguity, the wording and formatting of the questions, as well as its reliability [24], [25]. Only minor corrections were made to wording of a few questions and there was no concern regarding the ambiguity of questions.

This study used structural equation modelling [SEM] within the AMOS software package to test the mediating model [23]. To test the moderating model, multigroup moderation analysis in AMOS was conducted.

#### IV. RESULT

Usable responses were received from 140 firms' CEOs and 321 TMT members from a sample of 1500 SMEs [a response rate of 9% which is comparable to other TMT research using a mail survey, e.g. [24], [25]. A structural model using product terms was run using maximum-likelihood estimation.

The result of this study revealed that all construct measurement models exhibit adequate fit (Table I). Two alternative models were created by confirmatory measurement. In the first model, three constructs representing entrepreneurial orientation (EO) were placed in the model separately. In the second model, EO was treated as a single construct represented by nine items. The first model showed better fit [ $\chi^2 = 1208.843$ , GFI=.829, AGFI=0.806, IFI=0.888, TLI=0.865, and RMSEA=0.043] (Table II). This provides evidence for the fitness of the hypothesized model.

According to Anderson and Gerbing's [26] approach, five nested models were compared: a saturated model [Ms], a null model [Mn], a theoretical model [Mt], the "next most likely" constrained model [Mc] and the unconstrained alternative model [Mu]. The results show significant differences between alternative models and suggest that Model 5 [the unconstrained alternative model [Mu]] has the best fit to the data. Thus, Model 5 [Mu] as the hypothesized model is most likely the appropriate model fitting data and this can be used in hypothesis testing [Table III].

Based on the mean of the imputed variable, two groups represent TMTs with low [i.e. group 1] and high [i.e. group 2] degrees of behavioural integration were created for multigroup analysis in AMOS. A chi-square difference test was performed to detect whether the difference between these models is statistically significant to allow a comparison of moderation paths. The result showed that the chi-square difference is 20.844, degrees of freedom difference is 11, and the difference is significant at P-value=0.0350<0.05. The result indicated that several paths differ across different groups, implying the moderation effects.

Unstandardized estimates shown in Table IV suggest that all paths are statistically significant [i.e. C.R.>1.96, sig.<0.05].

TABLE I  
FIT INDICES OF CONSTRUCT MEASUREMENT MODELS

Latent variable	$\chi^2$	DF	CMIN/DF	GFI	AGFI	IFI	TLI	CFI	RMSEA
Behavioural Integration	24.18	25	.968	.963	.933	.999	.999		.001
Metacognitive knowledge diversity	50.19	33	1.52	.972	.953	.988	.987		.034
Metacognitive experience diversity	19.99	12	1.66	.987	.970	.985	.868		.039

TABLE II  
FIT INDICES OF ALTERNATIVE MODELS

	$\chi^2$	DF	CMIN/DF	GFI	AGFI	IFI	TLI	CFI	RMSEA
Full Confirmatory Factor Model with three constructs representing EO	1208.843	443	2.73	0.829	0.806	0.888	0.865		0.043
Full Confirmatory Factor Model with EO as a first-order construct	1408.743	435	3.23	0.799	0.756	0.765	0.784		0.058

TABLE III  
FIT INDICES AMONG ALTERNATIVE MEASUREMENT NESTED MODELS

<i>fit indices among alternative measurement nested models</i>											
Nested Model	$\chi^2$	Df	$\chi^2/DF$	CFI	IFI	TLI	AGFI	RMSEA	Comparison	$\Delta \chi^2$	$\Delta Df$
Model5:	1208.843	443	2/73	0.94	0.829	0.806	0.888	0.865	5 versus 4	48.8***	8
Model4:	1258.643	451	2.79	0.94	0.829	0.805	0.868	0.845	4 versus 3	30.7**	12
Model3:	1299.343	459	2/78	0.92	0.819	0.804	0.866	0.849	3 versus 2	29.65**	13
Model2: Covariates only	1318.995	472	2/77	0.91	0.812	0.802	0.866	0.839	2 versus 1	19.25**	5
Model 1: Mn : Null model	1338.243	477	2/78	0.91	0.809	0.801	0.859	0.834	-	-	-

