Journal of Management & Organization, 20:1 (2014), pp. 38–55
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doi:10.1017/jmo.2014.22

Environmental uncertainty affects inter-organisational partner selection: The mediating role of cost and strategy in alliance motivations among SMEs

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Abstract

This paper investigate the degree to which environment uncertainty affects inter-organisational alliance partner selection in small to medium-sized enterprises and blends the resource-based view in a multiple-mediator model in which different dimensions of alliance motivation (cost and strategy) act as mediating mechanisms that transmit the positive effects of environment uncertainty to partner selection criteria. Four hypotheses are developed and then tested on a survey data sample of 108 firms in the Taiwanese steel industry. Our research findings show the mediating effects of alliance motivation cost and strategy and understanding how environment uncertainty impacts alliance motivation (cost and strategy) within small to medium-sized enterprises.

Keywords: environment uncertainty, resource-based view, alliance motivation (cost and strategy), partner selection, SMEs

Received September 2012. Accepted March 2013

INTRODUCTION

A significant amount of recent research has documented how environmental uncertainty may render a firm's investment in building specific relationships, moving into different markets, or using certain business models obsolete (Eisenhardt & Martin, 2000; Zoilo & Winter, 2002; Vassolo, Anand, & Folta, 2004). Firms in a dynamic environment face challenges in seeking important partners from whom they can obtain support and resources to survive and adapt to future changes in the business environment and to meet current business demands (Dong & Glaister, 2006; Shah & Swaminathan, 2008; Wu, Shih, & Chan, 2009). For example, Lin and Liu (2012) mentioned that organisational change over time to meet environmental or internal contingencies is central to the field of organisational change and development. Many scholars have noted the importance of uncertainty as a driver of partner selection (e.g., Podolny & Phillips, 1996). However, the difficulties firms face in selecting the right partner represent a factor affecting the success of strategic alliance; for instance, the appropriate use of a partner's relationships will help to transform an entrepreneur's personal network into an effective tool for generating strong firm performance (Bratkovic, Antoncic, & Ruzzier, 2009). The existence of this phenomenon for small to medium-sized enterprises (SMEs) demands particular attention due to these firms' relatively low level of resources, technology, competencies and essential knowledge (Dickson & Weaver, 2011); both the current literature and managers could benefit from

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https://doi.org/10.1017/jmo.2014.22 Published online by Cambridge University Press

this research by building an understanding of how SMEs may, through their selection of partners, obtain support and resources helpful for their survival in a dynamic environment. As a result, our thesis is that when facing environment uncertainty (which called the external environment), the criteria used by an SME to select its partner are affected by alliance motivation (cost, strategy).

The purpose of this study is to advance the investigation of the relationships between factors driving SME firms' alliances, such as alliance motivation, partner selection strategy and external environment uncertainty, as the firms seek new opportunities (Solesvik & Encheva, 2010; Solesvik & Westhead, 2010). We aim to understand alliance partner selection as being influenced by different types of alliance motivation (cost, strategy) given uncertainty in the external environment. In particular, the concentrate on partner selection criteria variables, which are typically studied at the individual level (McFadyen and Cannella, 2004; Perry-Smith, 2006; McFadyen, Semadeni, & Cannella, 2009), the multinational level (Fang, 2011), or the business-unit level (Ulbrich, Troitzsch, Anker, Pluss, & Huber, 2011). However, there lacks a conceptually and empirically validated understanding of alliance partner selection at the SME level. This finding is quite surprising, as previous research on alliance formation (Dickson & Weaver, 2011), strategic intent (Gulati, 1998) and potential partner evaluation (Solesvik & Encheva, 2010) indicates that a firm's competitive advantage, to a large extent, originates in the alliance or network activities of its collaboration partners. These studies indicate that insight into the alliance partner selection process and into how these activities may be influenced benefit our understanding of how to build a partner selection process within a business unit or firm.

The strategic management perspective (Dong & Glaister, 2006; Shah & Swaminathan, 2008; Wu, Shih, & Chan, 2009) suggests that the selection of a property partner is a critical determinant of a successful strategic alliance. Transaction cost theory (Williamson, 1975, 1985) also suggests that firms choose their exchange partners to minimise the searching and integrating costs of economic resources and to cope with the environmental threat of opportunistic behaviour. The main finding of this paper is to investigate how an uncertain external environment influences alliance motivations such as cost and strategy, which emphasise here, and enhances partner selection activities. On the basis of studies of the partner selection process (Evans, 2001; Doherty, 2009; Holmberg and Cummings, 2009), this paper will conceptualise and operationalise partner selection by the process-oriented view (Chen, Shih, & Yang, 2009) and indicate that alliance motivation plays a mediating role between environment uncertainty and partner selection. Previous research indicates that alliance motivation is an important explanatory factor for alliance strategy-related activities within a firm (Chen, Lee, & Wu, 2008). In the context of strategic alliance, scholars have examined the impact of alliance on firms' competitive advantage through the acquisition of necessary resources, information, knowledge and capabilities, which enable the firm to implement more efficient and effective strategies (Barney, 1991; Auh & Menguc, 2005). Studies in the field of SMEs' strategic alliance indicate that partner selection is a primary mechanism whereby not only firms but also organisation partners rely on each other for survival in a dynamic environment. The partner selection process is related to environment uncertainty not directly but through alliance motivation.

