A Study on Formation and Performance of SME Alliances with Special Reference to Indian Manufacturing Firms

THESIS

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by

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CERTIFICATE

This is to certify that the thesis entitled **A Study on Formation and Performance of SME Alliances with Special Reference to Indian Manufacturing Firms** and submitted by **Mr. Prabhudesai Rohit Subhash** ID No. **2013PHXF0413G** for award of Ph.D. of the Institute embodies original work done by him under my supervision.

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ABSTRACT

The rate of strategic alliance formation has proliferated in recent years as firms have begun to understand the scope that exists for value creation by combining complementary skills and capabilities (Zhao, 2014). Small and medium enterprises (SMEs), which lack the requisite resources necessary for achieving competitiveness, can gain access to them through alliance formation, but remain vulnerable to potential partner opportunism which can even erode the value of their existing competencies (Alvarez & Barney, 2005; Franco & Haase, 2013). While extant research has determined the necessity and risks associated with alliances for SMEs, consistent insights on their alliance management process- as to what causes variation in alliance formation, how the performance of alliances can be measured, and what causes variation in performance outcomes- are missing. The aim of this study was to determine the antecedents which influence the alliance formation tendencies of SMEs, to develop measures for analyzing the performance of SME alliances, and to determine how the antecedents affect these measures of SME alliance performance. Indian manufacturing SMEs were chosen as the target population for the purpose of the study.

Firstly, the extant literature pertaining to SME alliance management was reviewed, whereby the relevant antecedents of alliance formation in SMEs, the measures used for assessing alliance performance, and the antecedents which affect these measures of alliance performance, were identified. As the literature insights on the Indian manufacturing SMEs, which are idiosyncratically defined, were found to be missing, exploratory case studies were undertaken on four Indian manufacturing SMEs to gain a practical understanding. Based on the insights from the literature review and exploratory case studies, conceptual models for analyzing the impact of antecedents on alliance formation and performance were developed. Survey questionnaire was subsequently developed and personal interview method was adopted for data collection purposes.

Convenience sampling approach was used to collect responses from 770 manufacturing SMEs in Goa, of which 127 SMEs responded, indicating a response rate of 16%. 59 SMEs indicated that they were engaged in alliances, yielding data for 86 alliances.

Findings of the study provide novel implications for researchers and practitioners. In terms of alliance formation, while extant literature has identified firm-level and environmental-level antecedents which influence the propensity of SMEs to form alliances, they have been studied in isolation. This study integrates the two levels by determining how tangible resources, intangible resources, and entrepreneurial orientation, which are firm-level antecedents, in conjunction with perceived environmental uncertainty, an environmental-level antecedent, affect the alliance formation tendency of SMEs. While tangible and intangible resources as well as entrepreneurial orientation were found to act as precursors of alliance formation, environmental uncertainty was found to moderate the relationship between both types of resources- tangible and intangible- and alliance formation. Thus, the study establishes the linkage between firm-level and environmental-level antecedents in determining SME alliance formation. The study also conceptualizes alliance performance as a dual-level construct as opposed to the unitary approach traditionally adopted in extant literature. Thus, it analyzes the impact of antecedents on two distinct levels of alliance performance. Findings indicate that trust and organizational fit affect performance of the alliance, referred to as alliance-level performance, while commitment influences the benefits the SME receives from the alliance, defined as firm-level performance. Communication partially mediates the the impact of trust as well as commitment on firm-level performance, while conflict partially mediates the relationship between trust and organizational fit with alliance-level performance.

DECLARATION

I, **Prabhudesai Rohit Subhash**, hereby declare that the thesis entitled**, "A Study on Formation and Performance of SME Alliances with Special Reference to Indian Manufacturing Firms",** submitted to the **Birla Institute of Technology and Science, Pilani,** in partial fulfilment of the requirements for the award of the degree of Doctor of Philosophy is a record of original work done by me during the period 2014-2019 under the supervision and guidance of **Dr. Ch. V. V. S. N. V. Prasad**, Assistant Professor, Department of Economics, Birla Institute of Technology and Science, Pilani, Goa Campus and it has not formed the basis for the award of any degree or diploma or any other course to any candidate of any academic institutions.

Prabhudesai Rohit Subhash

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I have always believed that achieving a cherished objective is akin to scoring a goal in football- it requires background work from others in the form of an assist for you to score! The assist- the final pass- is as good as the goal, as one cannot exist without the other. Having completed and written my thesis, the feeling of elation is multiplied when I fondly remember all the moments of encouragement and support provided by all those around me, without whom I truly would not have been able to complete the work for my doctorate degree.

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LIST OF ACRONYMS

CAR	CUMULATIVE ABNORMAL RETURN
CMB	COMMON METHOD BIAS
GDITC	GOA DIRECTORATE OF INDUSTRIES, TRADE, AND COMMERCE
GDP	GROSS DOMESTIC PRODUCT
I/O	INDUSTRIAL ORGANIZATION
M&A	MERGERS AND ACQUISITION
OEM	ORIGINAL EQUIPMENT MANUFACTURER
PLC	PROGRAMMABLE LOGIC CONTROLLER
ROA	RETURN ON ASSETS
ROE	RETURN ON EQUITY
R&D	RESEARCH AND DEVELOPMENT
SIC	STANDARD INDUSTRIAL CLASSIFICATION
SME	SMALL AND MEDIUM ENTERPRISE

CHAPTER 1: INTRODUCTION

Beginning with the 1970s, firms realized that controlling all activities across the supply chain was resulting in a loss of efficiency along with a decline in product and service quality (James, 1985; Killing, 1988). Thus, strategic alliances were established, which allowed firms to focus on their core competencies, while partner firms would carry out the peripheral activities. In the following years, the scope of alliances gradually extended further as apart from the vertical alliances, firms also formed alliances with competitors to achieve the desired objectives (Culpan, 2009; Gomes, Barnes, & Mahmood, 2016)

While multiple benefits of alliances- such as sharing of costs and risks (Eisenhardt & Schoonhoven, 1996), entering new markets (Hamel, Doz, & Prahalad, 1989), gaining new skills (Hamel, 1991; Rothaermel & Boeker, 2008), and increasing market share (Hagedoorn, 1993)- have been identified in the extant literature; their outcomes are often times uncertain as future contingencies cannot be accurately predicted. The failure rates of alliances, based on managerial assessments, have been reported to be between 50-70% (Day, 1995; Park & Ungson, 2001; Zineldin et al., 2015).

Small and medium enterprises (SMEs) stand to gain access to a wide variety of opportunities and skills through alliances, but are especially prone to opportunistic behavior of partners, which can even erode the value of their existing skills (Yoo, Sawyerr, & Tan, 2016). While the necessity and pitfalls of alliances for SMEs have been well understood, deeper dimensions such as the process of alliance management have not been explored (Zhao, 2014). This study aims to provide holistic insights on the alliance management process of SMEs.

1.1 Background to study

1.1.1 Small and Medium Enterprises

The definition of SMEs varies from region-to-region. Gonzales, Hommes, and Mirmulstein (2014) classify the definitions used in 155 countries and find that each country either adopted a specific criterion or a combination of criteria to define SMEs. For certain countries, an official definition did not exist and, as such, different definitions were obtained from various sources. Overall, they find that 267 definitions existed for identifying SMEs in these economies. Figure 1.1 provides the frequency with which the criteria have been used in defining SMEs.

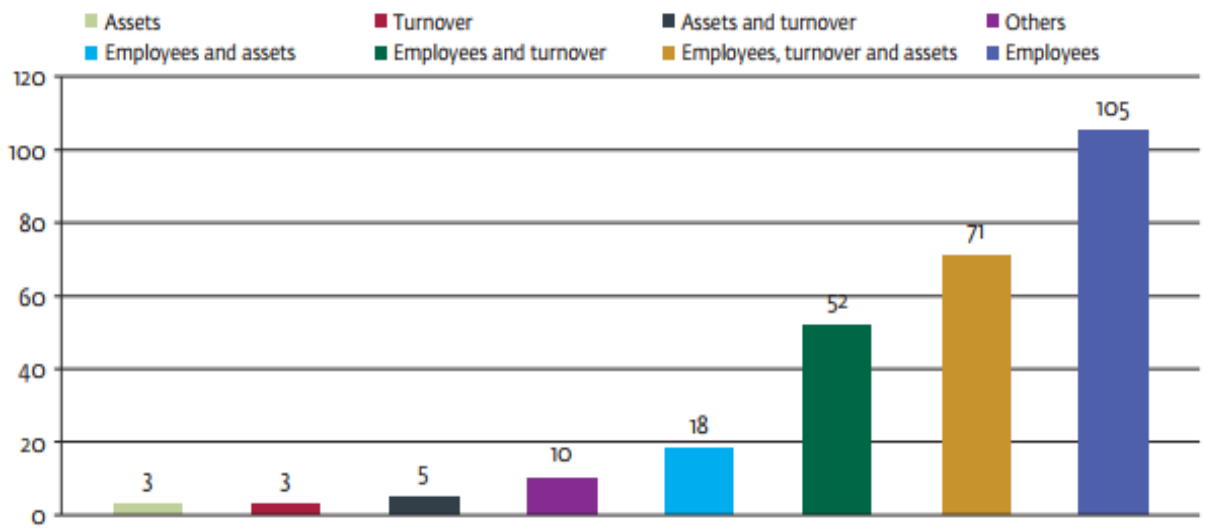

Figure 1.1- Frequency of criterion use for defining SMEs

Source: Retrieved from Gonzales et al. (2014)

The top ten economies in terms of gross domestic product (GDP) account for 66% of the global GDP. In all ten economies, SMEs account for more than 95% of the total firms (World Bank, 2017). Table 1.1 provides details on the specific definitions used for defining SMEs in these economies[1].

[1] GDP figures for all economies converted to US Dollars for comparative purposes

Table 1.1- Details on SME definitions used in top ten economies

Serial Number	Country	Criteria on which SMEs have been defined	Criteria details
1	United States of America[2]	Number of employees, Turnover	Number of employees- Less than 1,500 Turnover- Less than $39 million for service sector
2	China[2]	Number of employees, Total assets, Turnover	Number of employees- Less than 3000 Total assets- Less than $3.6 million Turnover- Less than $2.7 million
3	Japan[2]	Number of employees, Total assets	Number of employees- Less than 300 Total assets- Less than $2.8 million
4	Germany	Number of employees, Turnover	Number of employees- Less than 499 Turnover- Less than $59 million
5	United Kingdom	Number of employees	Less than 250
6	France	Number of employees, Total assets, Turnover	Number of employees- Less than 250 Total assets- Less than $50 million Turnover- Less than $59 million
7	India	Total assets	Manufacturing sector- More than $40000, less than $155000 million Service sector- More than $15000, less than $780000
8	Italy	Number of employees	Less than 249
9	Brazil	Number of employees	Manufacturing sector- Less than 499 employees Service sector- Less than 99 employees
10	Canada	Number of employees, Turnover	Number of employees- Less than 499 Turnover- Less than $50 million

Source: Retrieved from Gonzales et al. (2014)

[2] Further SME subclassifications exist.

1.1.2 Strategic Alliance

Considerable differences exist in extant literature as to what constitutes a strategic alliance. These differing perspectives on defining a strategic alliance can be categorized into two conceptual domains- broad and narrow. In the continuum of business relationships that can exist between firms, both views unanimously agree that equity arrangements such as wholly owned subsidiaries and mergers and acquisitions (M&As) lie outside the domain of alliances (Culpan, 2009).

From a narrow perspective, Hitt, Ireland, and Hoskisson (2012) define an alliance as "a cooperative strategy in which firms combine some of their resources and capabilities to derive a competitive advantage." Advocates of a narrow view state that alliances must involve sharing of resources and risks between partners. Thus, unilateral contractual structures- relationships wherein there is limited dependency between partners- such as subcontracting and licensing agreements, are not considered as types of strategic alliance under this conceptualization. The domain typically includes bilateral contractual mechanisms, partial equity ownership, and joint ventures as types of strategic alliance (Kale & Singh, 2009; Yoshino & Rangan, 1995)

Das and Teng (2003) proponents of broad view, define alliances as "interpartner cooperative arrangements aimed at pursuing mutual strategic objectives." Thus, viewed from this perspective, alliances also incorporate arm's-length transactions wherein firms are less integrated but the relationship nonetheless carries strategic importance. In this domain, in addition to the three types included in the narrow perspective, unilateral contractual mechanisms are also considered (Spekman, Isabella, & MacAvoy, 2000).

The continuum of business relationships and conceptual domains of strategic alliances are depicted in figure 1.2.

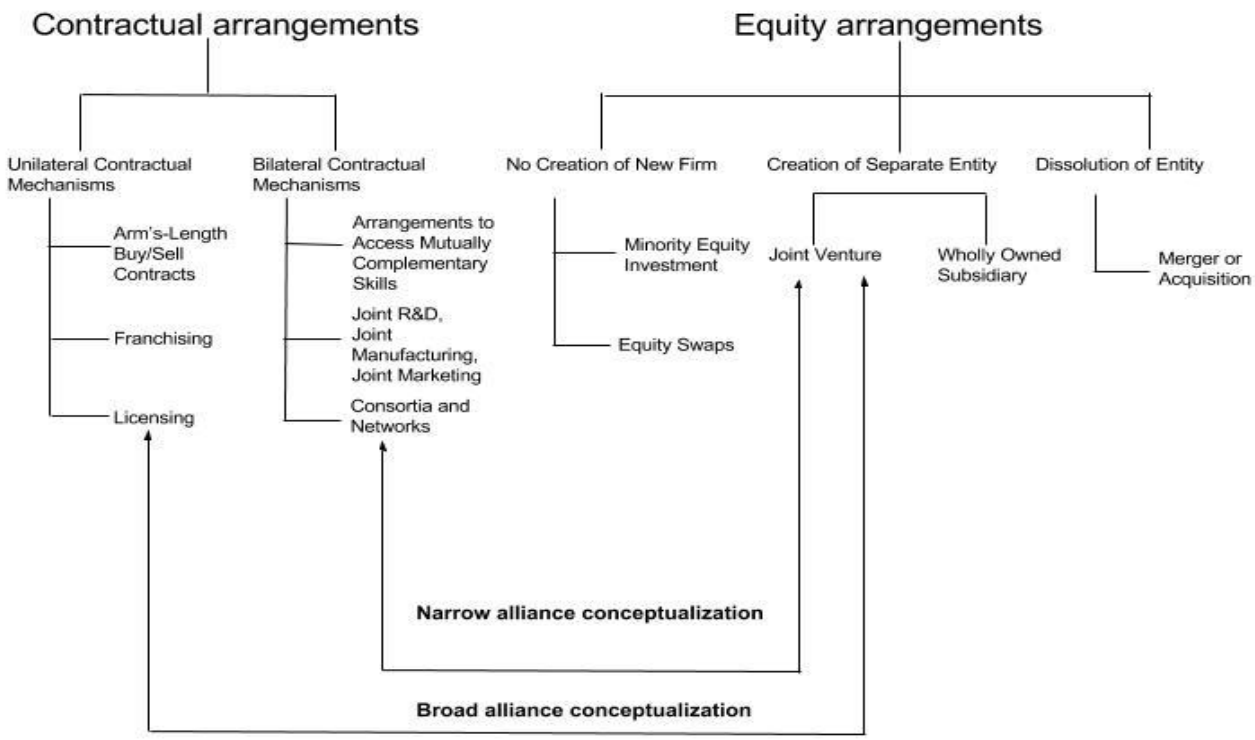

Figure 1.2- Continuum of firm relationships and conceptual domains of alliance

Source: Adapted from Yoshino and Rangan (1995)

1.2 Alliances of Small and Medium Enterprises

The aim of a firm in a business market remains, above all, to earn profits. However, as more and more economies have opened their traditionally closed borders to foreign firms, the dynamics of firm profitability- as to how firms can earn profits above the industry average- have steadily evolved (Bain, 1951; Grant, 2013; Schmalensee, 1985).

Research in strategic management has long tried to determine how firms can earn above-average returns. Focus of the earliest studies on the topic was on industrial organization (I/O) theory, which posited that firms ought to focus on industries in which the economic and technical barriers were low, in order to maximize profitability (Bain, 1951; Miles, Snow, Meyer, & Coleman, 1978;

Porter, 1981). However, the theory failed to explain how intra-industrial profitability differed more in comparison to profits of firms within different industries. Thus, resource-based theory (RBT) was proposed to explain how firms within an industry, despite facing similar competitive conditions, exhibited markedly different profitability outcomes (Barney, 1991; Wernerfelt, 1984). RBT proponents state that the ability of a firm to derive above average profits in an industry- referred to as its competitive advantage- is contingent on the presence of value-creating resources. Such resources when combined by a firm, give rise to firm-specific capabilities, which then yield a competitive advantage for the firm. The sustainability of this competitive advantage of a firm depends on the inimitability, non-substitutability, and imperfect mobility of the resources it possesses (Kristandl & Bontis, 2007; Peteraf, 1993; Rothaermel, 2016).

Given their heterogeneous and scarce nature, the supply of such resources necessary for building a competitive advantage is limited and possessed by different firms (Peteraf & Bergen, 2003). For a firm to develop such resources internally is extremely difficult as they are not imitable nor do they possess direct substitutes. Similarly, owing to their idiosyncratic association with a firm, such resources cannot be readily acquired via market transactions. The reputation of a particular firm, for example, cannot be easily imitated nor can it be traded through market exchanges. However, by forming a strategic alliance with reputed partner, the signaling effect ensures that the firm gains reputation in the marketplace (Das & Teng, 2002; Lin, Yang, & Arya, 2009). Formation of strategic alliances, thus, is a flexible strategic option to obtain access to such necessary resources owned by other firms, which cannot be internally developed or obtained through market transactions (Bizzi, 2017; Gulati, 1998).

While motives of resource acquisition underpin the rationale behind alliance formation, fundamental distinctions exist between large firms and SMEs in their alliance formation patterns. Large firms often require resources for growth purposes, while SMEs, due to their small size and

financial constraints, need resources for achieving competitiveness and surviving in the marketplace (Zhao, 2014). More so, strategic alliances are especially critical for SMEs given the low transaction costs involved, while large firms often can seek recourse to other strategic options such as mergers and acquisitions (M&As), thereby not depending upon alliances specifically for achieving their strategic objectives (Mukherjee, Gaur, Gaur, & Schmid, 2013; Prabhudesai & Prasad, 2018).

Though alliances carry idiosyncratic importance for the competitiveness of SMEs, certain related research questions have not been explored in the extant literature.

1.2.1 Why do SMEs exhibit differential rates of alliance formation?

While the motive behind alliance formation- such as resource acquisition- determines why an SME may want to form an alliance, it does not explain why SMEs, despite having the same motive, exhibit differential rates of alliance formation (Franco & Haase, 2013; Keil, 2000). The differences exist due to the presence of firm-level and environmental-level antecedents[3], which may cause SMEs to exhibit higher or lower rates of alliance formation (Park et al., 2002; Prabhudesai & Prasad, 2018). However, extant literature has studied the impact of such antecedents at both levels separately, as opposed to an integrated manner. As the strategy of a firm is shaped by the firm-level and environmental-level factors it faces, there remains a need to study these antecedents together to understand their impact on an SME's alliance formation tendencies (Park, Chen & Gallagher, 2002; Wymbs, 2016).

