



Proceedings of International Conference on Strategies in
Volatile and Uncertain Environment for Emerging Markets
July 14-15, 2017
Indian Institute of Technology Delhi, New Delhi
pp.550-556

Analyzing the Impact of Perceived Environmental Uncertainty on SME Alliance Formation: An Indian Perspective

Rohit Prabhudesai¹, Ch. V. V. S. N. V. Prasad²,
Shardul Walwadkar³ and Shubham Agrawal⁴

Abstract

Extant literature provides mixed findings on the impact of perceived environmental uncertainty on the alliance formation patterns of SMEs. This study aims to provide specific insights on this relationship from an Indian context. Based on a study of 127 SMEs in the manufacturing sector, the results indicate that alliance formation is positively associated with environmental uncertainty perceived by the managers of an Indian SME. The paper provides important practical and theoretical implications.

Keywords: Alliances, Alliance Formation, Perceived Environmental Uncertainty, Small and Medium Enterprises, SMEs.

1. Introduction

The decision by Small and Medium Enterprises (SMEs) to form alliances is often dictated by the environmental conditions within which they operate (Eisenhardt and Schoonhoven, 1996). Environmental uncertainty, defined as changes in the external environment whose impact becomes difficult to forecast, creates survival problems for SMEs (Milliken, 1987; Dickson and Weaver, 1997). SMEs, thus, must adapt to the changes in order to continue operations (Marino *et al.*, 2008).

Extant literature provides two conceptual theories to explain the behavior of SMEs facing an uncertain environment- prospect theory and threat rigidity theory (Voss *et al.*, 2008). Prospect theory states that when organizations are faced with an increasingly uncertain environment, where the potential impact of strategic choices cannot be clearly forecasted, firms tend to undertake risky options (Kahneman and Tversky, 1979). On the other hand, threat rigidity theory posits that since environmental uncertainty makes it difficult to verify information, firms stick to tried and tested routines (Sitkin and Pablo, 1992).

Empirically, in the context of SME alliances, both theories have been tested by researchers. Dickson and Weaver (1997), Marino *et al.* (2008) find support for prospect theory, while Mukherjee *et al.* (2013) find support for threat rigidity theory. Researchers have noted that the key reason for disparity in findings is due to the definition and idiosyncratic characteristics of SMEs differing

-
1. PhD Scholar, Department of Economics, KK Birla BITS Pilani Goa Campus, Sancoale Goa India
E-mail: rohit.prabhudesai@hotmail.com
 2. Assistant Professor, Department of Economics, KK Birla BITS Pilani Goa Campus, Sancoale Goa India
 3. KK Birla BITS Pilani Goa Campus, Sancoale Goa India
 4. KK Birla BITS Pilani Goa Campus, Sancoale Goa India

across regions. Thus, reliable insights can be obtained by focusing on a homogenous sample of SMEs (Nakos and Brouters, 2014; Smith and Deslands, 2014). To do so, this study aims to provide insights on the impact of perceived environmental uncertainty on the strategic alliance formation patterns of Indian SMEs.

The paper proceeds as follows. Firstly, literature review discusses how environmental uncertainty has been defined and studied by previous studies, generating the hypothesis for the study. Subsequently the methodology section discusses the sampling, variable measurement and variable analysis approaches undertaken. Discussion of the results is then undertaken, followed by the implications and limitations of the study.

2. Literature Review

The construct of environmental uncertainty was initially studied using objective measures (Aldag and Storey, 1975). However, other researchers argued that the phenomenon of environmental uncertainty faced by a firm was based on perception, thus suggesting that subjective measures were better suited for measuring the construct (Miles *et al.*, 1974). Discrepancies, however, were observed in the results obtained by using both types of measures (Pfeffer and Salanick, 1978). To provide consistent results, Milliken (1987) redefined the term of environmental uncertainty as perceived environmental uncertainty, to indicate the perceptual definition of environmental uncertainty based on the views of a firm's manager, and provided a multidimensional approach towards measuring the construct.

The environmental uncertainty faced by the managers of an SME shapes the strategic action of the firm (Krishnan *et al.*, 2016). However, the studies in an SME context that have analyzed the impact of perceived environmental uncertainty on alliance formation, have provided mixed results. Threat rigidity studies have mainly focused on the heightened transaction costs in uncertain environments which reduce the appeal of alliance formation for SMEs. Studies that have analyzed using prospect theory as the theoretical lens, on the other hand, posit that since firms require resources in uncertain environments, they will form alliances in order to acquire them (Voss *et al.*, 2008).

