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THE RELATIONSHIP BETWEEN METACOGNITION, ENTREPRENEURIAL ORIENTATION, AND FIRM PERFORMANCE: AN EMPIRICAL INVESTIGATION

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ABSTRACT

This study aims to examine the relationship between an entrepreneur's metacognition, entrepreneurial orientation (EO), and firm performance. We collected primary data from 190 entrepreneurs (business owners or founders) working in the U.S. through a survey. By performing both the confirmatory factor analysis (CFA) and the structural equation modeling (SEM), we tested our hypothesized research model that represented the metacognition-EO-firm performance relationship. The results from the statistical analysis demonstrate that an entrepreneur's metacognition has a significant positive impact on EO. Furthermore, the study result shows that EO has a full mediating effect on the relationship between entrepreneurial metacognition and firm performance. We, thus, anticipate that the findings of this study will help entrepreneurs to understand the mechanism of how their metacognitions impact their business outcomes as well as to recognize why they should consider their metacognitive abilities while executing entrepreneurial tasks.

Keywords: Entrepreneurial metacognition, metacognitive knowledge, metacognitive strategy, entrepreneurial orientation, confirmatory factor analysis, and structural equation modeling.

INTRODUCTION

In the context of entrepreneurial research, "cognition is defined as the knowledge structure that people use to make assessments and decisions involving opportunity evaluation, venture creation, or growth (Mitchell et al., 2002a, b)" (Haynie, Shepherd, Mosakowski, & Earley, 2010: 220). On the other hand, "metacognition" can be defined as the awareness and understanding of one's own cognitive processes; in other words, it can be shown as a higher-order process that reflects one's awareness and control over the knowledge structure people use in making an assessment or a decision (Haynie, 2005; Haynie & Shepherd, 2009). In particular, within the context of entrepreneurship, Haynie et al. (2010) argued that "metacognitive knowledge" can be considered as "a resource that is informed based on what the entrepreneur

understands to be true about people, tasks, and strategy, and can be brought to bear upon the task of formulating a metacognitive strategy to realize a desired outcome from the entrepreneurial task at hand” (Haynie et al.: 222). Furthermore, through their conceptual study, Haynie et al. (2010) demonstrated that “foundations of an entrepreneurial mindset are metacognitive in nature” (Haynie et al.: 217). Based on these arguments, it is, thus, rationally assumed that entrepreneurs having a strong metacognitive ability might be better positioned to successfully carry out their entrepreneurial tasks. However, the existing literature does not suggest enough guidance to understand how entrepreneurial metacognition affects entrepreneurial tasks, in particular, entrepreneurial orientation (EO) and their business performance. These relationships have not been yet examined empirically and statistically.

Therefore, the purpose of this study is to verify the conceptually developed relationship between metacognitive ability of entrepreneurs and their task performance through empirical test methods such as confirmatory factor analysis (CFA) and structural equation modeling (SEM). Specifically, this study intends to evaluate the following research questions:

- (1) How does an entrepreneur’s metacognition influence entrepreneurial orientation (EO)?
- (2) How does an entrepreneur’s metacognition influence firm performance?
- (3) How does EO influence the relationship between metacognition and firm performance?

THEORETICAL BACKGROUND AND HYPOTHESIS DEVELOPMENT

Entrepreneurial Orientation

Entrepreneurial orientation (EO) can be defined as the practices, processes, and decision-making activities that lead to new entry (Lumpkin & Dess, 1996). EO differs from entrepreneurship in that it is essentially the entrepreneurial process, that is, how entrepreneurship is undertaken—the methods, practices, and decision-making styles used to act entrepreneurially (Sang & Suzanne, 2000). In terms of EO dimensions, Miller (1983) suggested three dimensions—risk-taking, proactiveness, and innovativeness—in order to characterize entrepreneurship. Later, Lumpkin & Dess (1996) identified two more dimensions of EO—competitive aggressiveness and autonomy. Among the dimensions of EO, autonomy refers to the independent action of an individual or a team in bringing forth an idea or a vision and carrying it through to completion (Lumpkin & Dess, 1996). It means the ability and will to be self-directed in the pursuit of opportunities (Lumpkin & Dess, 1996: 140). Competitive aggressiveness represents the intensity of a firm’s efforts to outperform industry competitors and is characterized by a strong offensive posture directed at overcoming rivals (Lumpkin & Dess, 2001). This is an important element of EO since new ventures are much more likely to fail than established businesses and an aggressive stance is critical to the success and survival of a new start-up (Lee & Peterson, 2000). Proactiveness is defined as “seeking new opportunities which may or may not be related to the present line of operations, introduction of new products and