[3] An antecedent has been defined as a preceding condition, cause, or stimulus which gives rise to later developments (Merriam-Webster's Online Dictionary, 2019).

1.2.2 How is SME alliance performance measured? What causes variation in performance?

The performance of an alliance, due to the potential for acquiring resources necessary for achieving competitiveness, carries strategic importance for SMEs. Thus, researchers have tried to unravel why certain SME alliances exhibit superior performance in comparison to others (Zhao, 2014). However, in studying the impact of underlying antecedents which cause performance variations, divergent results have been obtained. While certain studies report a positive impact of an antecedent on alliance performance, others find no association or even a negative relationship (Christoffersen, 2013; Robson, Skarmeas, & Spyropoulou, 2006). The reasons for such inconsistent findings can be identified as

(a) Analyzing alliance performance as a unitary construct- Multiple measures have been used in the extant literature to analyze alliance performance. The different measures, though, have assumed alliance performance to be a unitary construct (Christoffersen, Plenborg, & Robson, 2014; Nielsen, 2007). However, Ariño (2003) finds that while certain measures of alliance performance were correlated, others were not, thereby implying that all the measures were not essentially measuring the same dimension of the construct. Thus, the inconsistencies in findings have been due to researchers failing to understand that the measures captured different dimensions of alliance performance (Christoffersen et al., 2014).

(b) Lack of integrated approach in studying the impact of antecedents- In analyzing the impact of antecedents on SME alliance performance, researchers have chosen to study them separately as opposed to providing an integrated insight (Gaur, Mukherjee, Gaur, & Schmid, 2011). Robson et al. (2006) and Christofferson (2013) find that the antecedents affect alliance performance through a complex interplay, rather than having a simple direct impact. Thus, a holistic insight- as to how

the interplay between antecedents affects SME alliance performance- has been missing in the extant literature (Prabhudesai & Prasad, 2017)

1.3 Need for the study

Overall, there exists an empirical gap on why specific SMEs exhibit greater alliance formation tendencies, how the performance outcomes of SME alliances are measured and what determines the success and failure of such alliances. Through the results of the study, researchers and practitioners alike will be better able to understand the holistic process of SME alliances.

The study provides insights on the alliance management process of manufacturing SMEs in India. India has a total of 1.7 million formally registered SMEs, of which 1 million (59%) are manufacturing SMEs and they contribute 40% of the overall exports as well as 45% of the overall manufacturing output of the country by value (MSMEs, 2017). Year-wise statistics on Indian manufacturing SMEs are provided in table 1.2.

Table 1.2- Details on Indian manufacturing SMEs

Year	Gross Value of Output of SME Manufacturing Sector (in crore)	Share of manufacturing SME sector in total GDP (Percentage)	Share of SME manufacturing output in total output (Percentage)
2006-07	1198818	7.73	42.02
2007-08	1322777	7.81	41.98
2008-09	1375589	7.52	40.79
2009-10	1488352	7.45	39.63
2010-11	1653622	7.39	38.50
2011-12	1788584	7.27	37.47
2012-13	1809976	7.04	37.33

Source: Ministry of Micro, Small, and Medium Enterprises (2019)[4]

[4] The latest available data was for the year 2012-13

As can be seen, the contribution of SME manufacturing sector to the national GDP and its share in the overall manufacturing output have steadily declined over the last few years. Furthermore, in the year 2016, the SME manufacturing output accounted for only 8% of the overall GDP of the nation, while competing economies such as China had 60% of their GDP due to manufacturing SMEs (Economic Times, 2016).

The lack of resources- such as the lack of knowhow and capital- has been identified as a key hindrance in the growth of Indian manufacturing SMEs (Gaur et al., 2011; Thakkar, Kanda, & Deshmukh, 2012). As alliances improve the competitiveness of SMEs through provision of resources, the insights from the study on the alliance management process will assist in improving the productivity and performance of Indian manufacturing SMEs.

1.4 Objectives of the study

The aim of the study is to specifically address the following objectives:

a. To study and analyze the antecedents of SME alliance formation.

b. To identify and develop a set of measures for analyzing the performance of SME alliances.

c. To study and analyze the antecedents of SME alliance performance.

1.5 Research questions

Based on the research gaps and corresponding objectives, this study aims to seek solutions to the following research questions

a. How do the antecedents at firm-level and environmental-level affect the alliance formation tendencies of SMEs?
b. How do the antecedents affect the alliance-level performance and firm-level performance?

1.6 Scope of the study

This study uses the broad conceptualization of strategic alliance, as it has been adopted in earlier SME alliance studies such as Franco and Haase (2013); Lohrke, Kreiser, and Weaver (2006); Marino, Lohrke, Hill, Weaver, and Tambunan (2008). Similarly, given the definitional variability existing across nations for SMEs, the study focuses on Indian SMEs to obtain consistent insights. As indicated in table 1.1, Indian SMEs are separately defined- depending upon whether it is a manufacturing or a service firm. As manufacturing SMEs generally have a greater need for tangible as well as intangible resource acquisition through alliances (Arend, 2006; Van Gils & Zwart, 2004), only the manufacturing SMEs were considered for the purpose of this study.

1.7 Organization of the thesis

The thesis is organized into seven chapters. This chapter provides a background on alliances and their importance for SMEs, while also identifying the objectives, scope, and need for the study. Chapter 2 outlines how extant research has analyzed the impact of antecedents on alliance formation as well as alliance performance of SMEs, while also identifying how the performance of these alliances has been measured. Chapter 3 provides a discussion on the exploratory case studies conducted to gain a practical understanding of the alliance management process of Indian manufacturing SMEs. The insights from literature review and exploratory case studies are used for developing the conceptual models of the study, which are presented in chapter 4. Methodology adopted for the purpose of the study is discussed in chapter 5. The data analysis and discussion of results is presented in chapter 6. Finally, chapter 7 discusses the implications, limitations, and scope for future research from the study.

CHAPTER 2: LITERATURE REVIEW

This chapter reviews how the alliance management process of SMEs has been studied in the extant literature. Section 2.1 identifies why SMEs form alliances and what antecedents cause variation in their alliance formation patterns. Section 2.2 describes how SME alliance performance has been measured in the extant literature. Section 2.3 then determines the antecedents which cause variation in the performance of SME alliances. Finally, section 2.4 identifies the gaps in literature across these three domains.

2.1 Alliance formation by SMEs

When the resources possessed by a firm are systematically integrated, they provide superior market performance in comparison to rivals (Lin & Wu, 2014; Peteraf, 1993). An SME, however, lacks the tangible and intangible resources as compared to larger firms, due to its small size (Narula, 2004). In terms of tangible resources, SMEs often do not possess the necessary financial capital and physical equipment; while they also find it difficult to develop on their own intangible resources such as brand reputation and specific knowhow (Fernández-Olmos & Ramírez-Alesón, 2017; Stockdale & Standing, 2004). These resources, however, can be accessed and internalized by an SME through alliance formation (Franco & Haase, 2013).

Thus, while resource acquisition remains the broad motive, the objective of an SME in forming a particular alliance depends on the type of resource it requires (Franco & Haase, 2015; Van Gils & Zwart, 2009). Extant literature identifies four broad objectives which drive SMEs to form alliances.

a. Learning new competencies and skills- An SME may not possess the competencies and skills, possessed by a potential partner, acquisition of which may be necessary for achieving competitiveness. For example, the specific technology necessary for developing

a product or improving a process, which is a form of tacit knowledge, can only be accessed and internalized through repeated interactions. Alliances present SMEs with opportunities to acquire such tacit knowledge (Bretherton & Chaston, 2005; Van Gils & Zwart, 2004).

b. Sharing of complementary resources- In certain cases, an SME may possess a resource but lack the associated competencies necessary for fully obtaining value from it. In such situations, partnering with a firm that has the necessary complementary resources can assist in deriving a competitive advantage. For example, small biotechnology firms often have the resources necessary for developing a product but lack the commercialization capability. Thus, they form licensing alliances with established firms, who in turn handle the steps necessary for commercializing the product (Hanna & Walsh, 2008; Rothaermel & Deeds, 2004).

c. Sharing of risks and costs- SMEs often do not possess the resources essential for undertaking full scale activities which can help them in deriving scale benefits, such as setting up manufacturing plants or research and development (R&D) facilities. Thus, they undertake such activities in collaboration with other firms, in order to share the associated risks and costs (Franco & Haase, 2015; Narula, 2004).

d. Gaining access to new markets- Due to their small size and lack of experience, SMEs lack the knowhow essential for entering and operating successfully in foreign markets. Thus, they form alliances to leverage the market knowhow of the partner firm, thereby alleviating risk of foreignness and reducing chances of failure (Lee, Kelley, Lee, & Lee, 2012; Lu & Beamish, 2006).

While these objectives explain the underlying tendency of an SME to form an alliance depending upon the type of resource sought, they do not explain why multiple SMEs may have the same objective yet exhibit differential alliance formation tendencies. Such variations in alliance

formation tendencies can be attributed to the presence or absence of certain antecedents (Keil, 2000; Van Gils & Zwart, 2009).

2.1.1 Review of antecedents of SME alliance formation

Literature review was conducted with the purpose of identifying how the impact of antecedents on alliance formation tendencies has been determined in the extant literature.[5] A total of 13 studies have analyzed the impact of antecedents on SME alliance formation. Broadly, the studies have used two distinct approaches. The first approach, adopted in 10 studies, has been to determine if the SME was engaged in an alliance at the time of data collection. The other approach, followed in 3 studies, focuses on the intention of an SME to form an alliance in the near future, typically within the next year. Table 2.1 classifies the studies depending upon the unit of analysis.

Table 2.1- Classification of studies that have analyzed SME alliance formation

Unit of analysis	Studies
Alliances that had already been established	Blind and Mangelsdorf (2013); Colombo, Grilli, and Piva (2006); Dickson and Weaver (1997), Dickson and Weaver (2011); Eisenhardt and Schoonhoven (1996); Franco and Haase (2013); Mukherjee et al. (2013); Park et al. (2002); Shan, Walker, and Kogut (1994); Steensma, Marino, Weaver, and Dickson (2000)
Future alliance formation intentions	Lohrke et al. (2006); Marino et al. (2008); Ozmel, Reuer, and Gulati (2013)

[5] Pertinent empirical articles from peer-reviewed English journals were identified by searching in ABI/Inform Complete and Business Premier Source databases from the time span of 1985 to 2018. Keywords used for the search process were: strategic alliance, alliance, strategic alliance formation, alliance formation, Small and Medium Enterprise alliance, Small and Medium Enterprise alliance formation, SME alliance, SME alliance formation, startup alliance, startup alliance formation. To make the search process more rigorous, relevant articles from the reference section of the searched articles were also included.

The antecedents studied in the extant literature have been classified into two levels: Environmental-level, where studies have determined how the external environment of a firm influences its alliance formation decisions, and firm-level, wherein the focus has been on understanding how the attributes of a firm primarily determine its alliance formation tendencies (Padula and Dagnino, 2007; Prasad & Prabhudesai, 2018). Table 2.2 specifies how the various antecedents at both levels have been studied in the extant literature.

Table 2.2- Classification of studies that have analyzed antecedents of SME alliance formation

Level	Antecedent	Studies
Firm-level	Alliance experience	Lohrke et al. (2006); Marino et al. (2008)[6]; Park et al. (2002)
	Entrepreneurial orientation	Dickson and Weaver (1997); Franco and Haase (2013); Lohrke et al. (2006)[6]; Marino et al. (2008); Steensma et al. (2000)
	International experience	Blind and Mangelsdorf (2013); Dickson and Weaver (2011)[6]; Marino et al. (2008)[5]
	Firm age	Colombo et al. (2006); Mukherjee et al. (2013)[6]; Park et al. (2002)[6]
	Firm industry	Colombo et al. (2006); Dickson and Weaver (1997); Dickson and Weaver (2011)[6]; Marino et al. (2008)[6]; Steensma et al. (2000)[6]
	Firm performance	Lohrke et al. (2006); Mukherjee et al. (2013)[6]
	Firm size	Blind and Mangelsdorf (2013); Dickson and Weaver (1997)[6]; Dickson and Weaver (2011)[6]; Eisenhardt and Schoonhoven (1996)[6]; Lohrke et al. (2006)[6]; Mukherjee et al. (2013)[6]; Park et al. (2002)[6]; Shan et al. (1994); Steensma et al. (2000)[6]
	Network ties	Eisenhardt and Schoonhoven (1996); Shan et al. (1994)
	Resource profile	Blind and Mangelsdorf (2013); Colombo et al. (2006); Franco and Haase (2013); Marino et al. (2008); Park et al. (2002)
	Venture capital support	Colombo et al. (2006); Ozmel et al. (2013)
Environmental-level	Environmental uncertainty	Dickson and Weaver (1997); Dickson and Weaver (2011)[6]; Eisenhardt and Schoonhoven (1996); Lohrke et al. (2006)[6]; Marino et al. (2008); Mukherjee et al. (2013); Park et al. (2002); Steensma et al. (2000)
	National culture	Lohrke et al. (2006)[6]; Steensma et al. (2000)

[6] The antecedent has been analyzed as a control variable in the study

2.1.1.1 Firm-level antecedents

At firm-level, resource profile and entrepreneurial orientation have been the key antecedents studied, both analyzed in 5 studies each. In terms of resources possessed by a firm, Park et al. (2002) and Franco and Haase (2013) study the broad resource base of a firm- the tangible and intangible resources it possesses, while other studies focus on subtypes such as financial or technological resources. In contrast, though, Entrepreneurial orientation has been analyzed uniformly in all studies, wherein the dimensions of innovativeness, proactiveness, and risk taking have been studied, based on the definition by Covin and Slevin (1989).

Other antecedents such as firm networks, by studying the number of alliances formed by the firm, and venture capital, by determining if there has been an inflow of equity or equity-linked investment for the firm, have been analyzed in relation to startup firms specifically, so as to identify how the associated ties helped them in alliance formation.

Firm demographic variables have also been analyzed, but predominantly as control variables. Size of the firm has been analyzed in 9 studies, either by measuring the number of employees in the firm or its turnover. Industry of the firm has been analyzed 5 times, with 4 studies specifically studying manufacturing SMEs and using standard industrial classification (SIC) codes to categorize industries, while Colombo et al. (2006) study manufacturing as well as service startups and group them into six industries to determine their impact on alliance formation. Age of the firm has been studied 3 times with each study measuring the time elapsed since the inception of the firm to the point of data collection, in order to operationalize the construct.

Similar to demographic antecedents, experience and performance of the firm have also been analyzed majorly as control variables. Experience has been analyzed in 5 studies, either as the firm's alliance experience, by determining whether the firm has had prior experience of alliance formation; or international experience, where studies have focused on the international sales of the

firm. Performance of the firm has been analyzed in 2 studies, with Lohrke et al. (2006) using managerial assessment of satisfaction with firm's performance and Mukherjee et al. (2013) utilizing objective measures in the form of return on assets of the firm.

2.1.1.2 Environmental-level antecedents

8 studies focus on the impact of environmental-level antecedents, but the attention has been specifically focused upon two- environmental uncertainty and national culture.

All 8 studies analyze the impact of environmental uncertainty on alliance formation tendencies of SMEs. Amongst them, 5 studies have analyzed the perceptual dimension of the construct, based upon managerial assessments, as defined by (Miles et al., 1978). From an objective perspective, Eisenhardt and Schoonhoven (1996) and Park et al. (2002) measure the market demand faced by the firms as a proxy for environmental uncertainty. While these 7 studies focus their attention mainly on the competitive dimension of the external environment, Dickson and Weaver (2011) measure the impact of national environment by studying indicators such as GDP and country risk.

The antecedent of national culture has been analyzed in 2 studies and both studies employ Hofstede's cultural dimensions (1980) to study its impact on SME alliance formation.

2.2 Alliance performance measurement

Alliance performance has been studied extensively in the extant literature, yet, due to the diverse approaches used for measurement, the concept has not been clearly defined (Fang, Lee, Palmatier, & Guo, 2016; Krishnan, Martin, & Noorderhaven, 2006). Das and Teng (2003) define alliance performance as the extent to which the goals set by both partners have been achieved. However, the definition does not encompass all the approaches used for alliance performance measurement in extant literature. Thus, Ariño (2003) attempts to define alliance performance construct based

upon the three layered circumscribed conceptualization of organizational performance measurement, provided by Venkatraman and Ramanujam (1986).

The narrowest level in the model pertains to measuring the financial performance of the alliance. Indicators such as return on assets (RoA), return on equity (RoE), sales growth, and various ratios are used for assessing the performance of an alliance at this level. However, financial conceptualization is more suited for equity alliance performance measurement, and more so, due to its inability to convey the extent to which strategic objectives have been achieved, it carries limited applicability (Christoffersen et al., 2014). The next layer, intending to provide a broader perspective, measures the operational performance of an alliance by determining its stability, which is assumed to be a proxy for actual performance of the alliance. Thus, stability measures assume that longer the alliance runs, or if there are no contractual changes, partners are satisfied with the performance of the alliance. However, it has been observed that alliances which are terminated early are not necessarily unsuccessful, given that the alliance might have already achieved the results expected by both partners. Similarly, contractual changes may be necessitated due to occurrence of contingency situations and are not related to alliance performance. Stability measures, thus, do not convey the correct implications across all cases of alliance performance measurement (Christoffersen et al., 2014; Das & Teng, 2000). The broadest level of the model- organizational effectiveness measures- eliminates the pitfalls of the other two conceptualizations as it specifically seeks to measure the extent to which the goals of the alliance have been achieved using the perceptions of the key stakeholders involved (Musarra, Robson, & Katsikeas, 2016).

While the broad model of alliance performance measurement given by Ariño (2003) provides an exploratory perspective, Christofferson et al. (2014) devise a more detailed conceptualization of the construct, based on their review of 167 studies. As compared to the single dimension with

multi-layered conceptualization suggested by Ariño (2003), they provide three distinct dimensions of alliance performance measurement, namely type, level, and domain.

While Ariño (2003) classifies the alliance performance measures into three distinct typologies, Christofferson et al. (2014) classify them into four types listed below.

a. Accounting- Alliance performance, when measured using this typology, is determined using objective indicators such as ratios and growth percentages. The typology is the same as financial level in the conceptualization provided by Arino (2004).
b. Cumulative abnormal return (CAR) - Uses the reaction of shareholders to the formation of alliances as a proxy for alliance performance.
c. Stability- The measure determines if any contractual changes or alliance termination has occurred, in order to determine the performance, similar to operational level in the model provided by Arino (2004).
d. Subjective- Relies on managerial assessments to determine the performance of the alliance, similar to organizational effectiveness measures conceptualized by Arino (2004).

While type identifies how the performance is being measured, level determines the specific aspect of alliance performance that is being studied- whether it is the performance of the firm or the performance of the alliance that is under consideration.

Domain further determines the facet of alliance performance that is being studied at a particular level- whether it is the financial performance, operational performance, or the overall performance.

Based on the three-tiered conceptualization, Christofferson et al. (2014) state that researchers must frame their hypotheses in accordance with the level and domain of performance they seek to measure. After accordingly specifying the hypotheses, pertinent typology can be chosen, which can accurately capture the performance characteristics of the particular level and domain. For

example, they find that certain studies analyzed overall alliance-level performance using stability measure, while the measure actually captures overall firm-level performance. They refer to this as construct mismatch and state that erroneous results can be obtained when such mismatches occur. Furthermore, they call for researchers to study alliance performance using the three-tiered model provided by them, so as to obtain consistent and reliable insights.