This paper makes several contributions to existing literature. First, it uses the process-oriented view to solve the inter-organisational partner-seeking question and to provide empirical evidence to support this viewpoint. Second, this study adds to the literature regarding the different roles of alliance motivation in partner selection by strategic alliances. In the existing literature, few studies address how cost motivation and strategy motivation affect partner selection. Third, this study examines the partner selection process in context and the unique attributes of SMEs in Taiwan. Since the research focus moved to a Chinese context, the role of SMEs has garnered attention in both theoretical and empirical areas, especially when SMEs have made great contributions to economic and social development. Therefore, this study analyses how environmental uncertainty and alliance motivation can affect a fastener firm's partner selection

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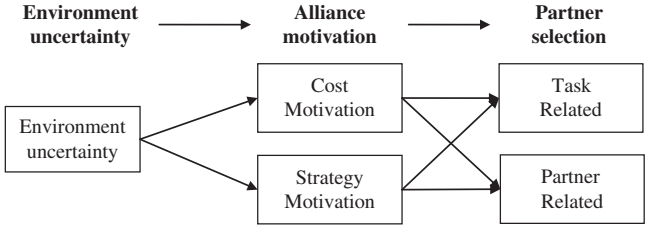

FIGURE 1. MAIN RESEARCH FRAMEWORK

decisions with reference to both a strategic alliance and insights from the emerging dynamic strategic alliance perspective with SMEs. Finally, this study provides a novel research framework for considering the attributes of environmental uncertainty and alliance motivation of an SME that are necessary for the cooperative partners to form a strategy alliance.

Figure 1 summarises the research framework of the partner selection process of this study. The remainder of the paper is structured as follows. The following section provides a literature review, which is followed by the present theoretical background of this paper. This background focuses on the concepts of external environment uncertainty, cost motivation, strategy motivation and partner selection in task-related or partner-related selection, and it examines how alliance motivation (cost, strategy) has a mediating effect on the relationship between external environment uncertainty and partner selection. After advancing the hypotheses of this study, the methodology section provides details about the sample collection procedure and the development and validation of the measurement instruments. Finally, as present the empirical findings, achieving the goals set out earlier, and end the paper with a discussion on the results in the previous section and a conclusion.

THEORY AND HYPOTHESES

Alliance-related literature usually emphasises the different situations of managing and selecting alliance partners. From the perspective of a resource-based view, the reasons for having an alliance partner are to acquire the valuable resources that the firm needs (Barney, 1991), to reduce environmental uncertainty (Auster, 1992), and to increase survival rates in particular markets (Hitt, Nixon, Clifford, & Coyne, 1999). Few authors explicitly identify the specific problems and tasks of selecting alliance partners as being motivated by alliance and environmental uncertainty. More recently, researchers have elaborated on these ideas by considering their implications not only for direct relationships but also for indirect relationships when they are measuring their alliance partners (Heimeriks & Duysters, 2007). They have recognised that selecting complementary partners can facilitate learning by accessing new knowledge, enlarging a firm's operational boundaries, acquiring valuable know-how, and increasing a firm's inimitability and sustainability (Chen & Chen, 2003), thus enhancing their own competence and competitive advantages.

The literature on organisation theory and behavioural decision theory has indicated that environmental uncertainty is a critical variable in influencing the organisational intention of partner choice (Auster, 1992). Environment uncertainty leads an organisation to face dynamic economic conditions that render it difficult to predict or control future outcomes (Krishnan & Martin, 2006). Sarkar, Echambadi, and Harrison (2001) suggested that environmental changes faced by a firm include the obsolescence of existing resources, changes in customer demands, transformed competitive landscapes and the potentially diminishing value of existing competencies. Furthermore, uncertainty implies that firms find it difficult to predict the future; consequently, the pressure of environmental uncertainty leads

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organisations to engage in substantial analysis of their status and to evaluate the threats and opportunities posed by changes in their environment. Therefore, when SMEs lack necessary resources, they must obtain these resources from the external environment to survive and create a competitive advantage; both theory and research tell us that the possibility of sharing R&D costs, learning new technologies and strengthening the capability to market technological developments represents a strong motivation for firms to forge strategic alliances to acquire complementary resources and to reduce uncertainty (Dickson, Weaver, & Hoy, 2006; Chen, Wang, Chen, & Lee, 2010).

Previous studies have provided theoretical and empirical explorations of the motivations for strategic alliance (Zuckerman & D'Aunno, 1990; Tripsas, Schrader, & Sobrero, 1995; Hagedoorn & Narula, 1996; Lambe & Spekman, 1997; Robertson & Gatignon, 1998; Barney & Hesterly, 2008; Chen et al., 2010). The choice of an appropriate partner is an important variable influencing a firm's performance and alliance success because it influences capability development and resource allocation, both of which may strengthen a firm's ability to achieve its strategic goals (Harrigan, 1988; Chen et al., 2010). Whereas prior studies point to the importance of partner selection, the empirical settings often referred to Western SMEs, and the sample of Asian SMEs has been underexplored. Therefore, this study attempts to investigate these particular aspects with different settings and considerations for partner selection, particularly focusing on SMEs that lack valuable resources and face environmental uncertainty. Although such a partner selection process is complex, there are often significant criteria required for the selection of an appropriate partner, including a reduction in transaction costs, searching costs and environmental uncertainty and the ability to gain resources from an alliance partner over time.