brands ahead of competition, strategically eliminating operations which are in the mature or declining stages of life cycle” (Venkatraman, 1989a: 949). According to Lumpkin & Dess (1996), innovativeness is regarded as a critical factor to identify the characteristics of an entrepreneur. They delineate the innovativeness as "a firm's tendency to engage in and support new ideas, novelty, experimentation, and creative processes that may result in new products, service, or technological processes" (Lumpkin & Dess, 1996:142). In addition, risk-taking is also one of the most widely recognized characteristics of an entrepreneur, because an individual who is willing to accept the uncertainty and riskiness associated with being self-employed is typically considered an entrepreneur (Lee & Peterson, 2000).

EO and Firm Performance. Concerning the relationship between EO and a firm's performance, Wiklund & Shepherd (2003) found that EO, universally, has a positive influence on a firm's performance. Other empirical studies also support EO's positive effect on a firm's performance (Zahra, 1991; Wiklund, 1999). However, the study of Lumpkin & Dess (1996) indicated that the features of a firm's external environment and internal organizational characteristics would have a significant impact on the relationship between EO and firm performance. Furthermore, in later studies, Lumpkin & Dess (2001) found that the EO dimensions varied independently rather than covary; in fact, their initial test demonstrated that proactiveness was positively associated with performance but competitive aggressiveness was not strongly related to firm performance. The longitudinal study of Zahra & Covin (1995) also argued that EO was associated with the firm's performance to some degree but, there were some mixed research findings regarding the relationship. Nevertheless, Morris (1998) illustrated that EO was significantly important not only for the survival and growth of firms but also for the economic prosperity of nations.

Entrepreneurial Metacognition

Metacognition. Flavell (1987) described metacognition as the process of formulating strategies in order to select from a set of possible cognitive mechanisms, based on the individual's understanding of his or her own strengths, weaknesses, assumptions, and motivations. For instance, activities such as “to be self-aware, to think aloud, to reflect, to be strategic, to plan, to have a plan in mind, to know what to know, and to self-monitor” (Guterman, 2002: 285) can be considered examples of metacognitive thinking. Moreover, metacognition can be described as “the control that the individual has over their own cognitions as a function of a differing ability to consider alternative cognitive strategies in light of a changing environment; it follows that control over one's cognitions that results in an ability to consider alternative cognitive strategies makes for more dynamic information processing” (Haynie et al., 2010: 219). Specifically, metacognition can be classified into the following categories: goal orientation, metacognitive knowledge, metacognitive experience, metacognitive strategy (or metacognitive

choice), and monitoring (Flavell, 1979, 1987; Griffin & Ross, 1991; Nelson, 1996; Haynie & Shepherd, 2009).

Metacognitive Knowledge and Strategy. In particular, "metacognitive knowledge" refers to one's conscious and cognitive understanding of people, tasks, and strategy (Flavell, 1987). According to the definitions of Haynie et al. (2010: 222), metacognitive knowledge consists of the following three specific aspects; (i) "metacognitive knowledge of people," referring to "perceptions about oneself, and about others, in terms of competencies," (ii) "metacognitive knowledge of tasks," reflecting "the nature of information acquired by an individual concerning a specific activity (i.e., writing a business plan, or calculating cash flows)," and (iii) "metacognitive knowledge of strategy," referring to "procedures for ensuring that a cognitive strategy is appropriate for achieving some desired goal" (Haynie et al. 2010: 222). Hence, within the context of entrepreneurship, metacognitive knowledge can be delineated as "a resource that is informed based on what the entrepreneur understands to be true about people, tasks, and strategy, and can be brought to bear upon the task of formulating a metacognitive strategy to realize a desired outcome from the entrepreneurial task at hand" (Haynie et al.: 2010, 222). In addition, "metacognitive strategy" can be defined as the selection of the most suitable cognitive response from a set of available cognitive responses (Fiske & Taylor, 1991). Within the context of entrepreneurship, metacognitive strategy can be described as the framework formulated by an entrepreneur through evaluating alternative responses to the entrepreneurial task process (Haynie et al., 2010).