2.2.1 Review of SME alliance performance measurement

Review of the extant literature was conducted to identify how performance of SME alliances has been measured in the extant literature.[7] A total of 42 studies have used specific type of measures for determining the performance of SME alliances. Amongst them, 31 studies use subjective measures, 12 studies use accounting measures, and 2 studies use stability measures.[8] Depending on the level at which the performance of the alliance was analyzed, table 2.3 provides classification of these studies.

[7] Pertinent empirical articles from peer-reviewed English journals were identified by searching in ABI/Inform Complete and Business Premier Source databases from the time span of 1985 to 2018. Keywords used for the search process were: strategic alliance performance, alliance performance, Small and Medium Enterprise alliance performance, SME alliance performance, joint venture performance, joint venture outcomes, JV performance, JV outcomes, startup alliance performance. To make the search process more rigorous, relevant articles from the reference section of the searched articles were also included.

[8] Lu and Beamish (2006) and Shamehr et al. (2015) use multiple typologies to study SME alliance performance.

Table 2.3- Classification of studies that have analyzed the performance of SME alliances

Level	Studies
Alliance-level	Argente-Linares, López-Pérez, and Rodríguez-Ariza (2013); Delerue and Perez, (2009); Downe, Loke, and Sambasivan (2012); Flatten, Greve, and Brettel (2011); Gao, Yang, Yin, and Ma (2017); Lu and Beamish (2006); Lyles and Baird (1994); Pansiri (2008); Perry, Sengupta, and Krapfel (2004); Pittino and Mazzurana (2013); Schumacher (2006); Şengün and Wasti (2011); Shakeri and Radfar (2015); Swoboda, Meierer, Foscht, and Morschett (2011); Vasudevan, Gaur, and Shinde (2006); Wah and Meng (2011); Weaver and Dickson (1998)
Firm-level	Baum, Calabrese, and Silverman (2000); Baum and Silverman (2004); Bojica and Fuentes (2012); Brouthers, Nakos, and Dimitratos (2015); Chang (2004); Colombo, Grilli, Murtinu, Piscitello, and Piva (2009); Fink and Harms (2012); Fink, Harms, and Kraus (2008); Flatten, Greve, and Brettel (2011); Gaur et al. (2011); Gómez-Miranda, Pérez-López, Argente-Linares, & Rodríguez-Ariza (2015); Kenny and Fahy (2011); Kim (2016); Lee (2007); Morris, Koçak, and Özer (2007); Nakos and Brouthers (2008); Pangarkar and Wu (2013); Pansiri (2008); Parida, Patel, Wincent, and Kohtamäki (2016); Stuart (2000); Stuart, Hoang, and Hybels (1999); Tajeddini, Elg, and Ghauri (2015); Talebi, Rezazadeh, and Najmabadi (2015); Wahyudi (2014); Wincent (2005); Yoo et al. (2016); Yoon, Lee, and Song (2015)

For measuring alliance-level performance, subjective measures were extensively used. Amongst the 17 studies that have analyzed alliance performance at this level, 16 use subjective measures, with stability and accounting measures used by only one study each.

However, for measuring firm-level performance, 11 studies out of 27 use accounting measures, while 17 use subjective measures. Stability measures, however, were only used once.

2.3 Review of antecedents of SME alliance performance

The performance outcomes of SME alliances have been identified to be contingent on certain antecedents (Christofferson, 2013; Talebi et al., 2015). However, Prabhudesai and Prasad (2017)

find that mixed results have been obtained in the extant literature as studies have not acknowledged the differences between the two levels of alliance performance while studying the impact of antecedents.

Extant literature was reviewed to determine how the impact of antecedents on SME alliance performance has been analyzed.[9] A total of 47 studies have analyzed the impact of antecedents on SME alliance performance. Table 2.4 provides the classification of studies based on the level of SME alliance performance at which the impact of antecedents has been analyzed.

[9] Pertinent empirical articles from peer-reviewed English journals were identified by searching in ABI/Inform Complete and Business Premier Source databases from the time span of 1985 to 2018. Keywords used for the search process were: determinants of alliance performance, antecedents of alliance performance, determinants of SME alliance performance, antecedents of SME alliance performance, drivers of alliance performance, drivers of SME alliance performance, drivers of joint venture performance, determinants of joint venture performance, antecedents of joint venture performance, antecedents of SME joint venture performance. To make the search process more rigorous, relevant articles from the reference section of the searched articles were also included.

Table 2.4- Classification of studies that have analyzed the impact of antecedents on SME alliance performance

Level	Antecedents	Studies
Alliance-level	Commitment	Delerue and Perez (2009); Pansiri (2008); Sherer (2003); Vasudevan et al. (2006)
	Communication	Delerue and Perez (2009); Downe et al. (2012); Wah and Meng (2011)
	Conflict	Delerue and Perez (2009); Dickson and Weaver (1997)
	Control mechanisms	Pansiri (2008); Pittino and Mazzurana (2013)
	Control scope	Argente-Linares et al. (2013); Lyles and Baird (1994)
	Cultural fit	Gao et al. (2017); Pansiri (2008); Swoboda et al. (2011)
	Opportunistic behavior	Dickson and Weaver (1998); Sengun and Wasti (2011); Shakeri and Radfar (2015); Wah and Meng (2011)
	Resource fit	Downe et al. (2012); Gao et al. (2017); Hoffmann & Schlosser (2001); Shakeri and Radfar (2015)
	Strategic fit	Argente-Linares et al. (2013); Gao et al. (2017); Hoffmann and Schloser (2001); Pansiri (2008); Shakeri and Radfar (2015); Swoboda et al. (2011); Volery & Mensik (1998); Wah and Meng (2011)
	Trust	Delerue and Perez (2009); Dickson and Weaver (1997); Downe et al. (2012); Hoffmann and Schlosser (2001); Hyder and Abraha (2004); Kirby and Kaiser (2003); Pansiri (2008); Schumacher (2006); Şengün and Wasti (2011); Sherer (2003); Volery and Mensik (1998); Wah and Meng (2011)
Firm-level	Absorptive capacity	Bojica and Fuentes (2012); Flatten et al. (2011); Hyder and Abraha (2004); Kim (2016); Lee (2007); Yoo et al. (2016)
	Alliance network size	Baum and Silverman (2004); Baum et al. (2000); Chang (2004); Colombo et al. (2009); Pangarkar and Wu (2013); Yoon et al. (2015)
	Commitment	Nakos and Brouthers (2008); Fink et al. (2008); Morris et al. (2007); Pansiri (2008); Wahyudi (2014); Yoo et al. (2016)
	Communication	Hyder and Abraha (2004); Lee (2007); Fink et al. (2008); Kenny and Fahy (2011); Fink and Harms (2012); Wahyudi (2014); Yoo et al. (2016)
	Conflict	Shakeri and Radfar (2015); Wahyudi (2014)
	Cultural fit	Pansiri (2007); Gao et al. (2017)
	Entrepreneurial orientation	Wincent (2005); Bojica and Fuentes (2012); Brouthers et al. (2015); Tajeddini et al. (2015); Talebi et al. (2015)
	Resource diversity	Baum and Silverman (2004); Pangarkar and Wu (2013); Parida et al. (2016); Yoon et al. (2015);
	Resource fit	Lee (2007); Kenny and Fahy (2011); Gao et al. (2017)
	Strategic fit	Wahyudi (2014); Gao et al. (2017)
	Trust	Gaur et al. (2011); Lee (2007); Morris et al. (2007); Pansiri (2007); Wahyudi (2014); Yoo et al. (2016)

2.3.1 Behavioral fit

Behavioral fit, the extent to which there is harmonization of relations between partners (Robson et al., 2006), has been analyzed in 25 studies, most amongst all antecedents. While only three studies analyze it as a single construct, others have chosen to study the specific component antecedents- trust, commitment, communication and conflict, which determine the behavioral fit between partners.

Trust has been studied most number of times amongst the constructs of behavioral fit, with its impact analyzed at both levels of SME alliance performance in 18 studies. While certain studies, such as Delerue and Perez (2009); Hoffmann and Schlosser (2001); Volery and Mensik (1998) use single-item measures to analyze the construct, others take a more specific approach by trying to determine whether the partner has the intention, and if it possesses the required competence, to make the alliance successful. The impact of the construct has been analyzed more on the alliance-level performance as compared to firm-level performance.

Communication between partners has been analyzed in 10 studies, where the focus has been primarily on the quality of information exchanged by partners. However, as opposed to trust, the influence of the construct has been analyzed more on firm-level performance as compared to alliance-level performance.

Commitment has been analyzed in 9 studies and researchers have focused specifically on determining if the partners undertake maximum efforts, through relational and resource exchanges, at making the alliance a success. Similar to communication, the impact of the construct has been analyzed more at firm-level compared to alliance-level.

Conflict between partners has been analyzed 4 times and its study has been equally distributed across both levels. Two studies each have tried to determine the conflict levels between partners and the mechanisms undertaken to resolve these conflicts.

2.3.2 Organizational fit

Similar to behavioral fit, the impact of organizational fit has been analyzed 10 times in total at both levels. Studies have focused on the extent to which partners are congruent in terms of their cultures, resources, and strategies to determine the impact on SME alliance performance. A composite approach has been undertaken in 5 studies, while 5 studies analyze the specific antecedents which make up the construct.

Strategic fit has been analyzed in 8 studies, of which 6 studies determine the extent to which goals and objectives of the partnering firms are congruent. Swoboda et al. (2011) analyze, in addition to goal congruence, other dimensions such as alignment in quality understanding, value creation, and innovation; while Gao et al. (2017) determine the similarity in geographic markets served and services offered by the SME and its partners to determine the strategic fit.

Resource fit has been studied in 6 studies, of which 5 studies have tried to measure how resources contributed by all alliance partners help in achieving desired outcomes. However, Lee (2007) focuses only on the contribution of the alliance partner, by determining the intangible resources contributed by them and the corresponding impact on the performance of SMEs.

Cultural fit has been analyzed in 3 studies and different approaches have been used to operationalize the construct. While Pansiri (2008) uses a single-item measure, Swoboda et al. (2011) aim to determine the congruence in ethical values, risk orientation, and management styles, with Gao et al. (2017) analyzing the construct by understanding the congruence between organizational cultures and operating styles of the partners.

2.3.3 Alliance network characteristics

The alliance network characteristics have been analyzed in 8 studies, in determining their impact on firm-level performance. 7 studies specifically focus on startup firms with only Parida et al. (2016) employing a small firm sample. Studies have either focused on the size of alliance network or the resource diversity of the network.

Size of the alliance network has been studied 6 times and has been measured by determining the number of alliance partners of the firm. Similarly, resource diversity has been analyzed in 4 studies by identifying the functional diversity of partner firms. To calculate the diversity, studies have either used Herzfindahl index or logarithmic transformations.

2.3.4 Absorptive capacity

Influence of absorptive capacity (ACAP) has been analyzed 6 times on firm-level performance. While four dimensions of ACAP have been identified in extant literature- acquisition, assimilation, transformation, and exploitation of knowledge (Todorova & Durisin, 2007), only two studies measure ACAP based on all four dimensions. Other four studies utilize generic measures to study the construct.

2.3.5 Entrepreneurial orientation

Entrepreneurial orientation has also been studied 5 times in its impact on firm-level performance. In order to determine the influence of the construct, four studies measure the three dimensions of innovativeness, proactiveness, and risk taking as defined by Covin and Slevin (1989). Bojica and Fuentes (2012) however, only analyze the impact of innovation dimension.

2.3.6 Opportunistic behavior

Opportunistic behavior, a construct which carries idiosyncratic significance for alliances of SMEs, since they do not often possess resources necessary for enforcing contracts (Dickson, Weaver, &

Hoy, 2006; Zhao, 2014), has been studied 4 times in the extant literature in determining its impact on alliance-level performance. As compared to the other behavioral constructs, however, it has been measured in a partner-specific manner- by determining if the partner puts selfish gains ahead of alliance interests.[10]

2.3.7 Partner reputation

Partner reputation has been analyzed in three studies with respect to its impact on the performance of the SME. While Stuart et al. (1999) operationalize reputation of firms which are alliance partners of SMEs based on the technological and commercial resources they possess, Stuart (2000) only uses technological resource as a proxy for partner reputation. Chang (2004) however, constructs an index to determine partner firm reputation, based on the number of venture capital investments made by partner firms and the IPOs attained by these invested firms.

2.3.8 Control mechanisms and scope

Control mechanisms and scope have each been studied twice to determine their impact on alliance-level performance.

In terms of control mechanisms, Nakos and Brouthers (2008) study specifically the impact of contractual controls in international strategic alliances, while Pansiri (2008) utilizes both contractual as well as relational controls for a general typology of alliances.

Control scope, on the other hand, has only been studied in the context of international joint ventures. Lyles and Baird (1994) determine that dominant decision making authority by foreign partner results in positive performance while Argente-Linares et al. (2013) find that dominant control by any partner- be it local or foreign- is linked to improved alliance performance.

[10] Opportunistic behavior was not considered as a component of behavioral fit as it has been analyzed in a partner-specific manner, while the behavioral fit antecedents focus on the interpartner dynamics (Christofferson, 2013; Prabhudesai & Prasad, 2017).

2.4 Gaps in research

While studies have analyzed the firm-level and environmental-level antecedents in determining their impact on SME alliance formation, rarely have these two perspectives been combined to provide an integrated perspective on alliance formation of SMEs. Though Park et al. (2002) manage to combine the two antecedents of firm resources and environmental uncertainty to provide a holistic view, they do so specifically for the semiconductor industry startups and caution researchers against generalizing the results of their study. Furthermore, they call for researchers to determine how firm-level and environmental-level antecedents jointly determine the alliance formation tendencies of SMEs. Thus, a theoretical understanding on how the firm-level and environmental-level antecedents holistically affect SME alliance formation tendencies, remains missing in the extant literature.

In terms of SME alliance performance, researchers have measured the construct by conceptualizing it as unidimensional, while recent research calls for approaching it from a multidimensional perspective (Christofferson et al., 2014; Prabhudesai & Prasad, 2017). Specifically, type, domain, and mode of SME alliance performance need to be understood while measuring the construct, so that reliable insights can be obtained.

The impact of antecedents on SME alliance performance is similarly unclear as researchers have either not analyzed them in an integrated manner, or the multi-level concept of SME alliance performance has not been acknowledged (Prabhudesai & Prasad, 2017). Thus, the exact impact of the various antecedents hitherto studied in the extant literature at both levels is not yet understood.

From the perspective of Indian manufacturing SMEs, which are idiosyncratically defined, only Vasudevan et al. (2006) have studied the impact of behavioral antecedents on alliance-level performance. However, holistic insights on the formation and performance outcomes of their

alliances remain missing in the extant literature. Specifically, the antecedents which cause Indian manufacturing SMEs to form alliances, how the performance of their alliances is analyzed, and antecedents causing variation in performance of their alliances, has not been understood.

CHAPTER 3: EXPLORATORY CASE STUDY

This chapter analyzes the exploratory case studies conducted on the alliances of four Indian manufacturing SMEs. Section 3.1 describes the purpose and methodology behind conducting the case studies, while section 3.2 provides details of the firms and their alliances. Finally, section 3.3 describes the cross-case analysis- why the alliances were formed, how the performance was measured, and what caused variation in alliance performance.

3.1 Purpose and methodology of case study

As the alliance management process of Indian manufacturing SMEs has not been explored in the extant literature, there was a need to gain insights on how they manage their alliances. Thus, it was considered necessary to conduct an exploratory study for obtaining answers to the following research questions

a. How and why do Indian manufacturing SMEs form strategic alliances?
b. How is the performance of alliances formed by Indian manufacturing SMEs measured?
c. What determines the performance of alliances formed by Indian manufacturing SMEs?

Yin (2009) states that if researchers aim to determine why or how a particular phenomenon takes place, case study or experimental design methods can be used to seek appropriate answers. However, experimental design is recommended in studies where researchers can control for the extraneous variables and focus specifically on the variables of interest. As that was not possible, case study methodology was utilized to gain a practical understanding on the alliance management process of Indian manufacturing SMEs.

A single-case design must be adopted if the phenomenon being studied is rare or unique. Otherwise, multiple-case design must be used as results can be compared across cases to improve the validity of the study (Dana & Dana, 2005; Herriott & Firestone, 1983). Thus, multiple case-

design was adopted. Open-ended questions were then drafted based on the research questions of the study (Willis, 2007). A case-study protocol was subsequently developed, which contained information on the procedure for data collection (Tellis, 1997).

Cases must be selected such that replication logic can be achieved (Yin, 2009). Accordingly, four SMEs were eventually selected, all from the Indian manufacturing sector. However, it was ensured that the selected firms exhibited differences, not only in terms of size and industry, but even in the type and scope of their alliances. Key respondents in each of the four SMEs, responsible for taking alliance related decisions were approached to participate in the study and their consent was obtained. Interviews were subsequently conducted with the key respondent from each SME in the month of November 2015. The duration of each interview varied from one to five hours. As respondents asked for maintaining anonymity, dummy names have been used for identifying the firms and their alliance partners. Details of the firms and their alliances are provided in table 3.1.

Table 3.1- Details of the case study firms and their alliances

	Number of employees	**Type of alliance formed**	**Designation of the respondent**	**Still in operation?**	**Area of operations of the strategic alliance**	**Number of alliances formed**	**Number of partners**
Firm A	44	Joint Venture	Managing Director	Yes	Storage solutions	1	1
Firm B	300 permanent employees	Joint Venture	Business Development Manager	Yes	Oral care products	1	2
Firm C	100	Joint Venture	Managing Director	No	Furniture solutions	1	1
Firm D	25	Bilateral contractual alliance	Engineering Manager	Yes	Electrical solutions	3	3

A case study database was developed containing the responses of the respondents. Wherever possible, these responses were cross-checked with additional documents, to which access was provided or were available on the internet, so as to achieve data triangulation. Individual cases were then prepared and sent back to the respondents for checking their validity (Baškarada, 2014). All four respondents reverted with their feedback and their comments were incorporated for revising the cases. Based on these final cases, cross-case analysis was conducted and final case study report was prepared. The entire methodological process is depicted in figure 3.1.