For SMEs from developing countries such as India, resource acquisition remains the key for staying competitive, especially in an uncertain environment. Despite the risks involved when the perceived environmental uncertainty is high, given the benefits, these SMEs tend to gain more from participating in alliances as required resources can be obtained (Marino *et al.*, 2008; Lee, 2014). Thus, it can be hypothesized that

Hypothesis 1: Greater the environmental uncertainty faced by an Indian SME, greater will be its alliance formation tendency.

3. Methodology

3.1 Sample and Data Collection

The target population of the study was Indian SMEs. Furthermore, only manufacturing companies in the Indian SME sector were considered to obtain reliable insights. An SME in manufacturing sector in India is defined as any firm which has an 'investment in plant and equipment of over 2.5 million Rupees but less than 100 million Rupees' (MSME, 2017). As personal survey interviewing method was chosen to obtain higher quality of responses, it was considered expedient to limit our study to the state of Goa and a list of all the manufacturing SMEs in the state was obtained from the Goa Industrial Development Corporation (GIDC). Furthermore, these SMEs were personally approached to record their responses to the questionnaire, along with a cover letter detailing the purpose of the study and its usefulness, vetted by the Goa Chamber of Commerce & Industry (GCCCI).

A key informant approach was used given that the strategic decision making in SMEs is usually concentrated in the hands of these decision makers. Thus, only these people were specifically asked to provide responses for each firm. Of the 770 firms in the list, 127 responded, giving a response rate of 16%.

3.2 Measures of Dependent, Independent, and Control Variables

The dependent variable in the study was alliance formation and was measured on a broad definition of the term strategic alliance, used in earlier studies such as Das and Teng (2000), Franco and Haase (2013), Marino *et al.* (2008). Thus, unilateral contracts, bilateral contracts, minority equity investments, and joint ventures were included as types of alliance and SMEs were asked to indicate if they were currently engaged in any of them with a partner firm(s).

The independent variable in the study was perceived environmental uncertainty and was based on the earlier empirical studies measuring the construct from the perspective of SME managers such as Dickson and Weaver (1997) and Marino *et al.* (2008). In line with the items used in these studies, seven item statements were included to measure the dimensions of general uncertainty, technological uncertainty, and competitive uncertainty as perceived by the key informant on a scale of 1-5 (completely disagree-completely agree).

Three control variables were used in the study. Firm size was measured by the number of full time employees working in the firm, firm age was measured by the years that had passed since the inception of the firm and year 2016, and nine manufacturing industries were also included in the analysis to control for their impact on alliance formation by SMEs.

3.3 Variable Analysis

An exploratory factor analysis was conducted to determine the pattern amongst the items measuring perceived environmental uncertainty. All seven items loaded onto one factor, with the factor accounting for 64% of the variance amongst items and with each loading value above the cut-off score of 0.7 (Hulland, 1999). The principal component loadings are provided in Table 1 below.

Table 1: Principal Component Analysis Results

	Component 1
Product Obsolescence	.726
Demand uncertainty	.841
Competitor uncertainty	.820
Competition in the industry	.784
R&D orientation of the industry	.792
Environmental threat	.786
Technological sophistication of the environment	.828

The reliability of the scale used for measuring the items was analyzed using Cronbach's alpha, which gave a value of 0.90, indicating high reliability.

4. Results and Discussion

As the dependent variable of alliance formation was categorical in nature (Yes/No), logistic regression technique was used for analysis purpose. Given the potential multicollinearity problems, it was considered necessary to perform a correlation analysis amongst the independent variable and control variables. The descriptive statistics along with the correlation values are given in Table 2. None of the variables exhibit significant correlation as all the values are below 0.5.

Table 2: Correlations and Descriptive Statistics

		Size of the firm	Age of the firm	Environmental uncertainty	Mean	Std. Deviation
1.	Size of the firm	1			53.2283	96.72110
2.	Age of the firm	-.236	1		19.5827	9.23197
3.	Environmental uncertainty	-.061	.132	1	2.8965	.97833

The general purpose equation used for measurement purpose was

$$Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4$$

Where X_1, \dots, X_4 are the control and independent variables in the study and Y is the logodds value of alliance formation. The results of analysis are provided in Table 3 below.

