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**ALLIANCE MANAGEMENT CAPABILITIES AND  
INTERNATIONALISATION IN SMEs SETTING:  
THE MEDIATING ROLE OF INNOVATION  
ACTIVITY**

**NADIA ZAHOOR**

A thesis submitted to the University of Huddersfield in partial fulfilment of the requirements  
for the degree of Doctor of Philosophy

The University of Huddersfield

November 2017

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# Abstract

Inter-organisational collaboration (IOC) has been regarded as a strategic option by companies from different sizes and sectors. In this regard, IOC is often related to innovation and internationalisation performance. However, research shows that these relationships are complex and risky where approximately 50% of them fail. Accordingly, scholars have sought to understand the dynamics of IOC and pointed towards the association between alliance management capabilities (AMC) and IOC success. However, despite the development in this topic, two important gaps remain. First, it is still unclear how AMC can actually lead to superior internationalisation performance. Second, the empirical research on AMC has thus far focused upon large firms, while overlooking SMEs. In this thesis, the two gaps are addressed by examining the process by which SMEs can realise the potential value of AMC for superior internationalisation performance by using the Resource-Based View (RBV). Specifically, in this process, radical and incremental co-innovation are conceived as the two strategic actions needed to leverage AMC for internationalisation performance.

This study adopts a quantitative survey approach to address the research question. To answer the research question of this study, a sample of 278 usable responses from SMEs in UK manufacturing industries was collected through a web-based survey. The quantitative data was analysed using the structural equation modelling (SEM) technique.

The analysis confirms that AMC is positively associated with radical co-innovation and incremental co-innovation. The positive effect of AMC on radical co-innovation is stronger at high levels of alliance partner diversity. The positive effect of AMC on incremental co-innovation is stronger at low levels of alliance partner diversity. In addition, both radical co-innovation and incremental co-innovation are found to have a positive relationship with internationalisation performance. No support is found for the interaction effect of foreign market knowledge on the relationship between radical co-innovation, incremental co-innovation and internationalisation performance.

Overall, this study makes three key contributions to the extant RBV literature in general, and AMC and IOC literature in particular. First, this study answers the question of how in RBV research and considers the strategic actions through which AMC contribute to internationalisation performance. Second, this study adds to current knowledge on IOC by showing some moderating effects. In particular, this study shows that the effect of AMC on strategic action varies depending upon the level of alliance partner diversity. Finally, this study contributes to AMC literature by empirically testing the AMC construct and its dimensions (that are inter-organisational coordination, inter-organisational learning, alliance transformation, alliance proactiveness and alliance bonding) in the context of SMEs. In such cases, the influence of AMC on SMEs' pursuit of actions in IOC is identified. This study offers practical implications for the managers of SMEs to better understand the need of AMC to effectively manage and execute the strategic actions and to achieve internationalisation performance.

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# **Dedication**

*To my family for their love and support*

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*"It always seems impossible until it's done."*

- Nelson Mandela

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# List of Abbreviations

AGFI	Adjusted Goodness of fit index
AMC	Alliance management capabilities
AMOS	Analysis of moment structure
ANOVA	Analysis of variance
AVE	Average variance extracted
CFA	Confirmatory factor analysis
CFI	Comparative fit index
CR	Construct (Composite) Reliability
<i>df</i>	Degrees of freedom
$D^2$	Malahanobis's distance
EFA	Exploratory factor analysis
FAME	Financial Analysis Made Easy
GFI	Goodness-of-fit index
GOF	Goodness-Of-Fit
IOC	Inter-organisational collaboration
KMO	Kaiser-Meyer-Olkin
MBA	Master of Business Administration
MI	Modification indices
ML	Maximum likelihood
NA	Not applicable
NFI	Normative fit index
OECD	Organization for Economic Cooperation and Development
PCA	Principal component analysis
RBV	Resource-based view
RMR	Root Mean Square Residual
RMSEA	Root mean square error of approximation
SD	Standard deviation
SEM	Structural equation modeling
sig	Significance
SMEs	Small and medium-sized enterprises
SRMR	Standardised RMR
SVA	Strategic value assessment
TCE	Transaction cost economics
UK	United Kingdom
VIF	Variation Inflation Factor
$\alpha$	Cronbach's alpha
$\beta$	Standard regression coefficient
R	Pearson's coefficient
$R^2$	Squared multiple correlations
$\lambda$	Factor loading
$\chi^2$	Chi square