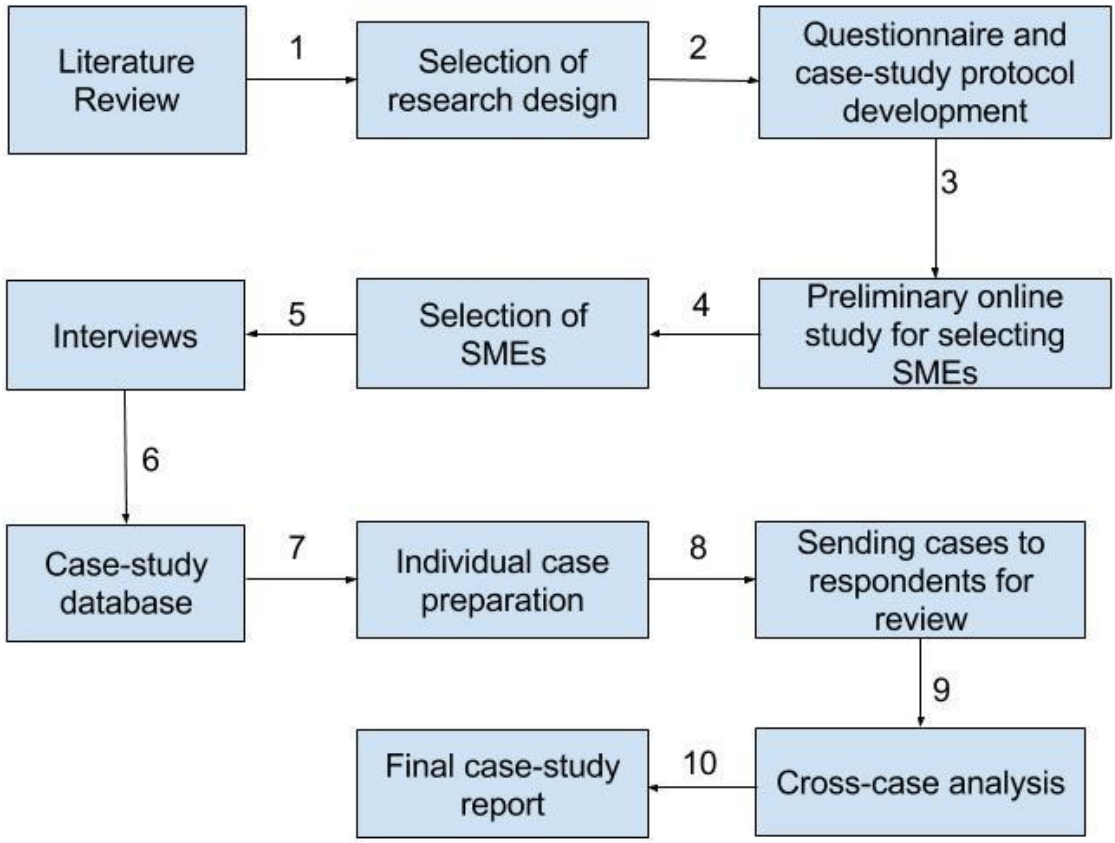

Figure 3.1- Methodological process of the case study

3.2 Details of the firms and their alliances

3.2.1 Firm A

Firm A, involved in the business of providing storage solutions, formed a joint venture in the year 2004 in order to gain access to the rotational molding technology, which its management considered essential for long-term profitability in the marketplace. The objective of the joint venture was to provide rotational molding technology based products in the Indian subcontinent.

The alliance has received the ISO 9000:2008 certification for excellence in quality and it caters to multiple local as well as foreign firms. Production occurs at the two manufacturing facilities under

the eyes of firm A, while technological, financial, and marketing support is provided by the partner firm.

3.2.2 Firm B

Firm B had a diversified business and was known to partner with foreign firms in order to manufacture their products in India. In the year 1993, while on a foreign trip, chairman of the firm came to know about the toothbrushes manufactured by partner M. He approached the top management team of partner M and proposed the establishment of a manufacturing unit in India for producing the toothbrushes. Subsequently, a joint venture was formed in the same year. Three years later, partner N, also specializing in toothbrush production, wanted to setup manufacturing facility in India. It joined the alliance as a third partner, with firm B holding a 50% stake and both partner firms having 25% stake each. In 2011, partner M exited the venture. Firm B now holds 51% stake while partner N holds 49% in the joint venture.

Firm B oversees the manufacturing aspect while technological and marketing activities are overseen by partner N. The joint venture has now bagged certifications such as BRC Grade A, ISO 9001:2008, and SA 9001:2008, with over 100 million toothbrushes annually produced and exported to more than 40 countries.

3.2.3 Firm C

Firm C is a furniture manufacturer and operates in the local market. At a trade fair organized in the year 2007, the managing director of the firm met a top management team member of the partner firm, which specialized in producing metal components for furniture. Subsequently, firm C and partner firm established a joint venture for producing furniture solutions in India. The manufacturing process was handled by firm C while the partner firm provided the necessary metal component knowhow and sold the products in foreign markets. The alliance was in operation for

a year, after which it had to be closed down. Prior specification of contractual clause enabled firm C to acquire control of the joint venture.

3.2.4 Firm D

Firm D is in the business of providing electrical solutions to local clients. In the year 2005, it established a strategic alliance with partner X as a channel partner, wherein it would provide value-added services using the products of partner X. Firm D gained visibility in the marketplace owing to the collaboration and was soon approached by firm Y to become its channel partner for automation equipment. A strategic alliance was subsequently established. Firm D formed an alliance as a channel partner with firm Z as well to provide automation services.

Today, firm D supplies original equipment manufacturer (OEM) parts such as switchgears manufactured by partner X. With partner Y, the company provides project services using automation OEM components such as programmable logic controllers (PLCs). Similarly, it provides motors and controllers of partner Z, while also delivering project solutions. While the firm provides OEM equipment for all three firms, it provides collaborative services only with partners Y and Z. Depending on the need of the clients, firm D uses the appropriate products of partners Y and Z for providing solutions.

3.3 Cross-case analysis

3.3.1 Antecedents of alliance formation

Across the alliances of all four firms, the primary motive of partners was to seek access to resources that were complementary to those possessed by them, whereby joint value could be created. Similarly, the SMEs pro-actively sought to acquire these resources, in order to stay competitive in the long run.

3.3.1.1 Resource complementarity

A firm forms an alliance in order to acquire resources, which when combined with those it already possesses, can create a competitive advantage in the marketplace (Das & Teng, 2000).

Firm A's management was looking to provide superior quality storage solutions but did not possess the latest technology necessary for doing so, which the partner firm had. The partner firm was looking to tap onto a big geographic market such as India, for its proprietary technology.

The foreign partners of firm B were similarly looking to sell their products in the Indian market but lacked the necessary market knowhow for making a greenfield investment. While firm B had the manufacturing experience through the prior joint ventures it had formed, it lacked the technology and reputation necessary for manufacturing the toothbrushes on its own.

Firm C wanted to broaden its product portfolio by learning about metal component manufacturing techniques and also increase its market presence by expanding into foreign markets. The foreign partner, on the other hand, could leverage on the core furniture competence of firm C and also the low cost manufacturing facilities in India.

In case of firm D, while it did produce certain electrical components, the products lacked the necessary reputation in the marketplace for competing with those sold by partner firms. Thus, by allying with them, not only could it become an exclusive area distributor of OEM components produced by partner firms, there was also the potential for leveraging on the technical competence of partners to deliver complex electrical solutions, which firm D could not have achieved on its own. For partner firms, firm D serves as their extended arm in the market for selling OEM parts and providing integrated solutions.

3.3.1.2 Entrepreneurial orientation

Lumpkin & Dess (2001) find that entrepreneurial firms seek to pro-actively acquire the resources necessary for achieving a competitive advantage in the marketplace. Such SMEs tend to spot opportunities and seek to capitalize on them through alliance formation (Brouthers et al., 2015).

The managing director of firm A recognized the importance of rotational molding technology ahead of competitors and sought to establish an alliance with a partner which had the necessary technology. Similarly, firm B's chairman had consistently spotted opportunities to partner with reputed foreign brands, in order to manufacture their products in India- from bandages to toothbrushes. Firm C's managing director similarly recognized the potential for learning new skills and accessing foreign markets through alliance formation, factors which would result in improved profits for the firm in the long-term. Firm D, in the year 2007, undertook a risky option of shifting to provision of automation services instead of its traditional focus on manufacturing electrical components. By allying with reputed firms which had the necessary competence to provide assistance in this segment, it emerged as the only firm in the local market which currently provides automation services.

3.3.2 Alliance performance measurement

Glaister & Buckley (1998) state that subjective measures provide a more accurate estimate of alliance performance as compared to other measures. Support was found for this assertion across the cases of all four firms as the respondents' assessments indicated that the other alliance performance measures did not adequately capture the collaborative outcomes for which alliances were formed.

Respondent of firm D rated alliances with partners Y and Z as highly successful, while that with partner X as mildly successful, despite there being little difference in the financial outcomes of all three alliances. Elaborating his reasons behind choosing alliances with partners Y and Z as more

successful, the respondent stated that partnerships with these firms were focused upon collaborative projects which took years to get initiated and commissioned; hence, financial audit would not be able to provide an accurate estimate of performance. On the other hand, he felt that alliance with partner X was strictly based on the sale of OEM components, and as such, its performance could be evaluated using the financial criterion.

Similarly, firm B's alliance with partner N has been highly successful financially, having made a profit of over 100 million rupees in the financial year of 2015-16. However, respondent of the firm was cautious against using financial indicators to evaluate the performance of the alliance. For a particular year, the sales had dropped and financial performance had been poor, yet, both partners were happy with the performance of the alliance as the fluctuation was caused by extraneous events beyond their control.

It was also found that the firm-level performance- performance of the firm due to alliance participation- is independent of alliance-level performance. Respondent of firm A considered the alliance of his firm a success, despite the joint venture not achieving its initial stated objective of becoming a leading rotational technology based product supplier in India. The reason provided was that access to latest technology was obtained by firm A, which enabled it to provide superior quality products to clients.

The alliance of firm C had also not achieved the financial returns expected of it by both partners. However, it fulfilled the specific objectives for firm C- gaining marketing and technological knowhow. Firm D has, similarly, learnt more from its alliances with partners Y and Z, which were identified as successful, and has therefore been able to expand its reach in the market.

Stability has also been proposed as a measure of alliance performance (Ariño, 2003). Inkpen and Beamish (1997) define stability as a change in relationship that was unplanned from one or more

partners' perspectives. The definition encompasses two components- process orientation, which studies the contractual changes that might be introduced once the alliance has started functioning, and outcome orientation, wherein the continuation or termination of the alliance is analyzed (Jiang, Li, & Gao, 2008). Earlier studies such as Harrigan (1988); Killing (1988) found that alliances that were highly successful from subjective or financial perspectives were those in which contractual changes were not made or which were not terminated. However, the stability-performance correlation was found to be non-uniform in subsequent studies (Yan & Zeng, 1999). Explaining the mixed findings in the literature, Christofferson et al. (2014) state that stability is contingent on the benefits derived by partner firms from the alliance.

The alliance of firm A has continued for over 13 years, despite not achieving the intended financial or strategic objectives. The continuation has been due to both firms needing each other's resources. Firm C's alliance, on the other hand, had been terminated and yet considered successful as the firm had fulfilled its objective behind alliance formation.

Similarly, from a process-oriented perspective, the alliance of firm B has undergone major contractual restructuring, as partner M exited the venture in the year 2011. This occurred as partner M was not obtaining sufficient profits from the alliance (0.5% of the total sales were through selling partner M's products).

3.3.3 Antecedents of alliance performance

It was observed that the behavioral fit between partners, namely trust, commitment, and communication, explained the differences in the performance outcomes of alliances of all four firms.

3.3.3.1 Trust

In case of firm A, while the alliance has been functioning for more than 13 years, absence of trust has hindered the achievement of objectives. Respondent of firm A stated that ex-ante promises made by the partner- such as overseas marketing of the manufactured products- had not been fulfilled.

In case of firm B, however, as partners have delivered on what was expected, it has led to fostering of trust in each other's ability. Today, firm B and partner N implicitly rely on each other to perform in order to attain alliance objectives. Thus, the joint venture has achieved the initial goals set by both partners- that of achieving sales penetration in the Indian market, and now exports to other countries.

The joint venture of firm C and its partner similarly did extremely well for the time period in which it operated as both partners delivered on what they had promised- manufacturing capability by firm C and marketing as well as technological support by the partner firm.

Talking about the alliances with partners Y and Z, which are considered highly successful, respondent of firm D cited trust in partners' intentions and ability as the drivers of performance. Both partner firms provide firm D with the necessary technical support essential for undertaking complex projects.

3.3.3.2 Commitment

In the alliance of firm A, the partner firm has not given the necessary importance to the alliance, thereby creating an isolated working environment. For example, when the joint venture had to recently pay a penalty, partner firm refused to cooperate and firm A had to incur the entire cost. Thus, both partners work separately on completing their activities rather than assisting each other.

However, in case of firm B, partner N has ensured that the alliance receives its maximum attention by not maintaining any other joint ventures. Partner N also undertakes periodic training of firm B's personnel at its headquarters and conducts quality control audits so as to ensure that the product quality is maintained. When the production efficiency had gone down due to labor related issues at the production facility, partner N chose to stand by firm B and the venture subsequently was able to achieve prior production levels.

3.3.3.3 Communication

Firm A and its partner communicate very little- once a month, and only the progress made by each side or significant updates to be conveyed are discussed. However, alliances of firm B and D, which have achieved the initial objectives, involve communication on a daily basis, wherein strategic and technical details are discussed.

CHAPTER 4: CONCEPTUAL MODEL

Based on the literature review and exploratory case studies, this chapter builds the conceptual model for the purpose of the study. Section 4.1 specifies the conceptual model for the impact of antecedents on SME alliance formation, while section 4.2 provides the conceptual model for determining the impact of antecedents on SME alliance performance.

4.1 Antecedents of SME alliance formation

Resources have been defined as tangible or intangible factors which can contribute to the economic benefit of a firm (Bretherton & Chaston, 2005; Wernerfelt, 1984). Specifically, six types of resources have been identified- physical, financial, reputational, technological, human, and organizational. These resources must be systematically combined by a firm to derive a competitive advantage (Grant, 2013).

SMEs, however, rarely possess all the resources necessary for deriving a competitive advantage and depend on alliances for acquiring them (Eisenhardt & Schoonhoven, 1996; Franco & Haase, 2013). While SMEs seek to acquire the necessary resources through alliance formation, they must also provide resources which are valuable to potential partner firms (Park et al., 2002). Thus, SMEs which lack resources will not be able to form alliances, while those which possess resources will be considered attractive alliance partners (Observed in cases A, B, C, D). Based on this, it can be hypothesized that

Hypothesis 1: Greater the resources possessed by an SME, greater will be its alliance formation tendency.

SMEs that are entrepreneurial in nature tend to opt for novel and unconventional strategic choices for maintaining their competitiveness in the long run (Brouthers, et al., 2015; Swoboda et al., 2011). This entrepreneurial orientation of an SME is defined in terms of three dimensions-

innovativeness, pro-activeness, and risk-taking. While innovativeness determines the ability of the firm to engage in activities which can give rise to value creating products or services, pro-activeness analyzes the extent to which the firm identifies and exploits opportunities in the external environment, with risk-taking dimension focusing on the ability to make choices involving uncertain outcomes and large payoffs (Covin & Slevin, 1989; Rauch, Wiklund, Lumpkin, & Frese, 2009).

SMEs with higher entrepreneurial orientation, due to their innovative, pro-active, and risk-taking abilities, seek to aggressively acquire resources through alliance formation in order to remain competitive in the marketplace (Observed in cases A, B, C, D). Thus, the following hypothesis can be postulated

Hypothesis 2: Greater the entrepreneurial orientation of an SME, greater will be its alliance formation tendency.

While resources possessed by a firm and its entrepreneurial orientation are the firm-specific drivers, they do not determine strategic responses of an SME by themselves (Franco & Haase, 2013; Van Gils & Zwart, 2009). Given the limited resources SMEs have for assessing and forecasting the impact of changes in the external environment, it also affects their strategic choices. When SME managers cannot accurately forecast the possible outcomes of their strategic decisions, referred to as perceived environmental uncertainty, they seek to share the associated risks with alliance partners. In situations when the perceived environmental uncertainty is seemingly high, SME managers seek to reduce the risks associated with explorative or exploitative activities undertaken by them through alliance formation with other firms. Thus, the tendency to form alliances will be greater when the environmental uncertainty perceived by the managers of an SME will be higher (Dickson & Weaver, 1997; Milliken, 1987; Mukherjee et al., 2013).

In order to combat an uncertain environment, SMEs possessing resources can combine them with those of other firms through alliance formation (Steensma et al., 2000). For example, SMEs having slack resources at their disposal were found to exhibit greater alliance formation tendencies in uncertain environments as such unused resources can be deployed more easily for combating uncertainty (Marino et al., 2008). Thus, it can be hypothesized that

Hypothesis 3: Perceived environmental uncertainty will positively moderate the relationship between resources possessed by an SME and its alliance formation tendency.

Similarly, as an uncertain environment increases transaction costs associated with alliance formation, conservative SMEs tend to internalize activities due to heightened risk of partner opportunism. However, given that resources are needed for combating uncertainty, entrepreneurial SMEs tend to frame the volatility in positive light and seek opportunities in such circumstances (Marino et al., 2008; Palich & Bagby, 1995). Thus, it can be theorized that entrepreneurial SMEs will exhibit a greater tendency to form alliances when the perceived environmental uncertainty is higher.

Hypothesis 4: Environmental uncertainty will positively moderate the relationship between entrepreneurial orientation of an SME and its alliance formation tendency.

The conceptual framework depicting the impact of antecedents on SME alliance formation is provided in figure 4.1.

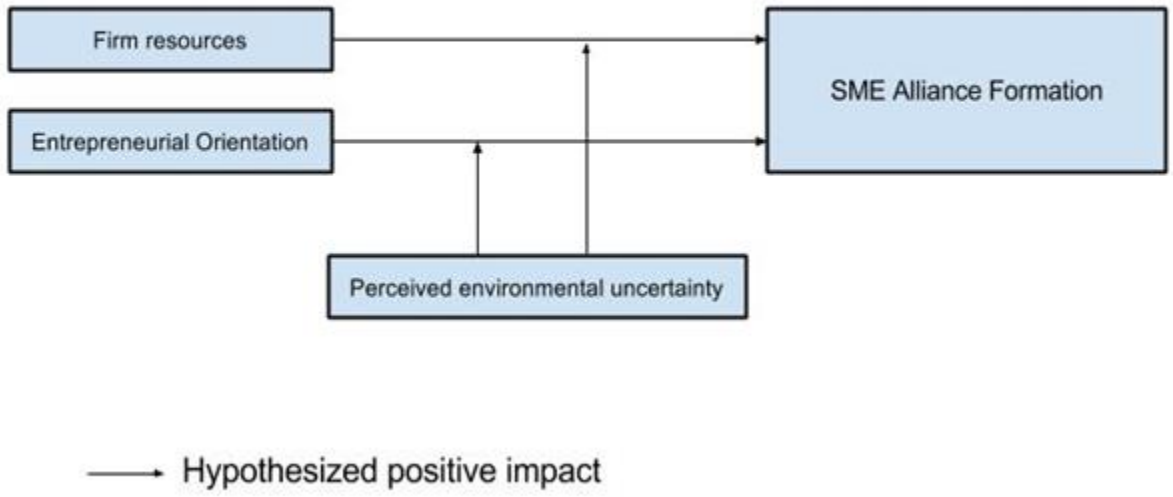

Figure 4.1- Antecedents of SME alliance formation

4.2 Antecedents of SME alliance performance

Trust and commitment, also referred to as the relationship capital between partners, form the glue which binds alliance partners together. Without the presence of relationship capital, even if the responsibilities of each partner are explicitly specified in the alliance contract, objectives of the alliance will not be met (Cullen, Johnson, & Sakano, 2000; Robson et al., 2006). Thus, trust and commitment have a fundamental impact on the performance of SME alliances (Graca, Barry, & Doney, 2015).