Research Model

The following Figure 1 demonstrates the hypothesized research model of this study. The model is composed of entrepreneurial metacognition, EO, and firm performance. Each path in Figure 1 is labeled with the related hypothesis, and every relation is argued in the following sections.

Figure 1: Hypothesized Research Model: the Relations among Metacognition, EO, and Firm Performance



The Relations among Entrepreneurial Metacognition, EO, and Firm Performance

Shane & Venkataraman (2000) defined entrepreneurship as the discovery, evaluation, and exploitation of opportunities to bring into existence a service and product. In general, a primary aspect of entrepreneurship is a high level of dynamism and uncertainty in the entrepreneurial

circumstance. Therefore, the intrinsic uncertainty and dynamism in an entrepreneurial environment require entrepreneurs “to rethink current strategic actions, organization structure, communications systems, corporate culture, asset deployment, investment strategies, in short every aspect of a firm's operation and long-term health” (Hitt et al., 1998). In the context of entrepreneurship, a metacognition can be described as “the dynamic consideration of cognitive functioning focused on how decision heuristics and strategies develop, adapt, and are employed over the duration of the entrepreneurial process” (Haynie et al., 2010: 218). Furthermore, Haynie et al. (2010: 217) argue that “foundations of an entrepreneurial mindset are metacognitive in nature, and subsequently detail how, and with what consequence, entrepreneurs formulate and inform higher-order cognitive strategies in the pursuit of entrepreneurial ends.” Thus, considering the relationship between the metacognitive process and the intrinsic characteristics of entrepreneurship such as uncertainty and dynamism, it is rationally assumed that metacognitive knowledge is a basis for an entrepreneur to establish an effective strategic framework for his or her entrepreneurial task. In turn, such a well-developed metacognitive knowledge and strategy of entrepreneurs might affect their entrepreneurial orientation positively. In order to examine the relationship between entrepreneurial orientation and metacognitive abilities of entrepreneur, the following hypothesis is, thus, proposed:

H1 Entrepreneurial metacognition has a positive impact on entrepreneurial orientation.

Additionally, grounded on the logic above, it is also anticipated that such an EO based on a strong metacognitive ability of entrepreneur could be eventually committed to realizing their desired business performance because numerous studies supported EO's positive effect on a firm's performance (Zahra, 1991; Lumpkin & Dess, 1996; Wiklund, 1999; Lee & Peterson, 2000; Wiklund & Shepherd, 2003). In other words, it is sensibly assumed that a strong metacognitive ability of entrepreneur positively influences entrepreneurial task performance through their enhanced EO. Therefore, the following hypothesis is posited to scrutinize the mediating effect of EO between entrepreneurial metacognition and firm performance:

H2 Entrepreneurial orientation positively mediates the relationship between entrepreneurial metacognition and firm performance.

METHODOLOGY

Target Sample

I collected the primary data through a survey research. The target respondents of this study were actual entrepreneurs such as business owners or founders. However, in some cases, actual entrepreneurs were not available to respond. Hence, some criteria in choosing target respondents were created. My first criterion was the choice of a single respondent from a company. My second criterion was the position of the target respondent in the organization, preferably an actual entrepreneur of a firm. My third criterion was that the target respondent was likely to have not only the knowledge of the firm's EO but also knowledge of the firm's entrepreneurial firm performance. If there was more than one subject from the same organization, I chose the target respondent based on his or her position in the organization (the highest rank among the target respondents) and the likelihood of his or her access to the information requested in the questionnaire.

Measurement

For this study, I used a questionnaire that consisted of items related to metacognition, EO, and entrepreneurial firm performance. Based on the prior EO studies, I employed the five EO dimensions such as proactiveness, risk-taking, autonomy, innovation, and competitive aggressiveness (Miller, 1983; Lumpkin & Dess, 1996, 2001) to test the developed hypotheses in this study. Most of the EO items were adopted directly from the empirical study of Lumpkin & Dess (2001); however, I created one competitive aggressiveness item (EC3) and all autonomy items (EA1, EA2, and EA3), by referring to the conceptual study of Lumpkin & Dess (1996). In addition, all items related to metacognition were adopted from the empirical study of Haynie & Shepherd (2009) but, some items were slightly revised to reflect the purpose of this study. For measuring the performance of entrepreneurial firm, I added the following items: sales growth, net profit margin, and market share growth. Moreover, for each item, the respondents indicated the extent to which they disagree or agree with the statement on a seven-point Likert type scale anchored by strongly disagree (1) and strongly agree (7). Appendix 1 lists the final selected measurement items after CFA test.