# Chapter 1. Introduction

*"Collaboration is important not just because it's a better way to learn. The spirit of collaboration is penetrating every institution and all of our lives. So learning to collaborate is part of equipping yourself for effectiveness, problem solving, innovation and life-long learning in an ever-changing networked economy."*

- Don Tapscott, Canadian businessman and author of the *Digital Economy*

In general, inter-organisational collaboration provides opportunities for firms to access resources from their partners, internalise superior knowledge and know how, achieve economies of scale, and develop market power allowing to absorb market risks. However, these relational linkages are becoming complex and difficult to establish and manage. Therefore, firms need to learn the art of collaboration and recognise an alliance management process that facilitate the establishment of effective external ties. In this thesis, the overarching aim is to investigate the collaboration enablers and process in the context of Small and Medium Sized Enterprises (SMEs).

This chapter presents the research problem and articulates the principal purpose of this study, and is structured as follows. First, the research background is provided. Second, the research problem is identified and a justification for the study is provided, which considers the theoretical and practical relevance of this study. Third, the purpose of this study is underlined and the research question is introduced. Fourth, a brief overview of the research approach is provided. Following this, the contribution of this study is outlined. Finally, an outline of the thesis is provided with a rough description of each chapter.

## **1.1 Research background**

To survive and prosper in today's highly competitive environment, firms are engaged in innovation and internationalisation activities (Cai, Chen, Chen, & Bruton, 2017; Odlin & Benson-Rea, 2017; Xia & Liu, 2017), where studies have documented the role of innovation and internationalisation for a firm's survival and growth (Coad, Segarra, & Teruel, 2016; Colombelli, Krafft, & Vivarelli, 2016; Golovko & Valentini, 2011). This is why the linkage between innovation, internationalisation and firm survival has fuelled great attention among policy makers and practitioners to use policy initiatives for innovation and internationalisation of SMEs (Alegre, Sengupta, & Lapiedra, 2013; Prange & Pinho, 2017).

This interest is also apparent among academics. For instance, in the innovation and international business literature, a large empirical literature has documented the linkage between innovation

and internationalisation for enhancing the productivity of SMEs (Aw, Roberts, & Xu, 2008; Cassiman, Golovko, & Martínez-Ros, 2010), thus enabling their survival. However, previous studies have explored the effect of SMEs' innovation and internationalisation activities in isolation, without considering the antecedents of these activities. Accordingly, other scholars considered the antecedents and argue that successful implementation of innovation and internationalisation depends on the characteristics of SMEs (Child et al., 2017; Dibrell, Davis, & Craig, 2008; Radas & Božić, 2009a). Among the characteristics which are the most important determinants of innovation and internationalisation activities are qualified scientists and engineers, investment in R&D, entrepreneurial orientation and market orientation (Armario, Ruiz, & Armario, 2008; Mitja, Robert, & Bostjan, 2006; Rhee, Park, & Lee, 2010). Although small firms are characterised by flexibility, they are at a disadvantage when it comes to resources (Dasí, Iborra, & Safón, 2015; Rogers, 2004). Since the successful implementation of innovation and internationalisation depends upon the concurrent utilisation of resources (Gaur, Mukherjee, Gaur, & Schmid, 2011; Mukherjee, Gaur, Gaur, & Schmid, 2013), the limited resources, whether financial, human, knowledge or others, can cause a bias for innovation and internationalisation of SMEs.