The mediation role of cost motivation

Part of the reason why environment uncertainty promotes alliance partner selection is that it enhances a firm's motivation to reflect on previous environment evaluations and prepares for future actions during the partner choice decision. Environment uncertainty enhances cost motivation by affecting its underlying processes: reflection and action. First, environment uncertainty encourages firms to consider potential cost or actual cost changes through seeking an alliance partner to reduce or share costs (Sakakibara, 1997; Murray & Kotabe, 2005). Second, environment changes induce cooperation among firms, which expect that partners will respond preferably and be willing to exchange critical technology and market information, thus reducing cost uncertainty, limiting transaction costs and facilitating learning (Dodgson, 1993; Rao & Schmidt, 1998).

The core argument of the transaction cost theory paradigm is that environment uncertainty has a positive impact on transaction costs (Parkhe, 1993). It assumes that cost increases for a firm whose strategic resource allocation does not align with the corresponding environment change (Lukas, Tan, & Hult, 2001). A dynamic environment and changes in the cost structure may allow firms to focus on re-evaluating their resource shortages and seeking complementary resources and capabilities through partnering with other firms along the industry value chain (Anand & Khanna, 2000). Complementary resources, such as operational skills, technical knowhow, financial support, managerial experience, marketing experience and distribution systems capabilities, not only improve a firm's cost structure but also reduce environment uncertainty. Strategic alliances influenced by environment change thus tend to be based on task-related partner selection, which is driven by seeking resource complementarities and the desire to reduce cost and environment uncertainty.

Furthermore, environment change and cost uncertainty highlight that firms should select partners to form strategic alliances through mutual trust and commitment in terms of finance (Walters, Peters, & Dess, 1994), similar cooperative cultures, compatible goals, and commensurate risk (Brouthers, Brouthers, & Wilkinson, 1995). Harrigan (1988) noted that when selecting alliance partners in response to a dynamic environment and cost changes, due consideration must be given to operations'

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scale and scope, firm size, technological capability, top manager style, and experience with similar affairs. In addition, research has provided evidence for the positive impact of environment uncertainty on cost motivation as well as the mediating effect of cost motivation in the relationship between environment uncertainty and partner selection criteria.

Hypothesis 1: Cost motivation positively mediates the linkage between environment uncertainty and task-related alliance.

Hypothesis 2: Cost motivation positively mediates the linkage between environment uncertainty and partner-related alliance.

The mediating role of strategy motivation

Another reason why environment uncertainty promotes partner selection is that it encourages firms to more aggressively enter the partner selection process, which is an attempt to reduce uncertainty during action phases. This study proposes that these selection processes of environment uncertainty come about through the increased motivation of a strategic orientation. Chen et al. (2010) suggest that the effects of environment uncertainty on strategy motivation depend on the degree of environment change and the level of strategy motivation under consideration. They argue that although some types of strategic objectives involve profit maximisation and limiting uncertainty, other types of strategic objectives tend to be more positive, such as helping teammates in need of a technological development or new products to adapt to environment changes. This latter type of strategy objectives is believed to be enhanced by a deep and affective form of environment uncertainty that tends to develop in alliance partnerships over time. This type of environment change induces an orientation towards the need for new technology and for decreasing the development time for new technology, which increases the firm's willingness to search for a potential partner and gain complementary resources through a strategic alliance (Chen, Lee, & Wu, 2008). This positive orientation also enhances alliance partners' understanding that under environment uncertainty, strategic choices help to increase market share and prevent cut-throat competition with competitors (Wang and Krakover, 2008); in this way, creating mutual consensus over strategic objectives will be helpful in acquiring financial resources, experienced managerial personnel and technical knowhow from task-related partners.

This study thus theorise that in the process of selecting an alliance partner, environment uncertainty promotes strategy objectives because it affects a combination of information exchanges, decreasing the time needed for technological development, environment change or new development products to maximise profit through cooperation that codetermines alliance partners' motivation to actively support each other. Partners in on-going alliances tend to be more focused on interorganisational relationships, and their cooperation tends to be more efficient and effective (Wong & Ellis, 2002), rendering them particularly likely to develop strong relationships and trust. In support of this notion, Daniels (1971) found that firms selecting similarly sized organisations as partners could be assured that the two firms will encounter similar situations or environments. Therefore, the two firms can build a well-developed relationship and benefit from a high-performing alliance. Strategy motivation can include corporate compatibility (Chen, Lee, & Wu, 2008) by making partners more aware of environment change, thus increasing their ability to synchronise their contributions in ways when they find potential partners with similar characteristics such as organisation culture, a positive past history, trust between the top management and the partner firm's size or structure (Geringer, 1991). Prior research offers support for both the positive effect of strategy motivation on alliance partner selection and the role of strategy motivation as a mediator between environment uncertainty and partner selection.

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Hypothesis 3: Strategy motivation positively mediates the linkage between environment uncertainty and task-related alliance.

Hypothesis 4: Strategy motivation positively mediates the linkage between environment uncertainty and partner-related alliance.