Pilot Testing

Initially, I conducted a pilot study (n = 57) with MBA students. However, I used the pilot test only to identify any problematic items and questions, to measure the length of time to complete the survey, and to pre-examine whether the hypothesized model fits this study.

Data Collection Procedure

I collected data via an online survey agency for the following reasons. First, sources for collecting the entrepreneurs' information were very limited. Second, typical entrepreneurs' information was only available through small regional-level authorities. Generalizing the findings based on such regional data would have limited the scope and impact of this study. Thus, email survey questionnaires were sent through the online survey agency to target respondents all over the U.S. I received a total of 190 usable responses for a response rate of 18 percent within two-wave surveys. The majority of respondents were small to medium size business owners or senior managers who were over 35 years of age. Of the respondents, 59.3% were male, and 40.7%, female; 55.9% were aged 45~60, 23.7% were 30~44, and 20.3% were over 60; 38.4% had a bachelor's degree, 32.2% had a graduate degree, 20.9% had a college degree, and 8.5% had a high school degree. In addition, among the respondents, 39.0% of firms had less than 100 employees, 19.2% had 100~500 employees, and 41.8% had more than 500 employees; 90.4% of firms were in the service industry, and 9.6% in manufacturing.

RESULTS

Confirmatory Factor Analysis (CFA)

I used IBM SPSS and AMOS to process the data. Structural equation modeling (SEM) was adopted as the primary analytical method to test the hypotheses of this study. However, an SEM analysis can be conducted only after acceptable reliability and validity of the measures has been established (Hair, Black, Babin, & Anderson, 2010). Thus, I first conducted a confirmatory factor analysis (CFA) to assess the reliability of scales for each construct and the validity for each construct, and then assessed the hypothesized SEM of this study.

Goodness-of-fit of the Model. The key goodness-of-fit (GOF) indices of this study contained the chi-square (X^2) statistic, normed chi-square (X^2/df), comparative fit index (CFI), Tucker-Lewis coefficient (TLI), Parsimony normed fit index (PNFI), and root mean square error of approximation (RMSEA). The Chi-square value (X^2) was 341.812 (N =190, degree of freedom = 168, p -value < .001) and the normed Chi-square (X^2/df) was 2.035 in the CFA model. The normed Chi-square value below 2.0 is the great acceptable fit and the value between 2.0 and 5.0 is regarded as the moderately acceptable fit level (Hair et al., 2010). Hence, the normed Chi-square 2.035 suggests an acceptable fit for the CFA model. In addition, Hu and Bentler (1999) suggest that a comparative fit index (CFI) value higher than .90 represents a good model fit, and Rigdon (1996) indicates that a RMSEA value less than .08 represents a reasonable fit. In this CFA model, I obtained an RMSEA value of .074 and a CFI value of .937, suggesting a good model fit. Moreover, TLI value (.914) and PNFI value (.644) also meet the desirable thresholds

for each fit index (TLI is close to 1.00; PNFI > 0.50), showing a fully acceptable fit (Bentler & Bonett, 1980; Mulaik, James, Van Alstine, Bennett, Lind, & Stilwell, 1989).

Test for Reliability and Validity. By calculating Cronbach's alpha coefficient for each construct, the reliability of scales for each construct can be evaluated (Cronbach, 1951; Nunnally, 1967). As represented in Table 1, the values of Cronbach's alpha for all constructs went over the limit of the acceptable level point of 0.70 (Hair et al., 2010). In addition, I conducted the validity analysis of constructs by calculating factor loading estimates. Construct validity can be defined as the extent to which a set of measured items actually reflects the theoretical latent construct those items are designed to measure, so it deals with the accuracy of measurement (Hair et al., 2010). A factor loading represents the correlation between an original variable and its factor; at a minimum, all factor loadings should be statistically significant (Anderson & Gerbing, 1988). In a sample of 150 respondents, factor loadings of .45 and above could be considered as having practical significance (Hair et al. 2010). Since the sample size of this study was 190, I set the minimum threshold of factor loading at 0.45 or above. Unfortunately, the innovativeness construct of this study had only one item that the standardized factor loading estimate was above the threshold of 0.45, so I could not include the construct in this research model. Table 1 represents the final results of CFA after I removed the all items that could not satisfy the suggested threshold of 0.45. After this process, all standardized factor loading estimates in the seven constructs were eventually above the threshold of 0.45, indicating the acceptable validity of the constructs. Furthermore, I evaluated convergent validity by average variance extracted (AVE). Convergent validity is an estimate of how well the individual items, which indicate a specific construct, converge or share a high proportion of variance. With CFA, the AVE is calculated as the mean variance extracted for the item loadings on a construct and is a summary indicator of convergence (Fornell & Larcker, 1981). This value can be calculated using standardized loadings of CFA. An AVE of .5 or higher is a good rule of thumb suggesting adequate convergence (Hair et al., 2010). Table 1 also demonstrates AVE estimates that were computed for each construct. AVE estimates of each construct ranged from 50% (.497) for the proactiveness construct to 81% (.805) for the metacognitive strategy construct. Thus, the convergent validity of this model was reasonably acceptable.