Trust has been defined as the intention and ability of alliance partners to honor the promises made by them (Krishnan et al., 2006). Thus, it analyzes whether the partners want to undertake steps to ensure that the alliance succeeds and whether they possess the competence necessary for doing so (Inkpen & Currall, 2004; Schumacher, 2006).

As partners begin to trust each other and carry out the intended activities, the need for contractual safeguards in order to monitor each other's behavior decreases, thereby reducing costs and helping attain alliance objectives (Perry et al., 2004). Trust also reduces perceptions of opportunism, especially in SME alliances, whereby partners do not hesitate to contribute resources for the success of the venture (Observed in cases A, B, C, D). Furthermore, it gives SMEs an opportunity to internalize resources, which are otherwise difficult to seek access to, thereby providing impetus to perform better in the marketplace (Yoo et al., 2016).

Commitment refers to the intention of partners to build a stable, long-term relationship (Anderson & Weitz, 1992). Partners in a committed alliance relationship eschew short-term, selfish gains over alliance benefit. Thus, such partners devote their resources and relational efforts in developing the alliance relationship, rather than searching for other partners (Nakos & Brouthers, 2008).

As monitoring and partner search costs decrease, with partners assisting each other to carry out activities intended toward achieving alliance objectives, performance of the alliance improves (Observed in cases A, B). Similarly, as the alliance endures, it provides sufficient opportunity for an SME to access and internalize the knowledge provided by partner firms (Perry et al., 2004).

Thus, it can be hypothesized that the presence of relationship capital in SME alliances will positively affect both levels of alliance performance- alliance-level and firm-level.

Hypothesis 1a: Trust between an SME and its alliance partner will positively influence the alliance-level performance.

Hypothesis 1b: Trust between an SME and its alliance partner will positively influence the firm-level performance.

Hypothesis 2a: Commitment between an SME and its alliance partner will positively influence the alliance-level performance.

Hypothesis 2b: Commitment between an SME and its alliance partner will positively influence the firm-level performance.

SMEs have a unique culture, possess specific resources, and even their objectives for alliance formation differ from others, especially large firms. When they find alliance partners who are aligned with their characteristics, working together toward achieving alliance-level as well firm-level objectives becomes easier. Misfit, however, can result in coordination problems, thereby hindering performance at both levels (Pansiri, 2008; Swoboda et al., 2011). Thus, the organizational fit between an SME and its alliance partners will be necessary for positive alliance performance at both levels. Based on this, the following hypotheses can be postulated.

Hypothesis 3a: Organizational fit between an SME and its alliance partner will positively influence the alliance-level performance.

Hypothesis 3b: Organizational fit between an SME and its alliance partner will positively influence the firm-level performance.

Presence of trust and commitment, as well as organizational fit, also causes exchange of critical information between partners (Observed in cases I, II, IV). Similarly, it reduces the conflict levels as disagreements are seen in positive light (Cullen et al., 2004). Increased communication and harmonization of conflict between alliance partners, which are byproducts of the relationship capital and fit between alliance partners, give rise to positive performance outcomes at alliance-level as well as firm-level (Christofferson et al., 2014; Robson et al., 2006). Thus, it can be hypothesized that

Hypothesis 4a: Communication between an SME and its alliance partner will mediate the relationship between trust and alliance-level performance.

Hypothesis 4b: Communication between an SME and its alliance partner will mediate the relationship between trust and firm-level performance.

Hypothesis 5a: Communication between an SME and its alliance partner will mediate the relationship between commitment and alliance-level performance.

Hypothesis 5b: Communication between an SME and its alliance partner will mediate the relationship between commitment and firm-level performance.

Hypothesis 6a: Communication between an SME and its alliance partner will mediate the relationship between organizational fit and alliance-level performance.

Hypothesis 6b: Communication between an SME and its alliance partner will mediate the relationship between organizational fit and firm-level performance.

Hypothesis 7a: Conflict between an SME and its alliance partner will mediate the relationship between trust and alliance-level performance.

Hypothesis 7b: Conflict between an SME and its alliance partner will mediate the relationship between trust and firm-level performance.

Hypothesis 8a: Conflict between an SME and its alliance partner will mediate the relationship between commitment and alliance-level performance.

Hypothesis 8b: Conflict between an SME and its alliance partner will mediate the relationship between commitment and firm-level performance.

Hypothesis 9a: Conflict between an SME and its alliance partner will mediate the relationship between organizational fit and alliance-level performance.

Hypothesis 9b: Conflict between an SME and its alliance partner will mediate the relationship between organizational fit and firm-level performance.

The overall conceptual model depicting the impact of antecedents on alliance performance at both levels is pictorially depicted in figure 4.2.

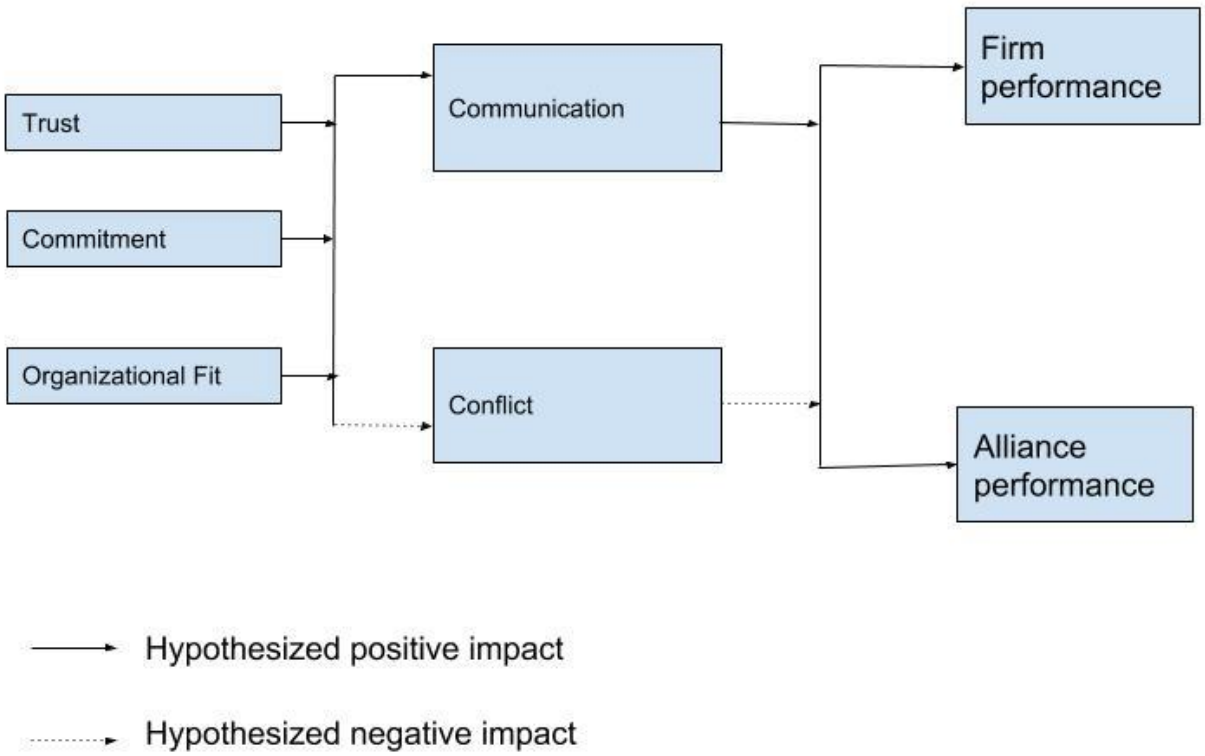

Figure 4.2- Antecedents of SME alliance performance

CHAPTER 5: METHODOLOGY

This chapter details the methodology adopted for the purpose of the study. Section 5.1 enumerates the survey research technique selected for data collection purpose, section 5.2 details the steps involved in the design and pretest of questionnaire, and section 5.3 describes the sampling design process of the study.

5.1 Survey research technique

While exploratory research design provides insights on the phenomenon of interest and helps a researcher to develop the hypotheses of the study, descriptive research design is used for testing the hypotheses. Survey research is the most frequently used descriptive research technique wherein data is collected using a structured questionnaire from a group of respondents, referred to as the sample. The findings from the sample are then generalized to the population of interest (Cooper & Schindler, 2014; Kothari, 2004). The main advantages of using survey research are the scope and ease of analysis- data can be collected from a large number of respondents, with analysis and interpretation of results relatively simpler in comparison to other techniques (De Vaus, 2001).

Survey questionnaires can be administered in one of the following four ways- personal, telephonic, mail, and internet (Kothari, 2004). Malhotra, Birks, and Wills (2012) state that when the aim of the researcher is to obtain large amount of information, personal interview method must be chosen. Thus, given the nature of the study, personal interview method was chosen as the means of administering the survey to the respondents.

5.2 Questionnaire design and pretesting

A survey questionnaire consists of a formalized set of questions designed to obtain the necessary information from the respondents. A well designed questionnaire reduces response errors, thereby

improving the validity and reliability of the study (Cooper & Schindler, 2014; Malhotra et al., 2012).

The process of questionnaire design was conducted on the guidelines provided by Churchill (1979); Anderson and Gerbing (1982). The domain of each construct defined in the conceptual models was specified and the items were accordingly framed based on the insights from the literature review and exploratory case studies.

All four respondents contacted during exploratory case studies had indicated their preference for a survey questionnaire designed in English language. Thus, an English worded questionnaire was accordingly developed, consisting of two parts- part A focused on analyzing the impact of antecedents on alliance formation tendencies of SMEs, and part B on determining the impact of antecedents on the performance of SME alliances. The questionnaire containing both parts is provided in appendix B.

Part A consisted of four sections. Section A contained questions pertaining to demographic information of the firm and respondents, with an additional question on alliance formation. Section B contained questions on resource profile, section C contained questions on entrepreneurial orientation, and section D contained questions relating to perceived environmental uncertainty.

The three variables of resource profile, entrepreneurial orientation, and perceived environmental uncertainty were measured by providing statements and the respondents were asked to indicate their responses on a scale of 1-5 (1= strongly disagree, 2= partially disagree, 3= neutral, 4= partially agree, 5= strongly agree).

Six distinct types of firm resources were identified based on the conceptualization by Grant (2013). A total of fifteen items, intending to measure each resource type, were used to determine the resource profile of the firm.

Eight items, measuring the three dimensions of innovativeness, proactiveness, and risk taking, were used to measure entrepreneurial orientation (Covin & Slevin, 1989; Marino et al., 2008).

Perceived environmental uncertainty was operationalized using seven items based on the three components of uncertainty SME managers encounter- general, competitive and technological (Marino et al., 2008; Miller & Friesen, 1982).

Alliance formation construct was operationalized as a dichotomous variable by determining if the SME was currently engaged in a strategic alliance or not. An alliance was defined using the broad typology suggested by Spekman et al. (2000) and Das and Teng (2000).

Part B was divided into three sections wherein section A was intended to seek details on the particular alliance characteristics such as type, age, and governance structure, section B contained questions pertaining to the antecedents, while section C contained questions intended to measure the performance of the alliance.

All constructs were measured using statements provided to respondents wherein they were asked to indicate their response on a scale of 1-5 (1= strongly disagree, 2= partially disagree, 3= neutral, 4= partially agree, 5= strongly agree).

A total of five items were used to define the construct of trust, based on the intention and ability of both firms in meeting the promises made to each other (Aulakh, Kotabe, & Sahay, 1996; Krishnan et al., 2006; Pansiri, 2008).

Commitment construct was operationalized using five items in order to determine if the partners had undertaken steps toward ensuring the success of the alliance (Pansiri, 2008; Perry et al., 2004).

While communication amongst partners has been measured in studies on the basis of frequency; the nature of information exchanged was also added as a dimension of the construct. Thus, a total

of four items were used to measure the construct (Krishnan et al., 2006; Sarkar, Echambadi, Cavusgil, & Aulakh, 2001).

The construct of conflict between partners was operationalized using five items on the task, process, and interorganizational dimensions, as defined by Jehn and Mannix (2001).

The construct of organizational fit was measured using five items, wherein the dimensions of cultural, resource, and strategic fit between the partners were analyzed (Lunnan & Haugland, 2008; Swoboda et al., 2011).

The two levels of alliance performance- alliance-level and firm-level, were measured using five and three items, respectively. Alliance-level performance was measured by determining whether the alliance was producing the expected results, and whether the partners were satisfied with financial as well as overall outcomes. Firm-level performance was determined based upon whether the objective for which the firm had formed the alliance had been achieved and if it benefitted from the alliance in terms of improvements in competitive position and skills learnt (Krishnan et al., 2006; Lavie, Haunschild, & Khanna, 2012; Murray & Kotabe, 2005).

Questionnaire must be pretested before it is used for the purpose of data collection, in order to identify and correct potential issues (Czaja, 1998; Rothgeb, Willis, & Forsyth, 2007). Four SME executives were approached personally to carry out the questionnaire pretest. Debriefing technique was used for analysis purpose (Malhotra et al., 2012). Content and length of the questionnaire were accordingly revised based on the responses provided.

5.3 Sampling design

When personal interview method is chosen and the population is dispersed across a large geographical region, researchers can opt for convenience sampling technique for data collection (Farrokhi & Mahmoudi-Hamidabad, 2012). In convenience sampling, the sample is chosen based

on the accessibility or proximity to the researcher (Etikan, 2016). As the definition of SMEs remains the same across states in India, it was considered unlikely that the alliance management processes would vary state-wise. Thus, convenience sampling approach was chosen owing to logistical constraints, whereby only the manufacturing SMEs from the state of Goa were chosen for the purpose of the study.

Data was collected using the key informant approach, wherein respondents such as chief executive officer, managing director, and proprietor, were approached to provide responses. Due to the small size of SMEs, these key informants are intimately involved with the strategic decision making and hence the approach was adopted (Bouncken & Kraus, 2013; Marshall, 1996).

A list of 918 SMEs was obtained from the Goa Directorate of Industries, Trade and Commerce (GDITC), of which 770 were identified as manufacturing SMEs. Key informants in each SME were contacted by phone to seek an appointment. The survey questionnaire along with the cover letter explaining the purpose of the study were then personally provided to them to obtain their responses.[11]

5.3.1 Details of the respondent SMEs

A total of 127 SMEs responded to the survey, indicating a response rate of 16%. Details of the responding firms are provided in table 5.1.

[11] Cover letter given to the respondents has been provided in appendix A.

Table 5.1- Details of the responding SMEs

Firm Size	**Number of firms (Percentage)**
0-50 employees	93 (73%)
50-100 employees	16 (13%)
>100 employees	18 (14%)
Firm age	**Number of firms (Percentage)**
<10 years	14 (11%)
10-20 years	63 (50%)
>20 years	50 (39%)
Firm industry	**Number of firms (Percentage)**
Chemical	7 (6%)
Electrical and electronic equipment	15 (11%)
Food	13 (10%)
Industrial and computer equipment	9 (7%)
Paper	10 (8%)
Primary metals	27 (21%)
Rubber	7 (6%)
Stone, clay, and concrete	9 (7%)
Other	30 (24%)

5.3.2 Details of the alliances of respondent SMEs

59 SMEs indicated that they were engaged in an alliance at the time of data collection (46%). To prevent response biases, each SME was allowed to provide responses for maximum of three of its alliances. Thus, data on 86 alliances was finally obtained. Details on the alliances are provided in table 5.2.

Table 5.2- Details on the alliances of respondent SMEs

Age	**Number of alliances (Percentage)**
<10 years	56 (65%)
>10 years	30 (35%)
Governance structure	**Number of alliances (Percentage)**
Equity	14 (16%)
Non-Equity	72 (84%)
Type	**Number of alliances (Percentage)**
Domestic	45 (52%)
International	41 (48%)

CHAPTER 6: DATA ANALYSIS

This chapter describes the steps undertaken in the analysis of data and presents the results of the study. Section 6.1 analyzes the impact of antecedents on SME alliance formation and provides a discussion of the findings, while section 6.2 analyzes the influence of antecedents on SME alliance performance and describes the findings.

6.1 Antecedents of SME alliance formation

Exploratory factor analysis was first conducted to obtain a set of optimal variables that could explain the maximum variance amongst the items in the study. Thereafter, common method bias was checked by running Harman's single factor test. The convergent validity was determined by checking if each shared unique variance with the construct, while discriminant validity was tested by checking for cross-loading of items and unique variance extracted by each construct. Internal reliability was determined by using cronbach's alpha and composite reliability measures.

Logistic regression analysis was used to determine the impact of antecedents on SME alliance formation. Results indicated that the two types of resources, tangible and intangible, as well as the entrepreneurial orientation, affected alliance formation tendency of SMEs. Firm size and industrial background were also found to be associated with alliance formation. Perceived environmental uncertainty, the moderating antecedent, however, was only found to affect the relationship between the two types of resources and alliance formation.

6.1.1 Validity and reliability analysis results

As the items in the study captured different dimensions of the constructs, it was essential to identify the latent factorial patterns. Thus, exploratory factor analysis was conducted using varimax rotation method to extract maximum variance (Fabrigar & Wegener, 2012). Four broad factor patterns were identified, explaining 68% of the variance amongst the items. An item measuring

raw material sourcing capability of the firm did not load onto any of the factors and was deleted. The factor loadings are presented in table 6.1.

Table 6.1- Factor loadings for each construct

Construct	Item	Loading
Tangible resources	TR1	.774
	TR2	.787
	TR3	.804
	TR4	.713
Intangible resources	ITR1	.762
	ITR2	.699
	ITR3	.758
	ITR4	.770
	ITR5	.802
	ITR6	.859
	ITR7	.820
	ITR8	.763
	ITR9	.863
	ITR10	.788
Entrepreneurial Orientation	EO1	.695
	EO2	.813
	EO3	.846
	EO4	.884
	EO5	.861
	EO6	.780
	EO7	.772
	EO8	.742
Perceived environmental uncertainty	PEU1	.696
	PEU2	.811
	PEU3	.814
	PEU4	.787
	PEU5	.655
	PEU6	.729
	PEU7	.750

Since the study uses subjective measures based on respondents' perception, it was considered necessary to check for common method bias (CMB). In studies based on subjective measures, the relationships between variables might be inflated due to CMB, whereby researchers risk drawing wrong inferences (Conway & Lance, 2010). To check for the presence of CMB, Harman's single factor test was used to determine if a single factor in the study accounted for more than 50% of the variance (Harman, 1967). While the test has been criticized by researchers (ex. Podsakoff, MacKenzie, Lee, & Podsakoff, 2003) for lacking power to detect CMB across all cases, Fuller, Simmering, Atinc, Atinc, and Babin (2016) find that the test only provides biased results when a single factor accounts for more than 70% of the variance in the study. Exploratory factor analysis showed that single factor accounted for 41% of the variance, thereby indicating that CMB was not likely to affect the results of the study.

The convergent and discriminant validity of the study was then checked. Convergent validity assesses the extent to which measures of a particular construct are related (Campbell & Fiske, 1959). All loadings had scores of 0.70 or above, indicating high convergent validity (Hulland, 1999). Discriminant validity, which determines if the items specifically measure the particular construct, was first tested by checking if any of the items measuring a particular construct cross-loaded on other constructs. This was not found to be the case. Furthermore, the square root of average variance extracted (AVE) by each construct was found to be greater than the correlations with other constructs, thereby indicating sufficient discriminant validity (Fornell & Larcker, 1981).