RESEARCH DESIGN

Sample

The unit of analysis is the alliance partner selection process and the resulting decision. This study employed a stratified sampling and questionnaire survey to collect data to test the validity of the model and main hypotheses. The variables in the questionnaire included a firm's background information, partner-related criteria, task-related criteria, cost motivations and strategy motivations. All independent and dependent variables required 5-point Likert-style responses ranging from 'strongly disagree' to 'strongly agree'. Before the distribution of the formal questionnaire, a pre-test involving exploratory interviews with several owners was conducted to ensure the questionnaire's relevance to the research purpose and the questionnaire's clarity to the respondents. The companies examined in this study are small and medium-sized Taiwanese steel firms listed in the yearbook published by the China Credit Information Service Incorporation. A stratified random sampling method was used to select 150 firms from the upper stream, middle stream and downstream of the manufacturing process of the steel industry. A total of 450 questionnaires were distributed for completion by owners familiar with the topic of this study. Follow-up letters and phone calls were made after one month to answer questions and increase the response rate. Of the 117 returned questionnaires, 20 were incomplete or invalid. The remaining 97 complete questionnaires were used for the quantitative analysis, yielding a useable response rate of 21.56%.

The measurement items derived from the survey were loaded on theoretical constructs. After controlling for the method factor, significant relationships between variables, providing evidence that common-method bias was not driving our findings. In addition, a principal components factor analysis on the questionnaire measurement items yielded five main factors with eigenvalues >1.0 that accounted for 76.53% of the total variance, and the first factor accounted for 49.21% of the variance. The sampling method was successful in soliciting respondents with varied firm characteristics. Respondents varied in stream (upper stream, 10.19%; middle stream, 0.3526; downstream, 0.5455), firm age (based on the year of firms' founding), firm size (based on employee headcount) and alliance type (material purchase, 26.85%; production, 27.78%; marketing, 22.22%; others, 23.15%).

MEASURE

Dependent variables

Task-related partner

The task-related partner construct was measured with 15 items in a manner consistent with previous research (Geringer, 1991; Glaister & Buckley, 1996; Chen, Lee, & Wu, 2008) associated with operational skills and resources. Respondents were asked to provide information about an alliance partner that could provide patents or technical know-how, experienced managerial personnel, high-quality technical staff, a marketing channel, a strong reputation and brand, preferential tax treatment from the government and strong distribution systems. The computed Cronbach's α coefficient,

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$\alpha = 0.9675$, confirmed the internal consistency reliability of the measure, being above the suggested value of 0.70 (Hair, Anderson, Tatham, & Black, 1998).

Partner-related partner

Partner-related partner was measured with seven items in a manner consistent with previous research (Geringer, 1991; Glaister & Buckley, 1996; Chen, Lee, & Wu, 2008) associated with the chosen investment mode and characteristics involving the presence of multiple partners. Respondents were asked to provide information about the alliance partner's characteristics and their particular preference. Sample items include 'commitment level between the top management teams', 'Relatedness of business product', and 'Relatedness of organisation culture'. The computed Cronbach's α coefficient, $\alpha = 0.8989$, confirmed the internal consistency reliability of the measure, being above the suggested value of 0.70 (Hair et al., 1998).

INDEPENDENT VARIABLES

Cost motivation

The construction of the measurement of cost motivation was primarily based on Chen, Lee, and Wu (2008), Kought (1988), Lewis (1990), and Yasuda (2005). A seven-item construct was selected because of organisational characteristics, and scales were developed to measure the motivation to reduce cost, share the risk of new technology development, share the risk of new market entrance, and avoid redundant investment. The Cronbach's α coefficient was 0.851, which is above the accepted value of 0.70 (Hair et al., 1998). The appendix presents the questionnaire items for all of the variables.

Strategy motivation

The construction of the measurement of strategy motivation was primarily based on Barney (1991), Chen, Lee, and Wu (2008), Glaister and Buckley (1996), and Teece (1986). A five-item construct was created because of organisational characteristics, and scales were developed to measure the strategy motivation associated with forging an alliance for strategic objectives such as increasing the market share, shortening the time for technological development, shortening the time for new product development, and preventing vicious competition from competitors. The Cronbach's α coefficient was 0.786, which is above the suggested value of 0.70 (Hair et al., 1998). The appendix presents the questionnaire items for all of the variables.

Environment uncertainty

The construction of the measurement of environmental uncertainty was primarily based on Dickson and Weaver (1997), Ducan (1972), and Miller (1992). Four items were selected to measure how the characteristics of the external environment influence the behaviour of alliance partners; the external characteristics of the environment are such things as the unpredictability of competitors' behaviour, the effect of competitors' behaviour on a firm's performance, and the sensitivity of environmental change. The Cronbach's α coefficient is 0.768, which is above the accepted value of 0.70 (Hair et al., 1998). The appendix presents the questionnaire items for all of the variables.

CONTROL VARIABLES

Three control variables were used in studies such as that by Nakos and Brouthers (2008) to influence alliance formation and performance among SMEs. Firm size was measured using the employee

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headcount, and firm year was measured as the number of years since the firm's founding. This study also categorised alliances into four types: material purchase, production, marketing and other.

ANALYSIS

Ordinary least squares regression analyses were used to test hypotheses. The analysed of mediating role were using the process-oriented view to test multiple mediation, as outlined by MacKinnon (2000). A straightforward extension of the Sobel test (Sobel, 1982: 290–312), in line with that of Baron and Kenny (1986: 1173–1182) involved the estimation of four separate regression equations. Because mediation requires the existence of a direct effect to be mediated, the first step in the analysis here involved regressing motivation on environment uncertainty and the control variables.