Construct	Factor Item	Standardized Factor Loading	S.E.	C.R. (t-value)	P	AVE^a	Cronbach's alpha
Proactiveness	EP3	.782				.497	.710
	EP2	.816	.093	10.965	***		
	EP1	.461	.097	6.034	***		

Table 1: Test Results of Confirmatory Factor Analysis (CFA)							
Construct	Factor Item	Standardized Factor Loading	S.E.	C.R. (t-value)	P	AVE ^a	Cronbach's alpha
Risk-taking	ER3	.845				.692	.870
	ER2	.852	.075	13.933	***		
	ER1	.798	.078	12.725	***		
Autonomy	EA3	.816				.671	.854
	EA2	.899	.074	14.339	***		
	EA1	.735	.079	11.074	***		
Competitive Aggressiveness	EC3	.877				.711	.876
	EC2	.855	.066	14.427	***		
	EC1	.796	.071	13.079	***		
Metacognitive Knowledge	MK3	.803				.628	.839
	MK2	.680	.083	9.988	***		
	MK1	.882	.089	14.048	***		
Metacognitive Strategy	MS3	.881				.805	.927
	MS2	.912	.073	18.193	***		
	MS1	.898	.072	17.692	***		
Firm Performance	Market Share Growth	.777				.733	.888
	Net Profit Margin	.929	.102	12.912	***		
	Sales Growth	.856	.103	12.332	***		

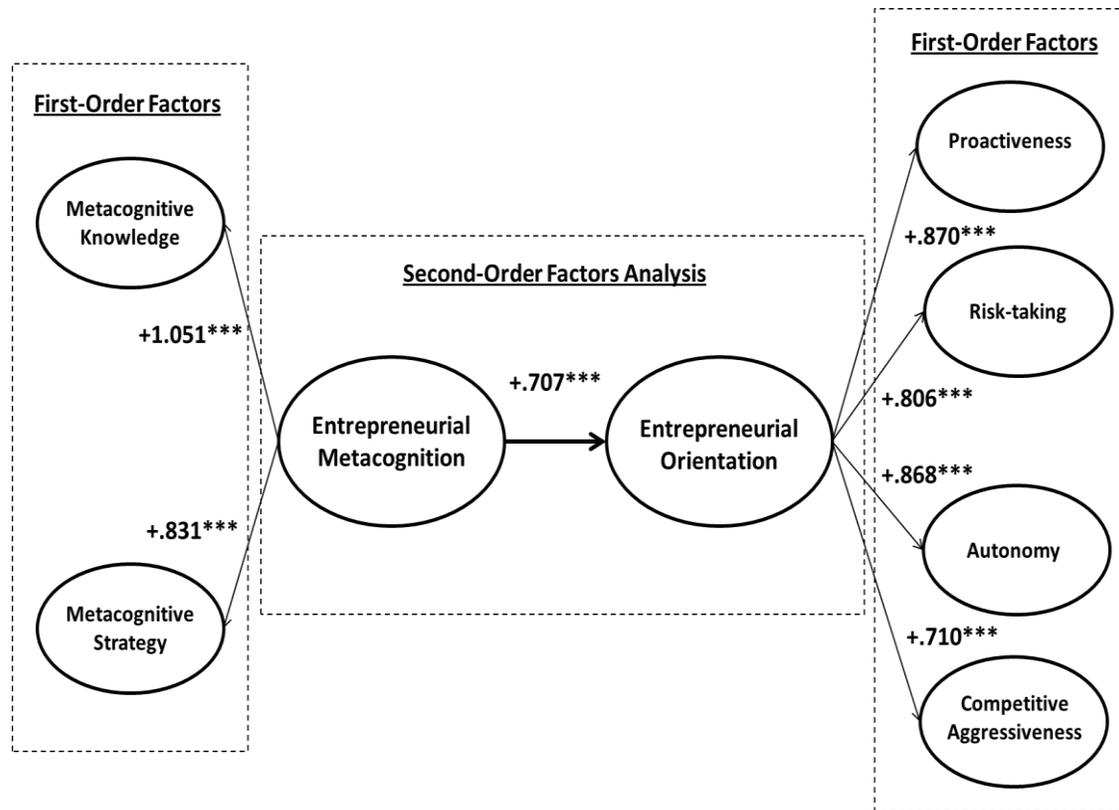
Note: Not estimated when loading set to fixed value (i.e., 1.000); N = 190; $X^2/df = 2.035$; CFI = 0.937; TLI = 0.914; RMSEA = 0.074; PNFI = 0.644; ***Significant at $p < 0.001$ level; ^aAverage Variance Extracted.