Composite reliability and Cronbach's alpha scores were determined to assess the internal reliability, with all four factors exhibiting scores of above 0.70, the cutoff value suggested by Peterson and Kim (2013). Results of validity and reliability analysis are provided in table 6.2 (square root of each construct's AVE is highlighted in bold).

Table 6.2- Validity and Reliability Analysis

Construct	Mean	SD	Composite Reliability	Cronbach's Alpha	Tangible Resources	Intangible Resources	Entrepreneurial Orientation	Perceived Environmental Uncertainty
Tangible resources	4.10	0.75	0.85	0.81	**0.76**	0.41	0.20	0.18
Intangible resources	3.60	0.97	0.94	0.95		**0.78**	0.51	0.39
Entrepreneurial orientation	3.00	1.06	0.93	0.95			**0.80**	0.54
Perceived environmental uncertainty	2.88	0.97	0.89	0.90				**0.74**

6.1.2. Data analysis

When the dependent variable is categorical and independent variables are continuous in nature, discriminant analysis or logistic regression can be used for analysis purpose (Menard, 2002; Press & Wilson, 1978). Pohar, Blas, and Turk (2004) suggest checking for normality of data to determine the analysis technique to be used. Thus, Kolmogorov-Smirnov and Shapiro-Wilk tests were run to test for normality (Razali & Wah, 2011). As the normality assumptions were not met, logistic regression technique was chosen for data analysis purpose as it provides robust results regardless of the distribution of data (Agresti, 2002). Appendix C provides results of the normality tests.

Results of logistic regression analysis, carried out using SPSS Statistics 24.0 software, are presented in table 6.3.

Table 6.3- Logistic regression analysis results

Variables	**Model 1**	**Model 2**	**Model 3**
Firm Size	0.020* (0.006)	0.019** (0.009)	0.012 (0.011)
Firm Age	0.013 (0.023)	-0.036 (0.039)	-0.047 (0.049)
Food Industry	-0.988 (0.753)	-1.291 (1.237)	-1.330 (1.410)
Paper Industry	-1.547* (0.872)	-2.496 (1.744)	-2.200 (1.731)
Chemical Industry	-1.411 (0.972)	-3.096 (1.673)	-2.948* (1.884)
Rubber Industry	-0.982 (0.905)	-1.014 (1.390)	-0.849 (1.645)
Stone and clay Industry	-1.679* (0.942)	-2.925 (1.466)	-2.942* (1.680)
Primary metals Industry	-1.136* (0.602)	-2.351 (1.266)	-2.693* (1.372)
Computer and Industrial equipment industry	-0.892 (0.845)	-1.375 (1.453)	-1.785 (1.689)
Electrical and electronics Industry	-1.072 (0.744)	-3.176 (1.601)	-4.189* (2.508)
Tangible Resource		1.357** (0.641)	0.323 (0.893)
Intangible Resource		2.601*** (0.601)	4.011*** (1.077)
Entrepreneurial Orientation		1.454** (0.498)	0.847 (0.761)
Environmental Uncertainty		-0.467 (0.496)	0.412 (0.623)
Tangible Resource by Environmental Uncertainty			-2.271** (1.068)
Intangible Resource by Environmental Uncertainty			1.665* (0.864)
Entrepreneurial Orientation by Environmental Uncertainty			-0.102 (0.534)
Constant	-0.377 (0.589)	0.904 (1.204)	1.343 (1.349)
Correct prediction percentage	73.2%	92.1%	91.3%
Nagelkerke R^2	0.28	0.80	0.84

*Notes: *p<0.10, **p<0.05, ***p<0.001; standard error in parentheses*

Model 1 (Pseudo R^2=0.28) consists of control variables, model 2 (Pseudo R^2=0.80) includes the independent and moderator variables, while model 3 (Pseudo R^2=0.84) then tests the interaction effects.[12] All models exhibited negative and significant log-likelihood values, thereby indicating better fit in comparison to the baseline model.

Amongst the control variables, firm size (β=0.020, p<0.001), paper industry (β=-1.547, p<0.10), stone and clay industry (β=-1.679, p<0.10) and primary metals industry (β=-1.136, p<0.10) were found to be significantly associated with alliance formation.

Hypothesis 1 predicts that greater the resources possessed by an SME, greater will be its alliance formation tendency. Support was found for the hypothesis as the tangible resources (β=1.357, p<0.05) and intangible resources (β=2.601, p<0.001) were found to positively influence alliance formation. Hypothesis 2 was also validated as entrepreneurial orientation (β=1.454, p<0.01) was found to be positively associated with alliance formation.

Support was obtained for hypothesis 3 as perceived environmental uncertainty was found to moderate the relationship between both types of resources and alliance formation. While the moderation coefficient was found to be negative in case of tangible resources (β=-2.271, p<0.05), a reverse relationship was observed in case of intangible resources (β=1.665, p<0.10).

Hypothesis 4 was not supported as the interaction effect of entrepreneurial orientation and perceived environmental uncertainty was not found to be significant.

6.1.3. Discussion

In line with the findings of researchers such as Franco and Haase (2013); Marino et al. (2008); and Park et al. (2002), the study establishes the importance of entrepreneurial orientation, tangible

[12] The interaction effect was calculated by mean centering the independent variables and the moderator variable to reduce multicollinearity (Jaccard, 2001).

resources and intangible resources in explaining alliance formation by SMEs. Amongst the three antecedents, possession of intangible resources has the highest impact on alliance formation as every unit increase causes the odds of alliance formation to rise by a factor of 13.481. A unit increase in entrepreneurial orientation and tangible resources increases the odds of alliance formation by a factor of 4.281 and 3.884, respectively. Furthermore, size of the SME and industrial characteristics were also found to affect alliance formation. A unit increase in firm size increases the odds of alliance formation by a factor of 1.020, indicating a weak yet positive impact. Firms from paper, primary metals industry, and stone and clay industry were found to exhibit a negative tendency toward alliance formation, with odds of alliance formation reducing by a factor of 0.213, 0.321, and 0.181 for firms belonging to each industry, respectively.

The study also offers novel insights on the moderating role of perceived environmental uncertainty, as the antecedent was found to only affect the relationship between the two types of resources and SME alliance formation.

When faced with a highly uncertain environment, and lacking the necessary tangible resources, SMEs seek to form alliances in order to acquire them. Tangible resources such as financial, are rare in nature and critical for the survival of an SME in an uncertain environment (Marino et al., 2008). Given the need to contribute valuable resources, SMEs use the intangible resources they may possess in order to form alliances and access the required tangible resources (Alvarez & Barney, 2001; Das & Teng, 2000). On the contrary, when an SME possesses such tangible resources in uncertain environments, the alliance formation tendency decreases as they do not need to seek them from alliance partners. In relatively stable environments, as the possession of tangible resources increases, alliance formation tendency increases as SMEs form alliances using these resources (Yamakawa, Yang, & Lin, 2011). Figure 6.1 plots the interactive effect by keeping the

values of perceived environmental uncertainty constant at one standard deviation below (low) and above (high) the mean value.

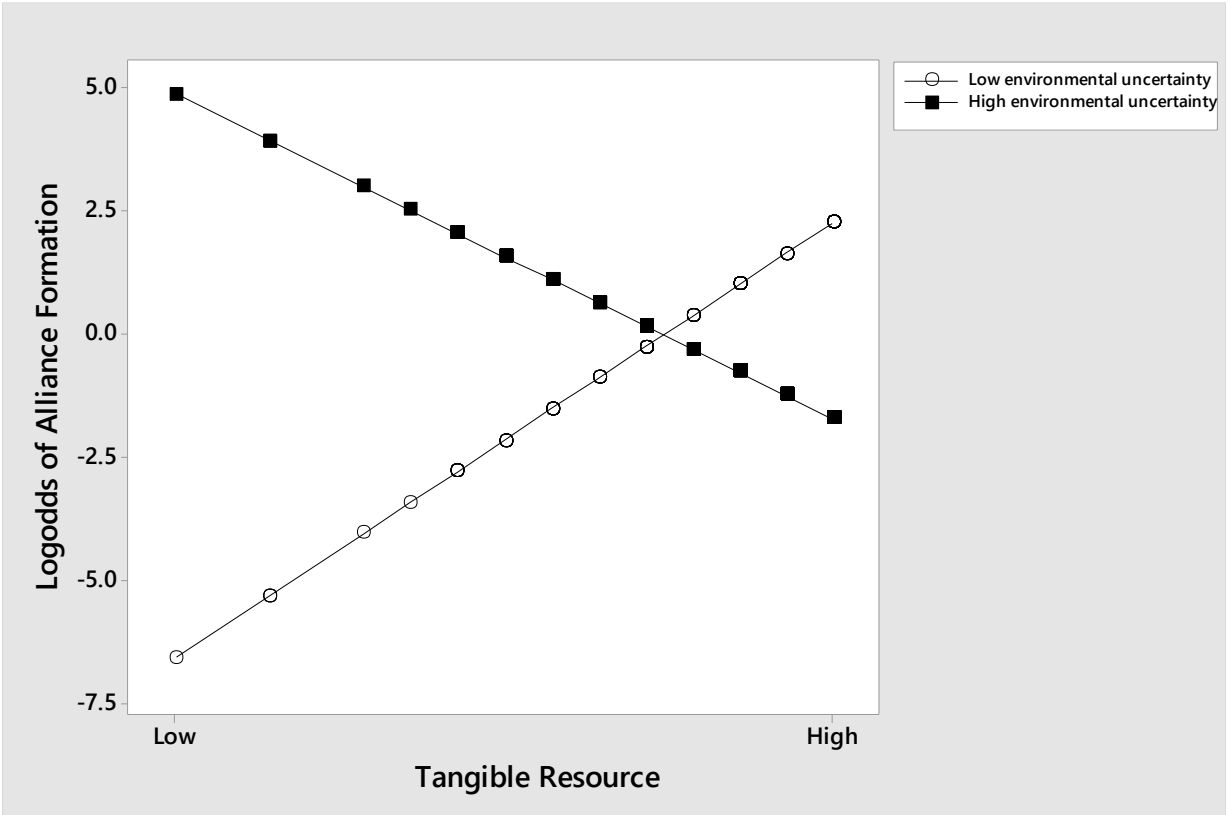

Figure 6.1- Interactive effect of tangible resources and perceived environmental uncertainty on SME alliance formation

When SMEs possess intangible resources, they seek to form alliances, irrespective of the levels of perceived environmental uncertainty they encounter. However, in a volatile environment the tendency to form alliances increases more sharply with an increase in intangible resources. In such an environment, given that SMEs face a critical need for resources, those possessing intangible resources are able to use them in order to form alliances and secure access to the required resources (Park et al., 2002). In stable environments, however, SMEs can nonetheless form alliances using the intangible resources they possess, similar to the case of tangible resources. Figure 6.2 plots this

relationship by keeping the values of perceived environmental uncertainty constant at one standard deviation below (low) and above (high) the mean value.

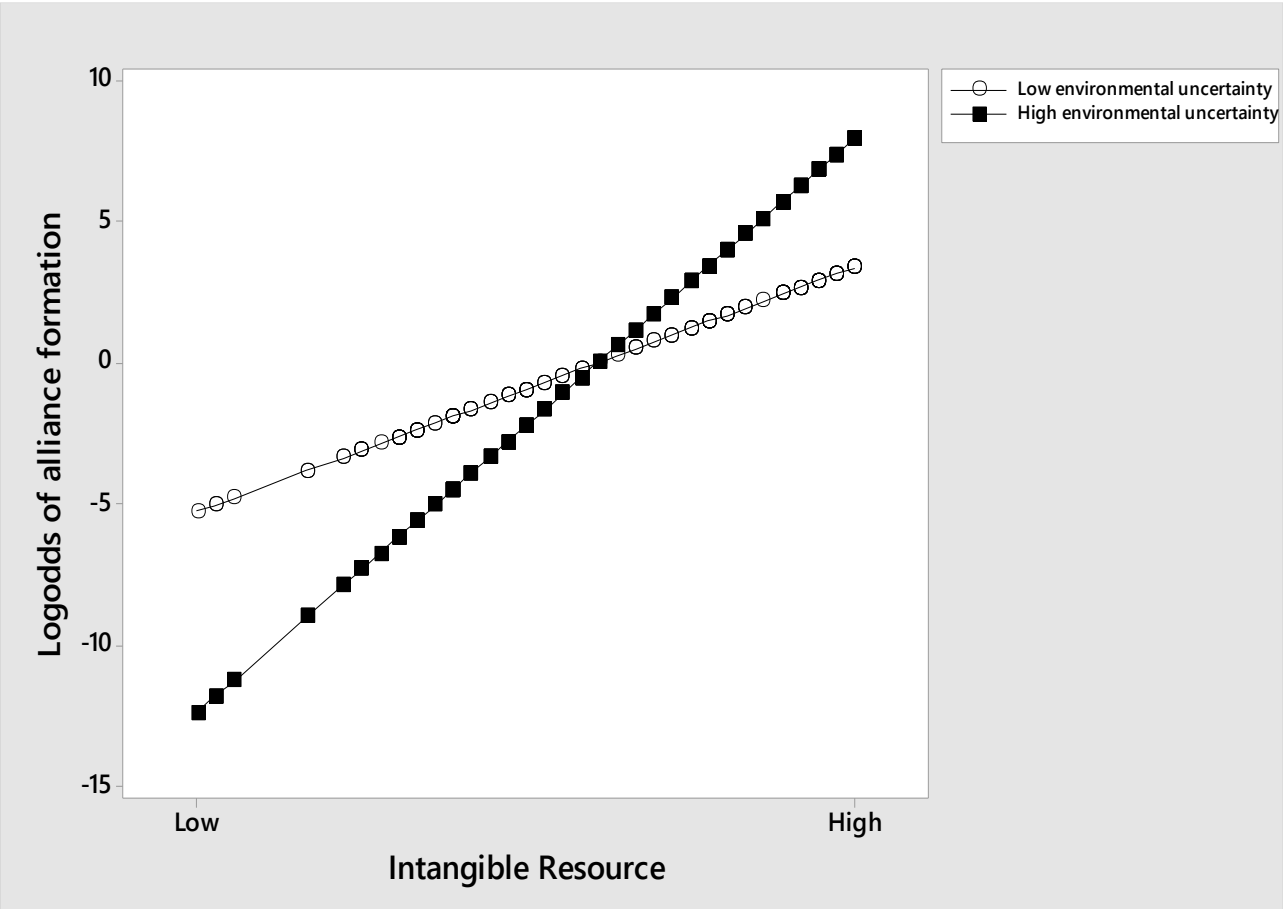

Figure 6.2- Interactive effect of intangible resources and perceived environmental uncertainty on SME alliance formation

The results contrast those obtained by Park et al. (2002) as they find that presence of manufacturing or technological resources in a stable environment decreases alliance formation tendency of small firms. The reasoning might be that Park et al. (2002) derived results which were specific to semiconductor startups in a developed economy, while this study analyzes manufacturing SMEs in a developing economy. SMEs in developing economies, despite the environment in which they operate, require alliances to access resources and achieve competitiveness (Marino et al., 2008).

Thus, despite operating in a stable environment, the tendency of the SMEs to form alliances when they possess resources might be due to their need to stay competitive in the marketplace.

6.2 Antecedents of SME alliance performance

The impact of antecedents on the two levels of alliance performance was analyzed using PLS-SEM technique. The measurement model was first tested to determine the convergent and discriminant validity. Convergent validity was determined by checking if each indicator shared unique variance with the construct, while discriminant validity was determined by calculating the average variance extracted, checking for cross-loadings and calculation of heterotrait-monotrait ratio. The internal reliability of the study was established using cronbach's alpha and composite reliability measures. Presence of multicollinearity and common method bias were then checked by determining the variance inflation factor scores. The moderating role of alliance type and governance structure was then analyzed and after determining that the measurement as well as structural model coefficients did not vary across the groups of moderator variables, structural model results were determined. The results indicated that trust and organizational fit affected alliance-level performance, while commitment affected firm-level performance. Communication was found to partially mediate the relationship between commitment and firm-level performance, while conflict partially mediated the impact of trust and organizational fit on alliance-level performance.

6.2.1 Choice of data analysis technique

As multiple relationships amongst variables were to be tested, structural equation modeling (SEM) was considered to be the most suitable technique for analysis purpose. When the sample size is relatively low in comparison to the parameters to be tested and prediction rather than confirmation is needed, Partial Least Squares-SEM (PLS-SEM) provides reliable results in comparison to Covariance Based-SEM (CB-SEM) (Hair, Hult, Ringle, & Sarsedt, 2016). Furthermore, Hair,

Ringle, and Sarstedt (2011) state that when antecedents of performance and their relative impact is to be determined, as is the objective of this study, PLS-SEM technique should be adopted. After verifying that the model for the study complied with the minimum sample requirements specified by Cohen (1992) and Hair et al. (2016), PLS-SEM technique using Smart PLS version 3.0 software was adopted for the purpose of data analysis.

6.2.2 Measurement model

In PLS-SEM, researchers must correctly make the choice of using formative versus reflective measures in measurement model, else they risk making type I and II errors, thereby biasing the results (Diamantopoulos & Siguaw, 2006). The choice must be primarily made based upon two conditions- by determining whether the indicators cause the construct or construct causes the indicators, and analyzing the interchangeability of indicators (Jarvis, MacKenzie, & Podsakoff, 2003). For the constructs in the study, while the first condition of construct-indicator relationship was found to be ambiguous, high correlations were observed between indicators of the same construct, thereby implying the unidimensionality of each construct. Thus, reflective measurement model was found suitable and adopted for all latent variables of the study.

6.2.2.1 Validity and reliability analysis

To check for the presence of random error, internal reliability of the measurement model must be determined (Hair et al., 2016). Composite reliability as well as Cronbach's alpha measures were used to check the internal reliability of the constructs in the study (Peterson & Kim, 2013). Values for all constructs on both the tests were found to be greater than 0.70, the cutoff value suggested by Hulland (1999).

Validity of the measurement model must be determined to check for the presence of systematic error (Henseler, Ringle, & Sinkovics, 2009). Hair et al. (2011) propose for checking convergent validity and discriminant validity for all latent variables to determine the validity of the

measurement model. The convergent validity was tested by checking if outer loadings had a value of over 0.70, which would indicate that the particular construct shared more than 50% of the indicator variance. All outer loadings for every construct had values over 0.70, thereby establishing convergent validity. Discriminant validity was first checked by determining if there was any cross-loading of indicators and calculating the AVE of all constructs. No cross-loading was found while square root of each construct's AVE was found to be greater than correlations with other constructs. Henseler, Ringle, and Sarstedt (2014) state that researchers must also check the heterotrait-monotrait ratio (HTMT) in a measurement model as it provides the most accurate estimate of discriminant validity. HTMT determines the extent to which indicators of different constructs correlate in comparison to correlation amongst indicators of the same construct. For smaller sample sizes, Teo, Srivastava, and Jiang (2008) recommend a cutoff score of 0.90, values below which indicate sufficient discriminant validity. Values for all constructs in the study fell below the 0.90 threshold. Results of reliability and validity analysis are provided in tables 6.4 and 6.5.