FINDINGS

The means, standard deviations, and correlations for all measured variables are shown in Table 1. There was a strong, positive correlation between alliance motivation and partner selection, indicating that firms' alliance motivation can indeed affect the willingness to select a partner. Further, motivation and environment uncertainty were significantly and positively correlated with partner selection, with ambidexterity demonstrating the strongest correlation. Bearing in mind that the context and variables were rated by different respondents, these high correlations are noteworthy. Essentially, this calculated the values of variance inflation factors associated with each of the predictors, which ranged from 1.23 to 2.17. Rather than calculating the value of variance inflation factors, after performed a separate regression analysis for each mediating test process and simultaneously separated the task- and partner-related variables into a single regression analysis to correct for any multicollinearity among these variables; the result fell within acceptance limits, suggesting that multicollinearity was avoided.

Hypothesis 1 predicts that cost motivation positively mediates the linkage between environment uncertainty and task-related alliances. The procedure were followed Baron and Kenny's (1986) to analyse the mediating role of cost motivation in affecting the relationships between the independent variable, environment uncertainty, and the dependent variable, task-related alliance. The first step was to examine the effects of the independent variables (including all control variables) on the mediator variable. As shown in Model 1 of Table 2, environment uncertainty ($\beta = 0.4753$, $p < .001$) was significantly related to cost motivation. Second, the independent variable, environment uncertainty, was regressed on the dependent variable, task-related alliance. The results for Model 2 of Table 2 indicate that a significant relationship exists between environment uncertainty ($\beta = 0.3348$, $p < .01$) and the dependent variable, task-related alliance. Third, after examined the relationship between the mediator and the dependent variable. Model 3 of Table 2 shows that cost motivation ($\beta = 0.7580$, $p < .001$) had a significant and positive effect on task-related alliance. Finally, as Model 4 of Table 2 demonstrates, that the previously significant linkage between environment uncertainty and task-related alliance were no longer significant after adding the cost motivation dimension to the regression model. However, cost motivation ($\beta = 0.7730$, $p < .001$) remained significantly related to task-related alliance. The findings from this set of analyses suggest that cost motivation fully mediates the relationship between environment uncertainty and task-related partner selection. This study further followed the Sobel test procedure to test the significance of the indirect effects of environment uncertainty on task-related alliance. This approach was a more direct test of the mediation hypotheses, following procedures outlined by Preacher and Hayes (2004), that examined the combined effects of the path between task-related partner selection and the

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Table 1. Descriptive statistics and correlation matrix

Variable	*Mean*	*SD*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	
1. Partner related	3.86	0.64	1.00										
2. Task related	3.64	0.79	0.70***	1.00									
3. Cost motivation	3.89	0.63	0.80***	0.51***	1.00								
4. Strategy motivation	3.71	0.58	0.65***	0.73***	0.58***	1.00							
5. Environment uncertainty	3.42	0.70	0.36***	0.24*	0.40***	0.41***	1.00						
6. Firm age	21.08	7.15	−0.10	−0.08	−0.12	−0.15	−0.09	1.00					
7. Firm size	74.48	67.50	0.05	0.22*	0.01	0.22*	−0.09	−0.01	1.00				
8. Alliance-purchase	0.23	0.42	−0.20*	−0.012	−0.34***	−0.07	0.12	0.13	−0.22*	1.00			
9. Alliance-manufacture	0.18	0.39	0.12	0.18	0.02	0.14	0.02	0.15	0.24*	−0.26**	1.00		
10. Alliance marketing	0.27	0.45	0.11	0.08	0.17	0.20*	−0.03	−0.43***	−0.02	−0.34**	−0.29**	1.00	
11. Alliance others	0.29	0.46	−0.02	−0.23*	0.12	−0.26**	−0.10	0.16	0.02	−0.36***	−0.31***	−0.40***	1.00

Note. *$p < .05$; *$p < .01$; ***$p < .001$.

Table 2. Results of regression analysis of alliance partner selection-task related

	Cost motivation		*Alliance partner selection-task related*						
	Model 1		*Model 2*		*Model 3*		*Model 4*		
Dependent variables	β	*t*	β	*t*	β	*t*	β	*t*	*Sobel test*
Control variables									
Firm age	−0.00	−0.17	−0.00	−0.31	−0.00	−0.21	−0.00	−0.26	
Firm size	−0.00	−1.46	0.00	1.37	0.00	2.85**	0.00	2.49*	
Alliance type									
Material purchase	−0.46	−2.79**	−0.19	−0.80	0.15	0.73	0.16	0.76	
Product manufacture	0.14	0.89	−0.12	−0.49	−0.22	−1.10	−0.23	−1.13	
Marketing	0.23	1.49	−0.39	−1.74	−0.57	−3.04**	−0.57	−2.94**	
Independent variable									
Environment uncertainty	0.47	6.15***	0.33	2.97**			−0.03	−0.28	
Mediating variable									
Cost motivation					0.75	7.05***	0.77	5.88***	4.63***
Model statistics									
R^2	0.40		0.20		0.42		0.43		
R^2_{adj}	0.35		0.14		0.39		0.37		
F	8.68***		3.32**		11.30***		8.32***		
n	97		97		97		97		

Note. *$p < .05$; **$p < .01$; ***$p < .001$.

mediating role of cost motivation (Sobel, 1982). As shown in the final column of Table 2, that cost motivation ($z = 4.6336$, $p < .001$) has a significant and indirect effect on task-related partner selection. The results of the Sobel test provided further support to the fully mediating role of cost motivation in affecting the relationship between environment uncertainty and task-related alliance. Accordingly, Hypothesis 1, proposing a mediating effect of cost motivation on environment uncertainty and task-related, was supported.