Structural Equation Modeling (SEM) Analysis

Test Results of the Hypothesized SEM. The hypothesized model in this study was tested by SEM analysis using AMOS; the analysis results are shown in Figure 2. In terms of the fit indices, the normed Chi-square (X^2/df) was 2.868, suggesting a moderately acceptable fit (Hair et al. 2010). Also, the CFI value (.902) was higher than the suggested threshold of 0.90 (Hu & Bentler, 1999) and PNFI value (.718) was higher than the threshold of 0.50 (Mulaik et al., 1989), demonstrating that the hypothesized SEM in this study has a fully acceptable model fit. As shown in Figure 2, the SEM result indicates that entrepreneurial metacognition has a not only

positive but also strongly significant impact on entrepreneurial orientation ($\beta = .707$, $t = 7.249$, $p < 0.001$). Thus, hypothesis 1 is strongly supported.

Figure 2: Test Results of the Hypothesized Structural Equation Modeling (SEM)

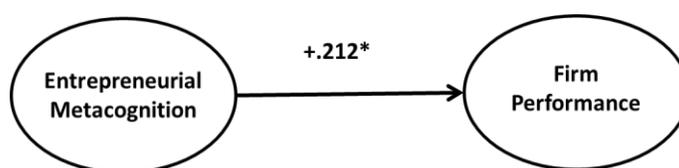


Note: Standardized estimates; ***Significant at $p < 0.001$ level; $N = 190$; $X^2/df = 2.868$; CFI = 0.902; PNFI = 0.718

Test Results of the Mediating Effect of EO. In order to examine the mediating effect of entrepreneurial orientation (EO) between entrepreneurial metacognition and entrepreneurial firm performance, I adopted the Baron & Kenny's (1986) steps. First, to investigate whether entrepreneurial metacognition has a direct effect on entrepreneurial firm performance, I developed a simple model ($N = 190$, $X^2/df = 2.713$, CFI = 0.996, TLI = 0.935). The test results show that entrepreneurial metacognition has a significant positive direct effect on entrepreneurial firm performance ($\beta = .212$, $t = 2.529$, $p = .011$), as represented in Figure 3. In addition, I constructed a competing model ($N = 190$, $X^2/df = 2.388$; CFI = 0.910; TLI = 0.884), shown in Figure 4, to examine whether EO play mediating roles between entrepreneurial metacognition and entrepreneurial firm performance. Figure 4 indicates that the effect of entrepreneurial

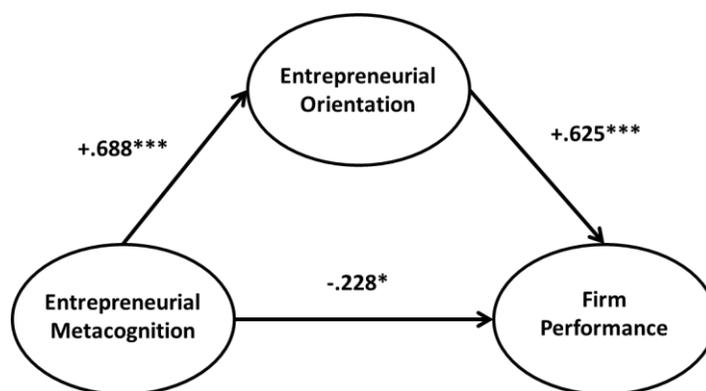
metacognition on entrepreneurial firm performance becomes significantly negative ($\beta = -.228$, $t = -1.983$, $p = .047$) when inserting the EO factor between metacognition and firm performance. On the other hand, the results shows that EO has a not only positive but also strongly significant impact on entrepreneurial firm performance ($\beta = .625$, $t = 4.739$, $p < 0.001$), as demonstrated in Figure 4. Consequently, the results confirm that the EO has a complete mediating effect on the relationship between entrepreneurial metacognition and firm performance. Therefore, hypothesis 2 is fully supported as well.