Table 6.4- Measurement model results

Construct	Items	Loadings	CR	Cronbach's Alpha	AVE (Square root)	Largest r
Trust	Trust1	0.847	0.95	0.92	0.88	0.70
	Trust2	0.922				
	Trust3	0.873				
	Trust4	0.927				
	Trust5	0.838				
Commitment	Commitment1	0.879	0.93	0.90	0.84	0.47
	Commitment2	0.796				
	Commitment3	0.871				
	Commitment4	0.865				
	Commitment5	0.800				
Organizational Fit	OF1	0.620	0.85	0.77	0.72	0.61
	OF2	0.688				
	OF3	0.785				
	OF4	0.687				
	OF5	0.829				
Communication	Communication1	0.876	0.95	0.92	0.90	0.53
	Communciation2	0.909				
	Communication3	0.920				
	Communication4	0.900				
Conflict	Conflict1	0.863	0.93	0.90	0.85	-0.82
	Conflict2	0.865				
	Conflict3	0.874				
	Conflict4	0.910				
	Conflict5	0.718				
Alliance-level performance	AP1	0.921	0.95	0.93	0.88	-0.82
	AP2	0.930				
	AP3	0.822				
	AP4	0.906				
	AP5	0.852				
Firm-level performance	FP1	0.929	0.95	0.91	0.92	0.53
	FP2	0.915				
	FP3	0.927				

Table 6.5- HTMT analysis results

HTMT	Trust	Commitment	Organizational fit	Communication	Conflict	Alliance-level performance	Firm-level performance
Trust							
Commitment	0.50						
Organizational fit	0.59	0.40					
Communication	0.40	0.52	0.33				
Conflict	0.72	0.41	0.66	0.50			
Alliance-level performance	0.74	0.46	0.69	0.43	0.88		
Firm-level performance	0.30	0.45	0.28	0.57	0.28	0.27	

6.2.2.2 Multicollinearity and Common Method Bias

Presence of multicollinearity amongst constructs must be tested as it can inflate the standard errors in the structural model, thereby providing inaccurate estimates (Hair et al., 2016). Kock and Lynn (2012) propose for carrying out a full collinearity test between all latent variables to check for the levels of variance inflation factors (VIFs). None of the VIF values were found to be over 3.3, the cutoff value suggested by them, thereby establishing that multicollinearity was not likely to affect the relationships in the structural model.

Similar to multicollinearity, CMB distorts the results of the structural model as the observed variance occurs due to the measurement method rather than actual variable relationships (Fuller et al., 2016). Harman's single factor test was first used to check for the presence of CMB by running an exploratory factor analysis (Harman, 1967). The factor with highest eigenvalue explained 42%

of the variance, thereby indicating that CMB was not likely to affect the results of structural model. Furthermore, based on the suggestions of Kock and Lynn (2012) the VIFs for inner model were checked. Guidelines remain the same as that for multicollinearity with values over 3.3 indicating the presence of CMB. Apart from the latent variable VIFs being lower than threshold value, average block VIF (AVIF) and average full collinearity VIF (AFVIF) values were 1.42 and 2.20 respectively, indicating that common method bias was not likely to affect the results of the study (Kock, 2015; O'Brien, 2007).

6.2.2.3 Heterogeneity

As SME alliance performance at both levels varies based on the type, if the alliance is domestic or international in nature, and governance structure, whether it is a contractual or an equity alliance, the moderating effect of both variables was separately checked to determine if the coefficients of the inner model were significantly different across groups (Kirby & Kaiser, 2003; Lyles & Baird, 1994; Nakos & Brouthers, 2008). Henseler, Ringle, and Sarstedt (2015) state that measurement model must be first checked to determine if there are significant differences across groups, an approach referred to as measurement invariance. Three steps are recommended by them to check for measurement invariance- configural invariance, compositional invariance, and equality of composite means and variances. Across the two groups of each moderator variable, configural invariance was established by using the same questionnaire, same indicators were used for measuring the latent constructs, and identical algorithm settings were specified in the analysis software. Compositional invariance was determined by checking for differences in indicator loadings across the moderator variable groups. None of the indicator loadings were significantly different at 5% level. Finally, composite group scores were checked to determine the differences in means and variances. None of the indicators exhibited significant differences at 5% level in means and variances, thereby establishing full measurement invariance and allowing for

conducting the multigroup analysis (MGA) for checking the differences in structural model coefficients across moderator variable groups. Step 2 and 3 results are provided in tables 6.6 and 6.7 for both moderator variables.

Table 6.6- MICOM results for alliance type

MICOM	*Step 2*		*Step 3*			
	Correlation	**P-Value**	**Mean difference**	**P-value**	**Variance difference**	**P-value**
Trust	0.998	0.206	-0.231	0.306	0.357	0.206
Commitment	0.998	0.637	-0.101	0.672	0.254	0.250
Organizational Fit	0.989	0.507	0.019	0.934	-0.318	0.308
Communication	1.000	0.911	0.013	0.953	0.102	0.768
Conflict	0.997	0.138	-0.014	0.955	0.277	0.308
Alliance-level performance	1.000	0.879	0.075	0.735	0.299	0.241
Firm-level performance	1.000	0.919	0.163	0.467	-0.416	0.477

Table 6.7- MICOM results for governance structure

MICOM	*Step 2*		*Step 3*			
	Correlation	**P-Value**	**Mean difference**	**P-value**	**Variance difference**	**P-value**
Trust	0.999	0.540	-0.231	0.481	0.217	0.559
Commitment	0.998	0.658	-0.116	0.693	0.478	0.165
Organizational fit	0.988	617	-0.053	0.845	-0.286	0.517
Communication	0.999	0.542	-0.204	0.474	0.381	0.331
Conflict	0.999	0.545	0.385	0.154	0.347	0.314
Alliance-level performance	1.000	0.816	-0.196	0.481	0.138	0.651
Firm-level performance	1.000	0.835	0.052	0.853	0.378	0.665

Henseler (2012) states that the nature of data distribution must determine the test to be used for determining MGA. Thus, Kolmogrov-Smirnov and Shapiro-Wilk test were conducted for each of the indicators to determine the normality of distribution (Razali & Wah, 2011). Results indicated that the sample distribution for all indicators was non-normal and are provided in appendix D. Thus, PLS-MGA approach was used, as it employs a distribution free approach toward testing for group differences among path coefficients. None of the path coefficients across the moderator variables of alliance type and governance structure were found to be significant at 5% level. Results of the MGA analysis are presented in table 6.8.

Table 6.8- MGA results

Multi Group Analysis	*Alliance Type*		*Governance Structure*	
	Path coefficient difference	**P-value**	**Path coefficient difference**	**P-value**
Trust -> Alliance Performance	0.289	0.944	0.254	0.709
Trust -> Firm Performance	0.134	0.386	0.345	0.132
Commitment -> Alliance Performance	0.060	0.337	0.087	0.573
Commitment -> Firm Performance	0.032	0.474	0.597	0.883
Organizational fit -> Alliance performance	0.085	0.294	0.283	0.921
Organizational fit -> Firm performance	0.329	0.851	0.557	0.948
Communication -> Alliance Performance	0.045	0.608	0.137	0.724
Communication -> Firm Performance	0.060	0.609	0.318	0.780
Conflict -> Alliance Performance	0.294	0.892	0.302	0.882
Conflict -> Firm Performance	0.141	0.660	0.620	0.121
Trust -> Communication	0.016	0.517	0.088	0.453
Trust -> Conflict	0.253	0.112	0.152	0.357
Commitment -> Communication	0.319	0.905	0.375	0.768
Commitment -> Conflict	0.079	0.330	0.056	0.541
Organizational fit -> Communication	0.251	0.106	0.063	0.592
Organizational fit -> Conflict	0.250	0.906	0.009	0.539

6.2.3 Structural model

The structural model was analyzed using bootstrapping procedure, with 5000 subsamples (n=86) and no sign change setting specified in the algorithm. The R^2 and Q^2 values were first examined to determine the predictive capability of the model.

R^2 value determines the explained variance in the endogenous constructs (Hair et al., 2016). The variance of the two levels of alliance performance, alliance-level and firm-level, was 73% and 26% explained, respectively. For the endogenous behavioral constructs of communication and conflict, the explained variance was 26% and 52%, respectively. All R^2 values are above the threshold value of 0.10, suggested by Falk & Miller (1992).

Q^2 statistic determines the predictive capability of each endogenous construct in the model and is obtained by running the blindfolding analysis (Streukens & Leroi-Werelds, 2016). An omission distance of 7 was specified to calculate the results. Values for each endogenous construct were found to be greater than zero, indicating sufficient predictive capability of the model (Fornell & Bookstein, 1982). Results for both statistics are provided in table 6.9.

Table 6.9- R^2 and Q^2 values

Endogenous construct	**R^2**	**Q^2**
Alliance performance	0.733	0.524
Firm performance	0.257	0.219
Communication	0.257	0.186
Conflict	0.516	0.337

6.2.3.1 Hypotheses and mediation testing

The structural model results are provided in table 6.10. It was found that trust (β=0.203, p<0.05, f^2=0.075) and organizational fit (β=0.151, p<0.10, f^2=0.055) affect alliance-level performance, while commitment affects firm-level performance (β=0.174, p<0.10, f^2=0.030), thus offering support for hypotheses H1a, H2b, and H3a. Other direct hypotheses, that is H1b, H2a, and H3b, were not supported.

Table 6.10- Hypotheses test results and f^2 values

Relationship	**β-coefficient**	**CI (5%, 95%)**	**f^2**
Trust -> Alliance Performance	0.203**	(0.058, 0.375)	0.075
Trust -> Firm Performance	0.043	(-0.281, 0.339)	0.001
Commitment -> Alliance Performance	0.081	(-0.036, 0.193)	0.016
Commitment -> Firm Performance	0.174*	(0.001, 0.339)	0.030
Organizational fit -> Alliance Performance	0.151*	(0.013, 0.282)	0.055
Organizational fit -> Firm Performance	0.075	(-0.129, 0.319)	0.005
Communication -> Alliance Performance	-0.016	(-0.121, 0.091)	0.001
Communication -> Firm Performance	0.455***	(0.243, 0.638)	0.206
Conflict -> Alliance Performance	-0.575***	(-0.721, -0.407)	0.547
Conflict -> Firm Performance	0.088	(-0.178, 0.326)	0.005
Trust -> Communication	0.162	(-0.051, 0.394)	0.023
Trust -> Conflict	-0.491***	(-0.690, -0.298)	0.321
Commitment -> Communication	0.374**	(0.168, 0.560)	0.145
Commitment -> Conflict	-.0.040	(-0.206, 0.123)	0.002
Organizational fit -> Communication	0.069	(-0.088. 0.241)	0.005
Organizational fit -> Conflict	-0.305**	(-0.475, -0.133)	0.140

*Notes: *p<0.10, **p<0.05, ***p<0.001*

Mediation testing has been traditionally done using the theoretical foundations provided by Baron and Kenny (1986) with the analysis performed using the Sobel's test (Hayes, 2009). However, the approach requires that the total effects be significant, or else mediation is not considered possible

(Zhao, Lynch, & Chen, 2010). Furthermore, Sobel's test uses a parametric approach which provides biased results when used for comparing the indirect path coefficients in mediation testing (Shrout & Bolger, 2002). Thus, Preacher and Hayes (2008) theorize for testing the significance of indirect effects as the basis for determining mediation. To account for the non-parametric nature of coefficients, they recommend using bootstrapping approach. The indirect-effects based approach of Preacher and Hayes (2008) has been recommended by Nitzl, Roldan, and Cepeda (2016) in the context of PLS-SEM, hence it was used for mediation testing in this study.

Nitzl et al. (2016) state that an indirect effect must be present for mediation to occur. Thus, the indirect effect through mediator variables was analyzed first. In case of alliance-level performance, conflict was found to act as a partial mediator for the impact of trust (β=0.282, $p<0.001$, VAF=58%) and organizational fit (β=0.175, $p<0.05$, VAF=54%), thereby providing support to hypotheses 7a, 9a; while for firm-level performance, communication partially mediated the impact of trust (β=0.073, $p<0.10$, VAF=63%) and commitment (β=0.170, $p<0.05$, VAF=50%), thereby validating hypothesis 4b and 5b. Hypotheses 4a, 5a, 6a, 6b, 7b, 8a, 8b, 9b were not supported. Results of mediation analysis are presented in table 6.11.

Table 6.11- Mediation analysis results

Mediating relationship	**β-coefficient**	**CI (5%, 95%)**	**VAF**	**Results**
Trust -> Communication -> Alliance Performance	-0.003	(-0.026, 0.021)	NA	No mediation
Trust -> Conflict -> Alliance Performance	0.282***	(0.167, 0.397)	58%	Partial mediation
Commitment -> Communication -> Alliance Performance	-0.006	(-0.046, 0.034)	NA	No mediation
Commitment -> Conflict -> Alliance Performance	0.022	(-0.073, 0.118)	22%	No mediation
Organizational fit -> Communication -> Alliance Performance	-0.001	(-0.014, 0.012)	NA	No mediation
Organizational fit -> Conflict -> Alliance Performance	0.175**	(0.056, 0.294)	54%	Partial mediation
Trust -> Communication -> Firm performance	0.073*	(0.021, 0.168)	63%	Partial mediation
Trust -> Conflict -> Firm Performance	-0.043	(-0.179, 0.093)	NA	No mediation
Commitment -> Communication -> Firm Performance	0.170**	(0.033, 0.307)	50%	Partial mediation
Commitment -> Conflict -> Firm Performance	-0.004	(-0.034, 0.025)	NA	No mediation
Organizational fit -> Communication -> Firm Performance	0.031	(-0.042, 0.105)	29%	No mediation
Organizational fit -> Conflict -> Firm Performance	-0.027	(-0.106, 0.052)	NA	No mediation

*Notes: *p<0.10, **p<0.05, ***p<0.001, VAF<20%=no mediation, 20%< VAF<80%=partial mediation, VAF>80%= full mediation.*[13]

[13] While indirect effect as well as VAF values are provided as guidelines for inferring full/partial mediation, Nitzl et al. (2016) specify VAF as the criterion to be used when sample size is relatively small.

6.2.4 Discussion

The study finds that amongst the two levels of alliance performance, the impact of antecedents explained alliance-level performance substantively, while firm-level performance is not sufficiently predicted, indicating that the latter is primarily influenced by other antecedents.

The study also finds that the analyzed antecedents have a differential impact on the two levels of alliance performance. Amongst the relationship capital variables, trust was found to affect alliance-level performance while commitment influences firm-level performance. The results resonate to a certain degree with findings in extant SME literature as Schumacher (2006) finds that trust indeed acts as a predictor of alliance performance, while Nakos and Brouthers (2008) observe that commitment positively influences an SME's performance due to alliance participation. The study also finds that organizational fit specifically affects alliance-level performance, as observed by researchers such as Swoboda et al. (2011).

Furthermore, it was also observed that apart from the direct influence discussed above, the impact of the three antecedents on alliance performance is mediated to a varying degree by the presence of communication and conflict amongst alliance partners. Communication levels amongst partners were found to positively mediate the influence of trust and commitment on firm-level performance. Thus, the findings indicate that presence of trust and commitment between partners increases communication between them, which in turn improves the performance of the SME. The results resonate to a certain extent with Fink et al. (2008), who find that the communication between international alliance partners and an SME plays a mediating role in the commitment-firm performance relationship, while the findings also indicate that trust-firm performance linkage, which has been observed in the case of SMEs by Gaur et al. (2011), actually occurs through the mediating influence of communication.

Contrary to the impact of communication which mediates the influence of antecedents on firm-level performance, conflict mediates the influence on alliance-level performance. Specifically, conflict levels between partners were found to mediate the influence of trust and organizational fit on alliance-level performance. Presence of trust and organizational fit leads to conflict alleviation, which then improves alliance-level performance. The finding is significant as many studies such as Cullen et al. (2000), Krishnan et al. (2006), and Lavie et al. (2012) have reasoned that trust and organizational fit influence alliance-level performance through conflict alleviation. The study finds support for their arguments.

CHAPTER 7: CONCLUSION

This chapter details the research outcomes, implications, limitations and scope for future research from this study. Research outcomes of the study are discussed in section 7.1, implications are provided in section 7.2, with limitations and scope for future research described in section 7.3.

7.1 Research outcomes

Aim of the study was to determine the antecedents of alliance formation, identify the performance measures and the corresponding antecedents causing variation in performance outcomes, whereby recommendations about the SME alliance management process could be provided.

Objective 1- To study and analyze the antecedents of SME alliance formation

The alliance formation tendency of Indian manufacturing SMEs was found to be contingent on the resources they possess and their entrepreneurial orientation. While the results resonate with those of earlier studies such as Dickson and Weaver (1997); Franco and Haase (2013); Marino et al. (2008); Shan et al. (1994), the unique finding was that perceived environmental uncertainty moderates the impact of the two types of resources- tangible and intangible, on the alliance formation tendency of SMEs. Specifically, while Indian manufacturing SMEs seek to form alliances in uncertain environments when they lack tangible resources, in order to possess them, but when they possess tangible resources the alliance formation tendency decreases. In stable environments, however, the alliance formation tendency increases with an increase in tangible resources. On the contrary, possession of intangible resources only increases the tendency of alliance formation, irrespective of the perceived environmental uncertainty levels.

Objective 2- To identify and develop a set of measures for analyzing the performance of SME alliances

As opposed to the unitary approach adopted in extant literature, the study identifies and measures two distinct levels of SME alliance performance, alliance-level performance, measuring the

performance of the alliance, and firm-level performance, measuring the performance of the firm due to alliance participation.

Objective 3- To study and analyze the antecedents of SME alliance performance

Finding support for the dual-level conceptualization, results indicate that the antecedents have a differential impact on the two levels of SME alliance performance. Trust and organizational fit affect the alliance-level performance, while commitment influences firm-level performance. Similarly, the study establishes that the impact of these antecedents is not direct, but is also carried by the presence of certain other antecedents- namely communication and conflict. The influence of trust and commitment on firm-level performance was found to be partially mediated by communication, while that of trust and organizational fit on alliance-level performance was partially mediated by conflict.

7.2 Implications

The findings of the study also provide important insights, which will assist researchers and practitioners in improving their understanding on the SME alliance management process.

7.2.1 Research implications

From a research perspective, while extant research has focused mainly on the SMEs in other regions, the unit of analysis for this study was the alliances of Indian SMEs. Thus, insights from the study can be used by researchers for comparative purposes in order to improve the understanding on the SME alliance management process.

In terms of alliance formation, while earlier studies have examined the antecedents in isolation, this study identifies how firm-level antecedents affect the alliance formation patterns of SMEs by taking into account the environmental-level influence. In doing so, it answers the call by researchers such as Park et al. (2002) to combine the antecedents at both levels in studying their

impact on SME alliance formation. Similarly, while studies in extant literature (ex. Alvarez & Barney, 2005; Eisenhardt & Schoonhoven, 1996; Franco & Haase, 2013) establish the importance of possessing resources and entrepreneurial orientation to form alliances, results of this study reinforce their findings. However, possession of intangible resources was identified as the key precursor in predicting alliance formation of SMEs. Furthermore, the novel finding from the study was that perceived environmental uncertainty differentially moderates alliance formation tendency of SMEs, depending upon the type of resources they possess. Thus, the findings provide a comprehensive insight on SME alliance formation process, which can be used as the basis for obtaining specific insights in future studies by researchers.