Table 3: Results of Logistic Regression Analysis

	Block 1Beta value (SE)	Block 2Beta value (SE)
Firm Size	.020 (.006)**	.017 (.006)**
Firm Age	.013 (.023)	.016 (.024)
Food Industry	-.988 (.753)	-.954 (.782)
Paper industry	-1.547 (.872)	-1.660 (.899)
Chemical industry	-1.411 (.972)	-1.408 (1.006)
Rubber industry	-.982 (.905)	-1.394 (.960)
Stone and clay industry	-1.679 (.942)	-1.677 (.978)
Primary metals industry	-1.136 (.602)	-1.331 (.660)**
Computer and industrial equipment industry	-.892 (.845)	-1.160 (.877)
Electrical and electronics industry	-1.072 (.744)	-1.814 (.825)**
Environmental Uncertainty		.742 (.251)**
Constant	-.377(.589)	-2.296 (.903)**
Nagelkerke R Square	.285	.362
-2 Log likelihood	144.357**	134.708**

Notes: ** = significance value < .05

In the first phase, only control variables were inserted to analyze their impact on alliance formation of SMEs. The model was significant ($p=.000$) with a negative log likelihood value and a Pseudo R square value of 28%. When the independent variable of Environmental Uncertainty was inserted subsequently in the second model, the model was again significant ($p=.000$) with an explained Pseudo R square value of 36%.

Environmental Uncertainty was found to be significant ($p<0.05$) in its impact on alliance formation, thus offering support for hypothesis 1. Given that the exponential coefficient is 2.09, for every unit increase in perceived environmental uncertainty by an SME, it can be said that the odds of its alliance formation go up by a factor of 2.09. Figure 1 graphically demonstrates the probability of alliance formation at every level of environmental uncertainty, keeping the other significant predictors constant at their mean value.

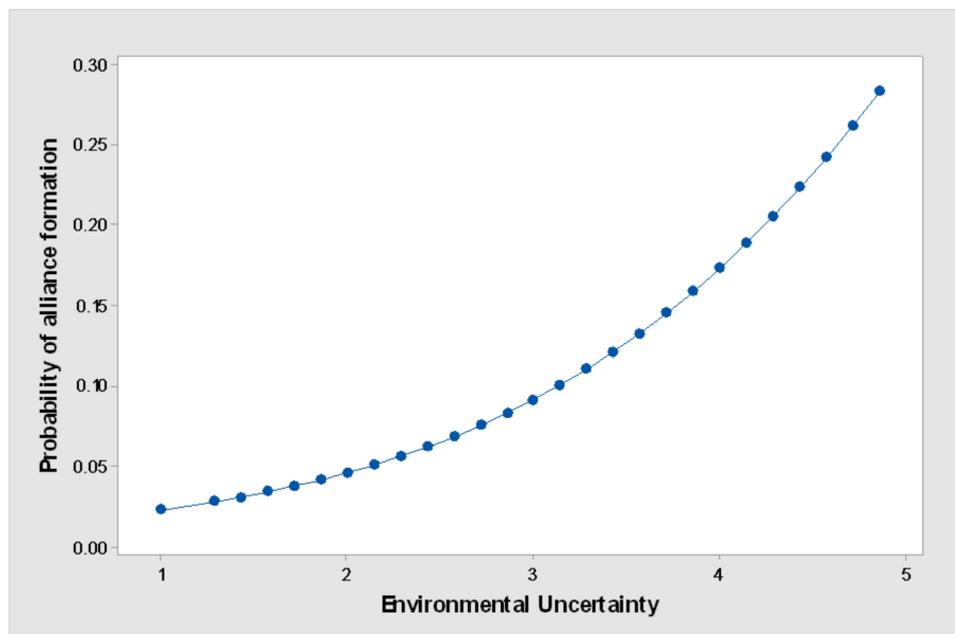


Figure 1: Probability of Alliance Formation

5. Conclusion

Alliance formation by SMEs is a function of the levels of environmental uncertainty perceived by its managers. SMEs tend to seek resources through alliance formation for combating the uncertainty in the environment (Dickson and Weaver, 1997). The study finds support in the Indian context for these suppositions, wherein increase in the perceived environmental uncertainty was found to be positively associated with alliance formation by SMEs.

The study provides important practical and theoretical implications. While earlier research has either focused on the impact of specific components of environmental uncertainty on SME alliance formation (Dickson *et al.*, 2006), on future alliance intentions (Marino *et al.*, 2008), or in a specific industrial domain (Voss *et al.*, 2008), this study provides a holistic overview of how exactly perceived environmental uncertainty affects SME alliance formation in the India. Thus, the SME managers in the Indian manufacturing sector can obtain insights on how alliance

formation varies as per the perceived environmental uncertainty levels. From a theoretical perspective, to the best of authors' knowledge, the study is the first of its kind from an Asian perspective. Thus, the insights from Indian SMEs' perspective can be compared with studies that have chosen samples from other regions, to obtain better insights on the relationship of perceived environmental uncertainty on SME alliance formation.