Figure 3: Direct Effect of Metacognition on Entrepreneurial Firm Performance



Note: Standardized estimates; *Significant at $p < 0.05$ level; $N = 190$; $X^2/df = 2.713$; CFI = 0.996; TLI = 0.935

Figure 4: Mediating Effect of EO between Metacognition and Entrepreneurial Firm Performance



Note: Standardized estimates; ***Significant at $p < 0.001$ level; **Significant at $p < 0.01$ level; *Significant at $p < 0.05$ level; $N = 190$, $X^2/df = 2.388$; CFI = 0.910; TLI = 0.884

The Impact of Firm Size. The target sample of this study was actual entrepreneurs such as founders or owners. However, in some cases, actual entrepreneurs were not available; therefore, I contacted senior managers who were knowledgeable about their firm-level EO and business performance. In particular, such cases were prevalent in large-sized firms consisting of more than 500 employees. As reviewed in the methodology section, among our sample data, 41.8% of firms had more than 500 employees. Thus, in order to investigate any impact of firm size on our study results, I divided the sample into two groups by firm size. Firms that had less

than 500 employees were classified under the ‘small to medium firms’ sample group (N = 118), and firms that had more than 500 employees were classified under the ‘large firms’ sample group (N = 72). Subsequently, I re-conducted the SEM analysis for each group individually. However, contrary to our concerns about firm size, the test results represented that there was no statistical difference between the two sample groups, as illustrated in Table 2. Furthermore, these two test results also showed a high statistical similarity with the initial test result obtained by a full of sample data (N = 190). Thus, it is obvious that firm size does not have any influence on the findings of this study.

		Small to Medium Firms	Large Firms
Number of Employees		< 500	≥ 500
Sample Size		N = 118	N = 72
Direct Effect of EM ^a on EO ^b and FP ^c	EM → EO	$\beta = .632^{***}$ (t = 4.913)	$\beta = .724^{***}$ (t = 5.110)
	EM → FP	$\beta = .921^{**}$ (t = 2.307)	$\beta = .946^{**}$ (t = 2.104)
Mediating Effect of EO between EM and FP	EM → EO	$\beta = .621^{***}$ (t = 4.853)	$\beta = .720^{***}$ (t = 5.100)
	EO → FP	$\beta = .510^{***}$ (t = 3.433)	$\beta = .757^{***}$ (t = 3.553)
	EM → FP	$\beta = -.067$ (t = -.531, p = .595)	$\beta = -.368$ (t = -1.905, p = .057)
Note: Standardized estimates; ***Significant at $p < 0.001$ level; **Significant at $p < 0.01$ level; ^a Entrepreneurial Metacognition; ^b Entrepreneurial Orientation; ^c Firm Performance.			

DISCUSSION

The results of this study provide explicit answers to my initial research questions. With regard to my first research question, "*How does entrepreneurial metacognition influence entrepreneurial orientation?*", the study results show that entrepreneurial metacognition has a strong positive influence on EO. As to my second research question, "*How does entrepreneurial metacognition influence firm performance?*", the results also clearly demonstrate that the metacognitive abilities of entrepreneurs have a not only positive but also significant effect on their firm performance. Regarding my last research question, "*How does entrepreneurial orientation influence the relationship between entrepreneurial metacognition and their firm*

performance?", the study results show that EO play a strong mediating role between entrepreneurs' metacognition and their firm performances.

Considering these findings, it is anticipated that a well-developed entrepreneur's metacognition could have a kind of leverage effect on the process of EO-business performance. In other words, the study findings imply that entrepreneurs' metacognitive abilities such as metacognitive knowledge and strategy could have a strong positive impact on the enhancement of their EO and could subsequently contribute toward producing better desirable outcomes from their entrepreneurial tasks. Table 3 summarizes this study results and the implications in brief.