Hypothesis 2, another hypothesis concerning mediation, predicted that cost motivation positively mediates the linkage between environment uncertainty and task-related alliance. As depicted in Table 3, the coefficient for environment uncertainty in model 5 had a positive and significant effect on cost motivation ($\beta = 0.4753$, $p < .001$). The second step was to demonstrate that the independent variable (environment uncertainty) influences the dependent variable (partner-related alliance). This step was supported in Model 6. Cost motivation had a significant positive relationship with partner-related alliance in Model 7 ($\beta = 0.8521$, $p < .001$). Finally, it was necessary to demonstrate that the mediator (cost motivation) influences the dependent variable (partner-related alliance) by controlling the independent variable (environment uncertainty). As shown in Model 8, the coefficient for cost motivation was positive and significant, indicating that there remained a main effect of cost motivation on partner-related alliance ($\beta = 0.8521$, $p < .001$). In addition, with cost motivation added to the equation, the coefficient for environment uncertainty was no longer significant. The procedures of Sobel test were used to test the mediating effect between cost motivation, environment uncertainty and task-related alliance. The results presented in the final column of Table 3 show that cost motivation had a significant positive mediating effect on the relationship between environment uncertainty and task-related alliance, thus providing support for Hypothesis 2, that cost motivation positively mediates the linkage between environment uncertainty and task-related alliance.

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Table 3. Results of regression analysis of alliance partner selection-Partner related

	Cost motivation		*Alliance partner selection-partner related*						
	Model 5		*Model 6*		*Model 7*		*Model 8*		
Dependent variables	β	*t*	β	*t*	β	*t*	β	*t*	*Sobel test*
Control variables									
Firm age	−0.00	−0.17	−0.00	−0.34	−0.00	−0.34	−0.00	−0.32	
Firm size	−0.00	−1.46	−0.00	−0.68	0.00	0.68	0.00	0.59	
Alliance type									
Material purchase	−0.46	−2.79**	−0.42	−2.24*	−0.02	−0.21	−0.03	−0.23	
Product manufacture	0.14	0.89	−0.03	−0.21	−0.16	−1.33	−0.16	−1.29	
Marketing	0.23	1.49	−0.05	−0.29	−0.25	−2.17*	−0.24	−2.05*	
Independent variable									
Environment uncertainty	0.47	6.15***	0.413	4.71***			0.011	0.17	
Mediating variable									
Cost motivation					0.85	12.93***	0.84	10.47***	4.42***
Model statistics									
R^2	0.40		0.26		0.67		0.67		
R^2_{adj}	0.35		0.20		0.64		0.64		
F	8.68***		4.52***		30.63***		22.47***		
n	97		97		97		97		

Note. *$p < .05$; **$p < .01$; ***$p < .001$.

In addition, the similar procedures were used to test Hypothesis 3, that strategy motivation plays an important mediating role in the relationship between environment change and task-related alliance. The results of step 1, presented in Table 4 (Model 9), show that environment uncertainty was significantly and positively related to strategy motivation ($\beta = 0.3857$, $p < .001$). The second step in the mediation analysis involved a regression test of environment uncertainty and task-related alliance. The results in Table 4 (Model 10) indicate that environment uncertainty had a significant positive relationship with task-related alliance ($\beta = 0.3348$, $p < .01$), and the results of step three show a positive significant relationship between strategy motivation ($\beta = 0.9781$, $p < .01$) and task-related alliance (Model 11). In the final step of the mediation analysis, environment uncertainty and strategy motivation were regressed on task-related alliance. As predicted, the results (Model 12) indicate that the significant relationship between environment uncertainty and task-related alliance became non-significant when strategy motivation was simultaneously entered into the regression equation. In addition, significant effect of strategy motivation ($\beta = 0.9978$, $p < .001$) on task-related partner selection maintains. The results of the Sobel test provided additional support for the fully mediating role of strategy motivation ($z = 5.1442$, $p < .001$). Together, these results suggest that strategy motivation mediates the relationship between environment uncertainty and task-related alliance, a pattern of results supporting Hypothesis 3.

Furthermore, Hypothesis 4 states that strategy motivation positively mediates the linkage between environment uncertainty and partner-related alliance. The Baron and Kenny's (1986) procedures were used to test Hypothesis 4. In step 1, the variables of environment uncertainty and strategy motivation were regressed, as shown in Model 13 of Table 5, revealing environment uncertainty to be a significant predictor of strategy motivation ($\beta = 0.3857$, $p < .001$). In steps 2 and 3, both environment uncertainty (Model 14) and strategy motivation (Model 15) had a significant

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Table 4. Results of regression analysis of alliance partner selection-Task related