SMEs, however, have alternatives to bridge the resource gap that exists with large firms (Mesquita & Lazzarini, 2008). In this regard, scholars have stressed the importance of inter-organisational collaboration (IOC) to overcome the constraints of resources and to be able to compete with large firms (Franco & Haase, 2015; Lockett, Jack, & Larty, 2012; Whittaker, Fath, & Fiedler, 2016). IOC refers to any joint activity that is intended to increase the value by working together rather than separately (Janice, 2007). It takes many forms, such as strategic alliances, joint ventures, networks and partnerships (Knoben & Oerlemans, 2006). In the particular case of SMEs, IOC represents a viable way to gain access to external complementary resources (Hoffmann & Schlosser, 2001), embedded tacit knowledge (Cumbers, Mackinnon, & Chapman, 2003), and capital (Wynarczyk & Watson, 2005). These advantages in turn enhance the rate of innovation, which ultimately can result in internationalisation performance (Stoian, Rialp, & Dimitratos, 2017). In this context, researchers argue that internationalisation offers market niches and higher demands, thus permitting the survival and sometimes expansion of firms (Castaño, Méndez, & Galindo, 2016). Nonetheless, the possibility to reach international markets depend on the innovation that allow the SMEs to compete in the market they desire to enter (Kiss, Fernhaber, & McDougall-Covin, 2017; Prange & Pinho, 2017). In light of this importance, SMEs are relying more extensively on IOC to create innovation and drive internationalisation performance (Chetty & Stangl, 2010). At times, internationalisation performance refers to the crossing of national boundaries in the process of growth (Chiva, Ghauri, & Alegre, 2014).

Despite the substantial interest in IOC, however, the IOC is notoriously unstable and associated with a high failure rate, both in SMEs and large firms (Bengtsson & Johansson, 2012; Greve, Baum, Mitsuhashi, & Rowley, 2010; Greve, Mitsuhashi, & Baum, 2012). For example, empirical research indicates that failure rates are often in excess of 50% (Kale, Dyer, & Singh, 2002; Lunnan & Haugland, 2008), in which most of these collaborations fail from inception (Lhuillery & Pfister, 2009). Failure of IOC can cause several adverse effects. For instance, firms can incur the loss of revenues and uncompensated transfer of resources (Das, Narasimhan, & Talluri, 2006). Other effects include operational difficulty, anxiety over the loss of proprietary information and loss of reputation (Lhuillery & Pfister, 2009; Park & Ungson, 2001). Considering the fact that the IOC is unstable, scholars tried to provide comprehensive discourses on why collaborations fail (Madhok, Keyhani, & Bossink, 2015). Park and Ungson (2001) argue that failure occurs when rivalry eclipses cooperative tendencies. Indeed, in collaborative relationships, firms are mutually interdependent, which leads to the sharing of the control and management of the collaborative relationships (Cuevas, Julkunen, & Gabrielsson, 2015; Sambasivan, Siew-Phaik, Abidin Mohamed, & Choy Leong, 2013). Specifically, for mutually interdependent firms, the frequent cooperation and competition between partners can create additional complexities (Ireland, Hitt, Camp, & Sexton, 2001; Li, Liu, & Liu, 2011). Thus, the effective management of collaboration is necessary to realise their potential benefits.

## **1.2 *Justification for thesis and the gaps***

Against the aforementioned research background, the effective management of collaboration becomes a critical issue for researchers in general (Kale & Singh, 1999). They have begun to consider firm capabilities as an organisational domain relevant to the management of collaboration. In fact, some empirical studies have considered certain capabilities in the research models and found their relevance for alliance success (Kale & Singh, 2007). While Heimeriks and Duysters (2007) consider the learning mechanism to be critical for alliance management, Kale and Singh (2007) study alliance learning processes that are directed towards learning, accumulating and leveraging alliance management know-how for alliance success. Being informed about learning capabilities to improve alliance management capabilities (AMC), a new stream of researchers specifically conceptualised the construct of AMC (Schilke & Goerzen, 2010; Schreiner, Kale, & Corsten, 2009). The empirical study by Schreiner et al. (2009), for example, conceptualised AMC in terms of 'cognitive, behavioural, or organisational skills that enable a firm to effectively and efficiently manage any given alliance' (p. 1396), and Schilke and Goerzen (2010) regarded AMC as a 'distinct dynamic capability with the capacity to purposefully create, extend, or modify the firm's resource base, augmented to include the resources of its alliance partners' (p. 1195). Thus, previous work has advanced understanding about the concept of AMC that can determine the alliance success (Schilke & Goerzen, 2010) and firm performance