However, the study carries certain important limitations. Firstly, given that the aim of the study was to analyze how perceived environmental uncertainty specifically affects alliance formation patterns of Indian SMEs, it ignores the impact of firm-level variables such as entrepreneurial orientation and resources, which have been proven to affect alliance formation in conjunction with perceived environmental uncertainty. Researchers can focus on combining environmental uncertainty with these variables, to obtain better insights on its relationship with alliance formation. Similarly, while this study utilizes the perceptions of SME managers on the environmental conditions they face, objective measures can be used by researchers for studying the construct and the insights can be compared, for developing a better understanding on the topic.

References

- Brouthers, K. D., Nakos, G., and Dimitratos, P. (2015) SME Entrepreneurial Orientation, International Performance, and the Moderating Role of Strategic Alliances, *Entrepreneurship Theory and Practice*, 39(5), 1161-1187.
- Dickson, P. H., and Weaver, K. M. (1997) Environmental Determinants and Individual-Level Moderators of Alliance Use, *Academy of Management Journal*, 40(2), 404-425.
- Dickson, P. H., Weaver, K. M., and Hoy, F. (2006) Opportunism in the R&D Alliances of SMES: The Roles of the Institutional Environment and SME Size, *Journal of Business Venturing*, 21(4), 487-513.
- Eisenhardt, K. M., and Schoonhoven, C. B. (1996) Resource-Based View of Strategic Alliance Formation: Strategic and Social Effects in Entrepreneurial Firms, *Organization Science*, 7(2), 136-150.
- Franco, M., and Haase, H. (2013) Firm Resources and Entrepreneurial Orientation as Determinants for Collaborative Entrepreneurship, *Management Decision*, 51(3), 680-696.
- Hulland, J. (1999) Use of Partial Least Squares (PLS) in Strategic Management Research: A Review of Four Recent Studies, *Strategic Management Journal*, 20(2), 195-204.
- Kahneman, D., and Tversky, A. (1979) Prospect theory: An Analysis of Decision under Risk, *Econometrica: Journal of the Econometric Society*, 47(2), 263-292.
- Krishnan, R., Geyskens, I., and Steenkamp, J. B. E. (2016) The Effectiveness of Contractual and Trust Based Governance in Strategic Alliances under Behavioral and Environmental Uncertainty, *Strategic Management Journal*, 37(12), 2521-2542.
- Lee, W. L. (2014) Environmental Uncertainty Affects Inter-Organizational Partner Selection: The Mediating Role of Cost and Strategy in Alliance Motivations among SMEs, *Journal of Management & Organization*, 20(01), 38-55.
- Marino, L. D., Lohrke, F. T., Hill, J. S., Weaver, K. M., and Tambunan, T. (2008) Environmental Shocks and SME Alliance Formation Intentions in an Emerging Economy: Evidence from the Asian Financial Crisis in Indonesia, *Entrepreneurship Theory and Practice*, 32(1), 157-183.
- Miles, R. E., Snow, C. C., and Pfeffer, J. (1974) Organization Environment: Concepts and Issues, *Industrial Relations: A Journal of Economy and Society*, 13(3), 244-264.
- Milliken, F. J. (1987) Three Types of Perceived Uncertainty about the Environment: State, Effect, and Response Uncertainty, *Academy of Management Review*, 12(1), 133-143.
- MSME, M.o. (2017) *What are Micro, Small & Medium Enterprises?*, [Online]: http://www.dcmsme.gov.in/ssiindia/defination_msme.htm (Accessed 11 April 2017).

Rohit Prabhudesai, Ch. V. V. S. N. V. Prasad, Shardul Walwadkar and Shubham Agrawal

- Mukherjee, D., Gaur, A. S., Gaur, S. S., and Schmid, F. (2013) External and Internal Influences on R&D Alliance Formation: Evidence from German SMEs, *Journal of Business Research*, 66(11), 2178-2185.
- Pfeffer, J., and Salancik, G. R. (1978) The External Control of Organizations, *New York*, 175.
- Sitkin, S. B., and Pablo, A. L. (1992) Reconceptualizing the Determinants of Risk Behavior, *Academy of Management Review*, 17(1), 9-38.
- Smith, T. A., and Deslandes, D. D. (2014) Disaggregating Jamaica's Micro, Small and Medium Firms on Challenges Faced for Better Policy Development and Planning, *Academy of Entrepreneurship Journal*, 20(2), 87.
- Voss, G. B., Sirdeshmukh, D., and Voss, Z. G. (2008) The Effects of Slack Resources and Environmental Threat on Product Exploration and Exploitation, *Academy of Management Journal*, 51(1), 147-164.