	Strategy motivation		*Alliance partner selection-task related*						
	Model 9		*Model 10*		*Model 11*		*Model 12*		
Dependent variables	β	*t*	β	*t*	β	*t*	β	*t*	*Sobel test*
Control variables									
Firm age	−0.00	−0.31	−0.00	−0.31	−0.00	−0.01	−0.00	−0.14	
Firm size	0.00	1.73	0.00	1.37	0.00	0.78	0.00	0.29	
Alliance type									
Material purchase	−0.17	−1.06	−0.19	−0.80	−0.03	−0.19	−0.02	−0.13	
Product manufacture	0.08	0.52	−0.12	−0.49	−0.18	−1.01	−0.20	−1.12	
Marketing	−0.25	−1.66	−0.39	−1.74	−0.16	−0.96	−0.14	−0.83	
Independent variable									
Environment uncertainty	0.38	5.14***	0.33	2.97**			−0.05	−0.53	
Mediating variable									
Strategy motivation					.97	9.40***	0.99	8.40***	5.14***
Model statistics									
R^2	0.34		0.20		0.55		0.56		
R^2_{adj}	0.29		0.14		0.52		0.52		
F	6.67***		3.32**		18.56***		14.01***		
n	97		97		97		97		

Note. *$p < .05$; **$p < .01$; ***$p < .001$.

Table 5. Results of regression analysis of alliance partner selection-partner related

	Strategy motivation		*Alliance partner selection-partner related*						
	Model 13		*Model 14*		*Model 15*		*Model 16*		
Dependent variables	β	*t*	β	*t*	β	*t*	β	*t*	*Sobel test*
Control variables									
Firm age	−0.00	−0.31	−0.00	−0.34	−0.00	−0.23	−0.00	−0.19	
Firm size	0.00	1.73	−0.00	−0.68	−0.00	−1.84	−0.001	−2.06*	
Alliance type									
Material purchase	−0.17	−1.06	−0.42	−2.24*	−0.28	−1.84	−0.30	−1.97	
Product manufacture	0.08	0.52	−0.03	−0.21	−0.11	−0.71	−0.09	0.84	
Marketing	−0.25	−1.66	−0.05	−0.29	0.09	0.64	0.12	0.84	
Independent variable									
Environment uncertainty	0.38	5.14***	0.41	4.71***			0.14	1.82	
Mediating variable									
Strategy motivation					0.782	8.74***	0.687	6.83***	4.145***
Model statistics									
R^2	0.34		0.26		0.49		0.51		
R^2_{adj}	0.29		0.20		0.45		0.47		
F	6.67***		4.52***		14.49***		11.82***		
n	97		97		97		97		

Note. *$p < .05$; **$p < .01$; ***$p < .001$.

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relationship with partner-related alliance ($\beta = 0.4132$, $p < .001$; $\beta = 0.7829$, $p < .001$, respectively). In step 4, when environment uncertainty was added to the equation in step 3, environment uncertainty was no longer significant at the conventional level, but strategy motivation remained significant ($\beta = 0.6879$, $p < .001$). The combined results from steps 1–4 supported Hypothesis 4. To further test Hypothesis 4, the Sobel test were performed to provides a direct test of the indirect effect of an independent variable on the dependent variable through the mediator (Sobel, 1982). The results presented in the final column of Table 4 indicate that the indirect effect of environment uncertainty on partner-related alliance was significant ($z = 401457$, $p < .001$). The results therefore supported Hypothesis 4.

DISCUSSION

The findings of this study provide a framework for the alliance partner selection process among SMEs that accommodates multiple mediating mechanisms through which environment uncertainty affects partner selection criteria. This study provides evidence that environment uncertainty can and does affect different partner selection criteria in different and distinct ways through cost motivation and strategy motivation. These results imply not only that the question of how environment change affects SMEs' alliance partner selection has several different answers but also that the consideration of any of these answers alone is incomplete (Chen, Lee, & Wu, 2008). It also suggests that if industrial scholars or managers wish to advance knowledge about the relationship between environment uncertainty and partner selection criteria, they must be more specific about all partner selection processes mediating the effects of environment uncertainty rather than relying on overly broad constructs.

Our study notes that studies adopting a single-mediator approach are at high risk of overstating the mediating effects, especially when one variable is subject to different measures and perspectives (De-Jong & Elfring, 2010). Our results suggest that studies on mediating mechanisms should follow our analysis in taking different dimensions into greater consideration. Our study reveals that considering a broad variety of dimensions helps to better explain not only the different ways in which environment uncertainty *does* affect alliance selection criteria but also the ways in which it *does not*. These findings advance knowledge about when SMEs face the challenge of environment uncertainty by examining how they select partners based on partner criteria and by proposing the existence of different motivations influencing alliance partner selection in the context of environment uncertainty. Our results provide initial support for this conjecture. A positive effect of environment uncertainty on cost- and strategy-related motivations in partner selection was found. The results support the argument that the environment uncertainty that develops in partner selection is likely to increase cost and strategy motivation, enabling alliance partners to help others in need (Sakakibara, 1997; Murray & Kotabe, 2005). This argument implies the consideration of motivation as a critical control mechanism. Organisation research scholars thus must broaden their view of the environment–motivation relationship by considering the type of alliance motivation and the environment uncertainty that develops within the strategy alliance studied.