(Kauppila, 2015; Parida, Pesämaa, Wincent, & Westerberg, 2017; Schreiner et al., 2009). However, despite the plethora of studies on AMC, the extant literature is limited in two interrelated ways.

First, the literature is scant in terms of explaining the role of the AMC for internationalisation performance (Ciravegna, Lopez, & Kundu, 2014). Indeed, it is acknowledged by previous studies as a potential question of investigation as to how AMC leads to internationalisation performance (Stoian et al., 2017). The ignorance of the 'how' question could render biased conclusions of the relationship between AMC and internationalisation performance. This gap is equally persistent in the resource-based view (RBV) research. The RBV primarily considers the resources, both tangible and intangible, that a firm possess. Specifically, RBV argues that possession of valuable and rare resources provides the basis for competitive advantage (Barney, 1991). However, question have arisen as to how such resources affect firm performance (Kraaijenbrink, Spender, & Groen, 2010; Priem & Butler, 2001). While the RBV is influential, further development is needed to sustain its reputation (Sirmon, Hitt, & Ireland, 2007).

Second, small firms face greater risk as compared to larger counterparts due to the small size that translate into lack of resources and infrastructure (Laufs & Schwens, 2014). For these reasons, SMEs often benefit from IOC to fill the resource gap (Parida, Westerberg, & Frishammar, 2012). Despite the extensive recognition of IOC in an SME context, the previous research on AMC investigated large firms (Leischnig, Geigenmueller, & Lohmann, 2014; Schreiner et al., 2009), thus leaving the SMEs as a potential area of future research (Bengtsson & Johansson, 2012; Parida & Örtqvist, 2015). The empirical investigation into how AMC leads to internationalisation performance in SMEs, thus becomes central to this research.

To address these two gaps, this study relies on RBV and AMC conceptualisation, and proposes a model to understand how AMC lead to internationalisation performance of SMEs. In doing so, this study looks inside the actions through which AMC lead to internationalisation performance. Previously, in RBV research, it has been argued that strategic actions mediate the relationship between resources and performance (Kraaijenbrink et al., 2010; Ndofor, Sirmon, & He, 2011). Scholars alleged that failure to implement strategic actions could waste a small firm's resources and impede performance (Choi & Williams, 2016). According to RBV, strategic action refers to 'a pattern of resource allocation that enables firms to maintain or improve their performance' (Barney, 1996, p. 27). Thus, AMC are resources possessed by SMEs and strategic actions are activities that are needed to leverage the resources.

Despite the importance of strategic actions, most prior research focuses on resources as a foundation for competitive advantage (Das & Teng, 2000; Lavie, 2006). This focus can be

explained by the static resource-based view (RBV), which suggests that possession of valuable, rare, inimitable and non-substitutable resources can lead to a firm's competitive advantage and lead to superior performance (Barney, 1991). However, researchers contend that resources can influence performance only to the extent that a firm can leverage them (Lockett, Thompson, & Morgenstern, 2009; Sirmon & Hitt, 2009). Therefore, failure to include the processes when examining the effect of resources on performance can lead to underspecified models and erroneous conclusions (Kraaijenbrink et al., 2010; Ndofor et al., 2011; Priem & Butler, 2001). Put differently, the results of RBV studies without considering the process can be biased due to misattribution of effect. Based on this reasoning, this study also extends RBV research and investigates the effect of AMC on strategic actions, which ultimately result in internationalisation performance.