\*: significant at p< 0.05 \*\*: significant at p< 0.01 \*\*\*: significant at p<0.001

TABLE IV  
RESULTS OF INTERACTION PATH ANALYSIS

	Path		Estimate	S.E.	C.R.	Sig.
Performance	<---	MGKD	0.31	0.088	3.523	0.001
Performance	<---	MGED	0.33	0.089	3.708	0.000
Performance	<---	BI*MGED	0.27	0.079	3.418	0.001
Performance	<---	BI*MGKD	0.29	0.093	3.118	0.002
Performance	<---	BI	0.22	0.077	2.857	0.005

The result [Table IV] also showed that relationship between TMT metacognitive knowledge diversity and firm performance is positive [b=0.31, p=0.001] and behavioral integration intensifies this association [b=0.22, p=0.005] by generating a significantly positive interaction [b=0.29, p=0.002]. Therefore, hypothesis 1 is supported.

There is a positive association between TMT metacognitive experience diversity and firm performance [b=0.33, p=0.000] which is intensified by behavioural integration [b=0.27, p=0.001] suggesting that behavioural integration positively moderates the relationship between TMT metacognitive experience diversity and firm performance. This finding offers support for hypothesis 2.

#### V. DISCUSSION

The findings confirmed that positive firm performance could be explained by the composition of TMT members with respect to their metacognitive abilities. This finding is in line with previous research [24] and the information/decision-making perspective [27] that different cognitive abilities of managers bring the team different options and solutions for decision-making and problem solving.

One possible explanation for this direct positive relationship could be the importance of metacognitive knowledge and experience. It has been argued that metacognitive knowledge and experience form a set of “valuable, rare, and inimitable cognitive resources” [13, p. 225]. Such metacognitive resources are important assets [28] which help individuals to understand their own array of knowledge and skills, decision-making, and action [13] [29]. In the case of top managers as a firm’s key decision-makers, such understanding could be extended to the firm’s strengths and weaknesses and accordingly its courses of action and strategies. Given a team composed of managers with different metacognitive abilities, there would be various interpretations and assessments of the firm’s strategies and actions.

In addition to the importance of metacognitive knowledge and experience, another possible reason for the direct relationship could be the study setting. Due to their liabilities of ownership and smallness, SMEs’ TMTs have latitude of action [25] [30]. They have greater autonomy and managerial discretion than top managers of larger firms. More notably, these firms are often governed by a small number of top managers [31], thus managers’ individual metacognition could be more leveraged into the team decision-making. This accordingly implies that besides the diversity variable, it is important to consider the context in which managerial decisions and actions take place [32] as it provides the

“purpose, resources, social cues, norms, and meanings that shape behaviour” [33, p. 813].

#### VI. CONCLUSION

This research provided significant findings in the relationship of TMT megacognitive diversity and firm performance. Incorporating behavioral integration further provides a more detailed understanding of the role of TMT metacognitive diversity and behavior in firms’ performance. First, the empirical findings in this study support previous result that managers’ metacognitive abilities (knowledge and experience) could provide better team decision-making and problem solving. However, since SMEs have a smaller number of top managers, managers’ individual metacognition has a greater leveraged into the team decision-making and has a greater impact on firm performance compared to managers in big firms. This is an important contribution in SME performance. Second, behavioural integration is an important factor to enhance positive effect of TMT metacognition (both knowledge and experience), resulting in positive firm performance. Since SMEs may have smaller TMTs, the effect of positive behavioural integration could further enhance quick decision making in these firms. Although this finding is consistent with previous studies [34], [16], [20], it consolidates the application of behavioural integration with positive SMEs performance.

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