Table 3: Summary of Test Results and Implications		
Hypothesis	Test Result	Implication
H1	<i>Supported</i>	<ul style="list-style-type: none"> ✓ Entrepreneurial metacognition has a strongly positive impact on EO (H1). ✓ EO fully mediates the relationship between entrepreneurial metacognition and firm performance (H2).
H2	<i>Supported</i>	<ul style="list-style-type: none"> ✓ A well-developed metacognitive ability leads entrepreneurs to establish a strong EO; subsequently, the enhanced EO positively contributes to producing better desirable outcomes from their entrepreneurial tasks (H1 & H2).

This study has some limitations. First, we could not include the "innovativeness" factor in the SEM model of this study because the AVE estimates of the factor did not satisfy the threshold of this study. Second, metacognition can be classified into five dimensions in general: goal orientation, metacognitive knowledge, metacognitive experience, metacognitive strategy, and monitoring (Flavell, 1979, 1987; Griffin & Ross, 1991; Nelson, 1996; Michael & Dean, 2009). However, this study simplified the metacognitive process and considered only two dimensions of metacognition—metacognitive knowledge and metacognitive strategy. Thus, we are unable to generalize the relationship between metacognition, EO, and entrepreneurial firm performance until all relationships with other metacognitive dimensions are completely examined. Hence, for future research, we suggest investigating how other dimensions of metacognition influence EO and entrepreneurial task performance.

CONCLUSION

We believe that the findings of this study contribute to extending the field of entrepreneurial cognition research. First, most of existent research were conducted at the cognitive level of analysis but, this study was examined at the metacognitive level of analysis within the context of entrepreneurship. Furthermore, although some conceptual studies regarding the relationship between an entrepreneur's metacognition and entrepreneurial task performance exist, the relationship has not been evaluated empirically and statistically yet. Therefore, it is anticipated that the findings of this study will help entrepreneurs to understand how their metacognitions impact EO and their business outcomes as well as recognize why they should consider metacognition while executing their entrepreneurial tasks.

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APPENDIX A: SURVEY MEASUREMENT ITEMS

These items are the final items used in this study, according to the results of the CFA test. Most of the EO items were employed from the study of Lumpkin & Dess (2001); however, all autonomy items (EA1, EA2, and EA3) and one competitive aggressiveness item (EC3) were fully created by referring to the study of Lumpkin & Dess (1996). All metacognition related items were employed from the study of Haynie & Shepherd (2009) but, some items were slightly revised to reflect the purpose of this study.

Proactiveness

EP1. In dealing with competitors, we typically initiate actions which competitors then respond to.

EP2. In general, the top managers of my firm have a strong tendency to be ahead of others in introducing novel ideas or products.

EP3. In dealing with competitors, we are very often the first business to introduce new products/services, administrative techniques, operating technologies, etc.

Risk-taking

ER1. We tend to choose and do high risk projects with chances of very high returns.

ER2. When confronted with decisions involving uncertainty, my firm typically adopts a bold posture in order to maximize the probability of exploiting opportunities.

ER3. Owing to the nature of the environment, my firm usually considers that bold, wide-ranging acts are necessary to achieve the firm's objectives.

Autonomy (fully created)

EA1. In general, the top managers of my firm place a strong emphasis on self-direction in the pursuit of opportunities.

EA2. The independent action of an individual or a team in bringing forth a novel idea and carrying it through to completion is usually held in high regard.

EA3. In dealing with novel ideas, we remain free to act independently, to make key decisions, and to proceed in order to promote the ideas into a new market.

Competitive Aggressiveness

EC1. My firm is very aggressive and intensely competitive.

EC2. My firm typically adopts a very competitive "undo-the-competitors" posture.

EC3. My firm pursues various activities aimed at overcoming rivals so that we achieve a competitive advantage in the marketplace.

Metacognitive Knowledge

MK1. We think of several ways to solve a problem and choose the best one.

MK2. We try to use strategies that have worked in the past.

MK3. We focus on the meaning and significance of new information.

Metacognitive Strategy

MS1. We ask ourselves if we have learned as much as we could have when we finished the task.

MS2. We ask ourselves if we have considered all the options when solving a problem.

MS3. We ask ourselves if there was an easier way to do things after we finish a task.

Entrepreneurial Firm Performance

1. Market Share Growth

2. Net Profit Margin

3. Sales Growth