While analyzing the impact of antecedents on SME alliance performance, as opposed to the unitary aspect hitherto used in extant literature, the study conceptualizes a dual-level approach toward measuring the construct. It also finds support for the dual-level conceptualization as both levels of alliance performance were predicted to a varying degree by the antecedents in the study. Thus, the study establishes the empirical disparateness of the two levels, indicating that they should be studied separately in future studies to obtain reliable insights on the impact of antecedents. Furthermore, researchers such as Christofferson et al. (2014) and Robson et al. (2006) find that alliance performance outcomes were not sufficiently predicted by the antecedents hitherto analyzed in extant literature as they had been studied in isolation. While they provided conceptual models for holistically testing the impact of antecedents on alliance performance, empirical research had been missing in the extant literature. This study establishes the interdependent nature of antecedents as it finds that while the key antecedents such as trust, commitment, and organizational fit affect alliance performance levels by themselves, their impact is also mediated by the levels of communication and conflict between partners. Thus, based on the results of the

study, researchers should aim to study the impact of antecedents holistically as opposed to in isolation, in future studies.

7.2.2 Practical implications

For practitioners, the study provides holistic insights on the Indian manufacturing SMEs- which are idiosyncratically defined and need resources through alliances.

In terms of alliance formation, it specifically finds that those firms which have a higher entrepreneurial orientation and possess resources are more likely to form alliances and thereby remain competitive in the marketplace. Furthermore, those that specifically possess intangible resources are more likely to be considered valuable alliance partners and exhibit greater alliance formation tendency. The importance of alliances for these firms can also be gauged from the finding that even in stable environments, when the need for external dependence decreases (Gulati, 1995; Park et al., 2002; Yamakawa et al., 2011) SMEs which had resources were more likely to form alliances. In uncertain environments, it was observed that the requirement was on obtaining tangible resources through alliance formation, which given the conditions, may be necessary for survival in the marketplace.

From an alliance performance perspective, the study finds that the interplay of antecedents disparately affects outcomes at both levels. Trust and organizational fit between an SME and its partner, with lower levels of conflict, will result in better alliance performance. Similarly, to gain benefits from the alliance, commitment by both firms, along with increased levels of communication between them, was found to be the necessary condition. Thus, by paying attention to the role of these antecedents, SME alliance managers can seek to improve the outcomes of their alliances at both levels.

7.3 Limitations and scope for future research

The study, despite the insights it provides, also carries certain important limitations. From an overall perspective, the study derives its sample from a region where SMEs are idiosyncratically defined. Similarly, though the sample size was found to be satisfactory for analysis purposes and comparable to other studies which have studied the topic (ex. Franco & Haase, 2013; Perry et al., 2004; Shakeri & Radfar, 2015; Voss, Sirdeshmukh, & Voss, 2008), it is still considered relatively small (Kock & Hadaya, 2016; Tabachnik & Fidell, 1996). For example, the findings on alliance formation tendencies of firms belonging to a particular industry were drawn based on a relatively small number of firms. The results of the study, thus, might need to be replicated in other regions as well as with larger sample sizes for generalizing them.

In terms of SME alliance formation, due to the broad population of manufacturing firms studied and reluctance of executives in the exploratory studies to disclose objective information, subjective measures were used for determining the impact of explanatory variables. Researchers can use objective measures of antecedents such as firm resources and environmental uncertainty, results which can then be compared with those of this study for obtaining reliable insights and furthering the understanding on the topic. Similarly, the interactive impact of firm-level and environmental-level antecedents, also impacts the choice of exploration-exploitation alliance formation by SMEs (Lavie and Rosenkopf, 2006; Yamakawa et al., 2011). While Park et al. (2002) test this proposition by determining how resource conditions and market demand affect exploration-exploitation alliance formation, they only study the functional perspective. Researchers could aim to determine how the antecedents at both levels affect choices of forming exploration-exploitation alliances along all three domains- functional, attribute, and structural.

From alliance performance perspective, the study utilizes subjective measures for studying the two levels of alliance performance. This was done as the contractual alliances were also included in

the scope of the study, whose performance outcomes cannot be accurately measured through other measures such as accounting (Lee & Cavusgil, 2006). In the future, accounting measures can be used to determine how firm-level performance, or the performance of equity alliances, is affected by the antecedents. The results can then be used for comparative purposes to further the understanding on the performance outcomes of SME alliances. Similarly, Subjective measures, even if they measure financial or other aspects of alliance performance, end up measuring the overall performance of the alliance (Christofferson et al., 2014). Thus, the use of accounting measures in future research could be used to study the domains of alliance performance- such as the financial performance of the alliance or firm. From the perspective of antecedents, the study, across the exploratory and descriptive approaches adopted, does not substantially explain firm-level performance. Researchers could focus on identifying and analyzing the antecedents which drive the benefits an SME receives due to participation in alliances. Furthermore, while the study uses an exploratory approach by considering the antecedents as unidimensional, future research can focus on the impact of their specific dimensions. Organizational fit, for example, was found to affect the alliance-level performance, but its various dimensions can be separately studied to determine their influence on both levels of alliance performance.

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APPENDIX A- COVER LETTER FOR SURVEY

Birla Institute of Technology and Science (BITS) Pilani
KK Birla Goa Campus

Dear Executive

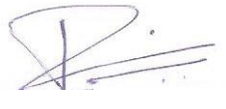
I, Rohit Prabhudesai, currently pursuing PhD in Strategic Management at the Birla Institute of Technology and Science (BITS) Pilani KK Birla Goa Campus, would like your assistance toward the completion of my research study titled 'Antecedents of SME alliance formation and performance'. The aim of this research is to determine the factors affecting the formation and performance of SME alliances. As SMEs typically suffer from lack of resources and are prone to being dominated in alliance relationships, the purpose of this study is to derive systematic inputs which could help managers to improve their alliance management skills. By doing so, the study aims to provide SMEs with a competitive edge in today's globalized business scenario. Your valuable opinion as an SME manager will assist greatly in providing critical insights on the topic.

I would like to guarantee that the responses provided by you will be kept anonymous and knowing fully the sensitivity of the data that maybe provided, full assurance is provided of keeping it confidential.

Thoroughly acknowledging the value of your time, I sincerely appreciate your efforts in completing this survey. Furthermore, a copy of the results of the survey will be made available to you in a customized format for your invaluable contribution.

Thanking you once again for your precious time and effort.

Yours Faithfully



Rohit Prabhudesai

APPENDIX B- SURVEY QUESTIONNAIRE PART A

Section A

1. Name of the firm

2. Name and designation of the respondent (optional)

3. Indicate the number of full time employees working in your firm

4. Indicate the year in which the firm was established

5. Indicate the industry in which your firm is operating

- ☐ Food, tobacco and kindred products
- ☐ Apparel, textile mill and other textile products
- ☐ Lumber, furniture, fixtures and wood products
- ☐ Paper, printing, publishing and allied industries
- ☐ Chemicals, petroleum and allied products
- ☐ Rubber and miscellaneous plastic products
- ☐ Leather and leather products
- ☐ Stone, clay, glass, and concrete products
- ☐ Primary and fabricated metal products
- ☐ Industrial, commercial machinery and computer equipment
- ☐ Electronic, electrical equipment and components
- ☐ Transportation equipment
- ☐ Measuring, photographic, medical, optical goods and clocks
- ☐ Other

6. Based on the categorization of a strategic alliance given below, indicate if your firm has currently formed an alliance with another firm.

(Types of strategic alliance: Subcontracting, contract manufacturing, buyer-supplier contracts, distribution agreement, marketing agreement, licensing agreement, R&D agreement, joint production, joint R&D, joint Distribution and marketing, minority equity purchase, equity Swap, joint Venture)

☐ Yes ☐ No

Section B

Given below are different statements measuring the resource capabilities of a firm. Please tick mark at the appropriate box to indicate your level of agreement with each statement where [1=strongly disagree, 2=partially disagree, 3=neutral, 4=partially agree, 5=strongly agree].

7. Firm resources

	1	2	3	4	5
(a) Firm possesses the capability of sourcing raw materials on its own	○	○	○	○	○
(b) Firm possesses the capability of manufacturing the products on its own	○	○	○	○	○
(c) Firm possesses the capability of distributing the products on its own	○	○	○	○	○
(d) Firm possesses the capability of raising funds internally (equity)	○	○	○	○	○
(e) Firm possesses the capability of raising funds externally (debt)	○	○	○	○	○
(f) Firm possesses the necessary technological knowhow	○	○	○	○	○
(g) Firm possesses the necessary R&D capability	○	○	○	○	○
(h) Firm possesses favorable brand reputation in the marketplace	○	○	○	○	○
(i) Firm's products enjoy favorable reputation in the marketplace	○	○	○	○	○
(j) Employees possess the necessary skills and abilities	○	○	○	○	○
(k) Managers possess the necessary operational knowhow (production techniques, quality control systems etc)	○	○	○	○	○
(l) Managers possess the necessary commercial knowhow (distribution, marketing etc)	○	○	○	○	○
(m) Firm adopts successful practices from other organizations	○	○	○	○	○
(n) Firm promotes knowledge sharing amongst employees	○	○	○	○	○
(o) Firm provides employees with training opportunities (skills training, department transfers, conference participation etc)	○	○	○	○	○

Section C

Given below are different statements measuring the entrepreneurial orientation of a firm. Please tick mark at the appropriate box to indicate your level of agreement with each statement where [1=strongly disagree, 2=partially disagree, 3=neutral, 4=partially agree, 5=strongly agree]

8. Entrepreneurial orientation

	1	2	3	4	5
(a) Top managers of the firm favor a strong emphasis on R&D, technological leadership and innovation	○	○	○	○	○
(b) Firm has introduced many new lines of products in the last three years	○	○	○	○	○
(c) Changes in product lines of the firm have been quite dramatic in the last three years	○	○	○	○	○
(d) Firm initiates actions to which competitors then respond	○	○	○	○	○
(e) Firm is often the first to introduce new products or services, techniques, technologies etc in dealing with competitors	○	○	○	○	○
(f) Firm adopts a very competitive "undo-the-competitors" posture in dealing with competitors	○	○	○	○	○
(g) Top managers of the firm have a strong proclivity for high-risk projects	○	○	○	○	○
(h) Top managers of the firm believe that owing to the nature of the environment, bold, wide-ranging acts are necessary to achieve the firm's objectives	○	○	○	○	○

Section D

Given below are different statements measuring the environmental uncertainty faced by a firm. Please tick mark at the appropriate box to indicate your level of agreement with each statement where [1=strongly disagree, 2=partially disagree, 3=neutral, 4=partially agree, 5=strongly agree].

9. Environmental uncertainty

	1	2	3	4	5
(a) The rate at which products become obsolete in the industry is very high	○	○	○	○	○
(b) Customer demand in the industry is unpredictable	○	○	○	○	○
(c) The actions of competitors in the industry are unpredictable	○	○	○	○	○
(d) There exists extreme competitive intensity within the industry	○	○	○	○	○
(e) Industry is extremely R&D oriented	○	○	○	○	○
(f) Environment within which firm operates poses a threat to firm's survival	○	○	○	○	○
(g) Environment within which firm operates is technologically very sophisticated	○	○	○	○	○

APPENDIX B- SURVEY QUESTIONNAIRE PART B

Section A

1. Name of the firm

2. Name and designation of the respondent (optional)

3. Name of the alliance partner (optional)

4. Indicate the year in which the alliance was established

5. Indicate the type of alliance formed by your firm

- ☐ Subcontracting, contract manufacturing, buyer-supplier contracts, distribution agreement, marketing agreement, licensing agreement, R&D agreement, joint production, joint R&D, joint distribution and marketing
- ☐ Minority equity purchase, equity Swap, joint Venture

6. Indicate the region in which partner firm is headquartered

- ☐ India
- ☐ Overseas

Section B

Given below are different statements describing your firm's relationship with the alliance partner. Please tick mark at the appropriate box to indicate your level of agreement with each statement where [1=strongly disagree, 2=partially disagree, 3=neutral, 4=partially agree, 5=strongly agree].

7. Antecedents of alliance performance

	1	2	3	4	5
(a) The goals and objectives for which both firms formed the alliance are similar	○	○	○	○	○
(b) The organizational values and social norms in both firms are congruent	○	○	○	○	○
(c) Our firm depends heavily on partner firm’s resources	○	○	○	○	○
(d) Partner firm depends heavily on our firm's resources	○	○	○	○	○
(e) Partner firm’s actions are in agreement with the promises made	○	○	○	○	○
(f) Partner firm can be relied upon to take the right decisions	○	○	○	○	○
(g) Our firm trusts the information provided by partner firm	○	○	○	○	○
(h) Partner firm trusts the information provided by our firm	○	○	○	○	○
(i) Partner firm has provided us with valuable information even when it was not a part of the alliance contract	○	○	○	○	○
(j) Partner firm has dedicated resources and people necessary for maintaining this alliance relationship	○	○	○	○	○
(k) Our firm has dedicated resources and people necessary for maintaining this alliance relationship	○	○	○	○	○
(l) Even if our firm could find another partner with necessary capabilities, we are not likely to terminate this alliance	○	○	○	○	○
(m) Partner firm has undertaken activities not mentioned in the alliance contract to make this alliance succesful	○	○	○	○	○
(n) Our firm has undertaken activities not mentioned in the contract to make this alliance succesful	○	○	○	○	○
(o) Exchange of information in this relationship takes place frequently and informally	○	○	○	○	○
(p) Partner firm shares critical information with our firm	○	○	○	○	○
(q) Our firm shares critical information with partner firm	○	○	○	○	○
(r) Partner firm communicates its expectations from our firm clearly	○	○	○	○	○
(s) There have been disagreements on the manner in which a task should have been performed	○	○	○	○	○
(t) Our relationship with partner firm is hostile and unfriendly	○	○	○	○	○
(u) There have been disagreements on the key alliance related decisions taken	○	○	○	○	○
(v) There have been disagreements on the allocation of resources	○	○	○	○	○
(w) There have been disagreements on the responsibility of carrying out alliance activities	○	○	○	○	○

Section C

Given below are different statements measuring the alliance performance. Please tick mark at the appropriate box to indicate your level of agreement with each statement where [1=strongly disagree, 2=partially disagree, 3=neutral, 4=partially agree, 5=strongly agree].

8. Alliance performance

	1	2	3	4	5
(a) Our firm is satisfied with the overall performance of the alliance	○	○	○	○	○
(b) Partner firm seems to be satisfied with the overall performance of the alliance	○	○	○	○	○
(c) Our firm is satisfied with the financial performance of the alliance	○	○	○	○	○
(d) Partner firm seems to be satisfied with the financial performance of the alliance	○	○	○	○	○
(e) Alliance produces results expected by both partners	○	○	○	○	○
(f) Our firm's competitive position has been greatly enhanced due to this alliance	○	○	○	○	○
(g) We have learned and benefitted from our partner's skills and competencies	○	○	○	○	○
(h) Our firm has achieved its primary objective(s) in forming this alliance.	○	○	○	○	○

APPENDIX C- NORMALITY TEST RESULTS FOR SME ALLIANCE FORMATION ITEMS

Item	K-S test statistic value	S-W test statistic value
TR1	.323**	.749**
TR2	.236**	.814**
TR3	.234**	.847**
TR4	.229**	.844**
ITR1	.214**	.864**
ITR2	.151**	.889**
ITR3	.214**	.873**
ITR4	.172**	.889**
ITR5	.187**	.872**
ITR6	.193**	.872**
ITR7	.184**	.887**
ITR8	.197**	.889**
ITR9	.214**	.862**
ITR10	.224**	.859**
EO1	.185**	.907**
EO2	.178**	.916**
EO3	.176**	.912**
EO4	.172**	.909**
EO5	.173**	.896**
EO6	.187**	.910**
EO7	.180**	.907**
EO8	.168**	.904**
PEU1	.226**	.854**
PEU2	.185**	.914**
PEU3	.191**	.910**
PEU4	.176**	.901**
PEU5	.156**	.905**
PEU6	.170**	.889**
PEU7	.165**	.901**

*Notes: **p<0.05*

APPENDIX D- NORMALITY TEST RESULTS FOR SME ALLIANCE PERFORMANCE INDICATORS

Item	K-S test statistic value	S-W test statistic value
Trust1	.301**	.795**
Trust2	.299**	.812**
Trust3	.183**	.915**
Trust4	.176**	.915**
Trust5	.182**	.884**
Commitment1	.255**	.847**
Commitment2	.250**	.863**
Commitment3	.253**	.820**
Commitment4	.248**	.837**
Commitment5	.187**	.876**
OF1	.207**	.895**
OF2	.208**	.850**
OF3	.156**	.892**
OF4	.179**	.902**
OF5	.172**	.873**
Communication1	.270**	.809**
Communciation2	.269**	.805**
Communication3	.267**	.798**
Communication4	.305**	.772**
Conflict1	.246**	.840**
Conflict2	.337**	.733**
Conflict3	.244**	.854**
Conflict4	.218**	.851**
Conflict5	.230**	.850**
AP1	.232**	.835**
AP2	.248**	.834**
AP3	.243**	.832**
AP4	.238**	.835**
AP5	.257**	.822**
FP1	.315**	.687**
FP2	.359**	.677**
FP3	.348**	.671**

*Notes: **p<0.05*

LIST OF PUBLICATIONS

Journals:

Prabhudesai, R., and Prasad, Ch. V. V. S. N. V. (2017). Antecedents of SME alliance performance: A multilevel review. *Management Research Review, 40*(12), 1261-1279 (Scopus indexed).

Prasad, Ch. V. V. S. N. V., and Prabhudesai, R. (2018). What drives SME explorative-exploitative alliance formation: An integrated perspective. *International Journal of Business Innovation and Research, 15*(1), 79-98 (Scopus indexed).

Prabhudesai, R., and Prasad, Ch, V. V. S. N. V. (2017). Understanding the international alliances of SMEs: An integrated perspective, International Journal of Entrepreneurship and Small Business. Advance online publication (Scopus Indexed).

Prabhudesai, R., and Prasad, Ch. V. V. S. N. V. (2017). What drives trust-performance relationship in SME alliances?, International Journal of Business and Globalization. Advance online publication (Scopus Indexed).

Conferences:

Prabhudesai, R., and Prasad, Ch. V. V. S. N. V. (2015). What drives small and medium enterprise exploration-exploitation alliance formation? A holistic perspective, at the 'IMRA IIMB Conference'.

Prabhudesai, R., and Prasad, Ch. V. V. S. N. V. (2016). The Antecedents of SME Alliance Formation: A Theoretical Approach, at the 'BESSH Singapore conference'.

Prabhudesai, R.; Prasad, Ch. V. V. S. N. V; Agrawal, S; Walwadkar, S. (2017). Analyzing the impact of perceived environmental uncertainty on SME alliance formation: An Indian perspective. At the 'Volatile and Uncertain Environment for Emerging Markets conference', IIT Delhi.

Prabhudesai, R., and Prasad, Ch. V. V. S. N. V. (2018). Determining the impact of entrepreneurial orientation on SME alliance formation at the 'International Conference on Entrepreneurship & Family Business', IIT Bombay (Awarded best paper award).

Prabhudesai, R and Prasad, Ch. (2018). Analysis of SME alliance performance: Review of extant literature at the 'International Conference on Economics and Finance', BITS Pilani Goa Campus.

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Till date, he has published six research papers and has presented his work in eight conferences, where his research output has also been recognized with the best paper award.

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