Furthermore, the findings support the validity of Geringer's (1991) framework by confirming the discriminant validity of the alliance selection processes to represent the partner selection categories and the distinct mediating effects of these processes. In addition, our study confirms the value of Geringer's framework as a starting point for selecting partner processes. Although the Geringer asserted that partner criteria should be considered when making strategy alliance decisions, this study propose that to arrive at a meaningful set of partner selection processes, scholars interested in how entire partner selection processes convert the motivation inputs to determine partner selection criteria should also consider the motivation variables related to these various partner selection processes. Finally, our results corroborate prior studies on partner selection that have shown a significant positive main effect of environment uncertainty on partner selection criteria (Chen, Lee, & Wu, 2008). Along

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with other studies, this study appears to suggest that the effects of environment uncertainty on partner selection criteria may be more pronounced in SMEs' alliance networks. Thus, this study encourage industrial researchers to abandon the aim of achieving one universal model of partner selection process in favour of developing models tailored to these particular types of alliances.

IMPLICATIONS

Strategic alliances have become a popular topic among firms around the world, and there have been a significant number of studies on this form of partner selection strategy. Based on the empirical findings, this study provided several important implications for managers when selecting the appropriate partner. First, environmental uncertainty can be perceived as an important accelerating factor of a firm's alliance motivation. Therefore, the manager should understand how firms have learned to manage environmental change, and through cost and strategy objectives, understand the concepts of sharing costs or R&D development risks, avoiding duplicate investment, increasing R&D capabilities, shortening the time required for technological development and increasing market share. Second, this paper systematically addresses the process of an SME's alliance partner selection. A manager trying to forge an alliance with other firms must prioritise motivations and then establish adequate measuring criteria and attributes for evaluating the candidate partners. Third, SMEs, which usually have less experience and fewer resources, are unlikely to be richer than other firms. In this situation, managers should carefully evaluate the candidate partners for acquiring tangible and intangible resources to develop their capability to enter a new market, to develop new technology, and to extend their domestic market share into global markets.

LIMITATION

In spite of these important contributions to theoretical and empirical implication, the current study also has several limitations. First, this study asserts cost motivation and strategy motivation as important mediating factors between environment uncertainty and partner selection criteria. However, there are other types of motivation (e.g., resource motivation and learning motivation) that influence the selection of a strategic alliance partner (Chen et al., 2010). Therefore, it is worthwhile to further investigate whether the mediation effect of alliance motivation on the relationship between environment uncertainty and partner selection criteria still holds for other types of motivation. Second, our sample focuses on SMEs in the steel industry. Characteristics related to the environment or motivation may vary in partner selection processes between industries. Our results provide evidence supporting our hypotheses, but samples from more industries or across countries with different environmental characteristics (more dynamic or stable as opposed to partner selection driven by technological change with the commensurate uncertainty) may make our results more generalisable. Finally, our multiple-mediator approach in evaluating partner selection criteria implies a specific causal order among phenomena; our data did not allow us to make causal inferences regarding changes in effects. Future research can provide a more precise and comprehensive test of these mediated effects, for instance, by adopting a cross-lagged panel design (Langfred, 2007) and/or by using structural equations model analysis to test this model (e.g., Costa, 2003).

CONCLUSIONS

In conclusion, this study advances the theoretical and empirical understanding of how environment uncertainty affects alliance partner selection in the evaluation of criteria. The results presented here

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highlight the importance of alliance motivations as materialisations of environment uncertainty and as mechanisms transmitting the effects of environment uncertainty to partner selection criteria. This study illustrates that environment uncertainty affects different partner selection criteria according to a variety of motivations; therefore, to consider ways in which environment uncertainty is believed to affect partner selection through a single factor may be overstating the influence of the research. Furthermore, our results suggest the need for more context-specific theories of inter-organisational strategy alliance by corroborating prior research findings that together suggest that the way in which environment uncertainty influences potential partner selection is different from how prior studies have shown it to operate within the entire process of alliance criteria selection. Therefore, this study encourages others to more closely examine how environment uncertainty affects different criteria of partner selection.

ACKNOWLEDGEMENTS

This work was supported by National Science Council (NSC), Taiwan, under contract of NSC-101-2410-H-151-025. In addition, the author would like to thanks the anonymous reviewers for their comments and suggestions.

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APPENDIX MEASURES AND MAIN ITEMS

1. Cost motivation (seven items, 5-point Likert scale ranging from 1 = 'do not agree' to 5 = 'completely agree')

1. The new technology benefit is lower than the cost incurred for its own development.
2. The cost required for joint R&D is lower than the cost required for in-house R&D.
3. The cost for consignment is lower than the cost for in-house manufacturing.
4. The cost for strategic alliance is lower than the cost for a stand-alone operation.
5. Creating a strategic alliance can share the risk of a new market entry.
6. Creating a strategic alliance can avoid redundant investments.
7. A strategic alliance is cost effective, although there are disincentives to a merger between parent firms.

2. Strategy motivation (five items, 5-point Likert scale ranging from 1 = 'do not agree' to 5 = 'completely agree')

1. Forging an alliance can maximise profit and possible cooperation.
2. Forging an alliance can increase market share.
3. Forging an alliance can increase the pace of employee exchange.
4. Forging an alliance can shorten the time for technological development and for new products to enter the market.
5. Forging an alliance can prevent vicious competition from competitors.

3. Environmental uncertainty: How would you characterise the external environment within which your company functions?

1. Competitors' behaviour is unpredictable.
2. Competitors' behaviour has a great effect on the firm's performance.
3. Environmental change is a sensitive issue.
4. The demands of a complex environment prevent technological sophistication.

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