Innovation activities are considered (i.e., radical co-innovation and incremental co-innovation) as unique forms of strategic actions. The focus on radical co-innovation and incremental co-innovation is rationalised based on the following reasoning. First, SMEs seek to pursue radical co-innovation and incremental co-innovation because radical and incremental innovation are two important activities required for internationalisation of the SMEs (Ganotakis & Love, 2011; O'Cass & Weerawardena, 2009). Second, the strategic objective of SMEs – that is to develop new innovation or modify existing innovations – is a particularly strong determinant of IOC (Freel & Harrison, 2006; Tomlinson & Fai, 2013). The IOC is the most important strategy for SMEs to explore radical and incremental innovations (Maes & Sels, 2014; Parida et al., 2012). Third, the potential value of strategic actions depends on the attributes of underlying resources that enable firms to engage in strategic actions (Barney, 2001a). Therefore, AMC is considered as a vital resource to manage IOC (Rothaermel & Deeds, 2006). Taken together, the above arguments suggest that radical co-innovation and incremental co-innovation are appropriate strategic actions that enable realising the benefits of AMC as resources for internationalisation performance.

In addition, this study argues that the relationship between AMC, strategic actions and internationalisation performance may be contingent on other factors (Leischnig et al., 2014; Parida et al., 2017; Schilke, 2014). Accordingly, alliance partner diversity and foreign market knowledge are deemed as critical contingencies that shape the relationship between AMC-strategic actions and strategic actions-internationalisation performance respectively. Particularly, alliance partner diversity serves as a key factor that influence the impact of AMC on strategic actions. The focus on this contingent factor answers the call to research that highlights the role of alliance characteristics as a potential moderating factor (Schilke & Goerzen, 2010).

### **1.3 Purpose of the study**

Against the outlined research gaps, this study aims to add to the RBV literature in general and the AMC and IOC literature in particular by addressing the following research question:

"How AMC lead to internationalisation performance of SMEs?"

In order to address this question, two research objectives are set forth as general guiding aims. First, the objective of this research is to examine the mediating role of strategic action to relate AMC to the internationalisation performance of SMEs. The accomplishment of this objective would help to develop an understanding of the linkage between resources-actions-performance. Second, the aim of this research is to extend the understanding of AMC- strategic actions-internationalisation performance framework by considering the moderating factors that can influence such a relationship.

### **1.4 Overview of research approach**

The quantitative research approach is adopted to answer the research question. In doing so, data were collected from a survey of 278 manufacturing SMEs in the United Kingdom (UK). UK is selected as the research context for two reasons. First, it is now commonly agreed that the economy of the UK is dominated by the activities of SMEs (Cowling, 2016). In 2016, there were 5.5 million businesses in the UK, with 99% of businesses being SMEs (Rhodes, 2016). Second, a growing number of UK SMEs tend to fill resource gaps and achieve internationalisation performance through IOC (Dave & James, 2014). Despite the prevalence of collaboration, most of them fail to meet desired collaboration objectives (Bengtsson & Johansson, 2012). It is intriguing to investigate how AMC lead to collaboration success and internationalisation performance by UK SMEs. For testing the proposed relationships, multi-group structural equation modelling was performed using AMOS (version 22.0). This technique was chosen to perform the analysis as it allows the assessment of various relationships, involving multiple constructs simultaneously (Tabachnick & Fidell, 2007).

### **1.5 Study key contributions**

This study contributes to the existing literature in two ways: theoretically and methodologically. On the theoretical side, this study adds to the RBV literature in general, and AMC and IOC literature in particular.

First, in the RBV literature, the empirical representation of the path between resources and performance have been missing (Kraaijenbrink et al., 2010). This study follows the

recommendations of Crook, Ketchen, Combs, and Todd (2008) and Ndofor et al. (2011) and adds strategic actions as a mediating variable between resources and performance.

Second, the study adds to the AMC and IOC literature by considering innovation activities (i.e. radical and incremental co-innovation) as strategic actions. Previous empirical studies examined the effect of IOC strategy on innovation, which ultimately leads to internationalisation performance of SMEs (Mesquita & Lazzarini, 2008; Stoian et al., 2017), without accounting for the complex resource-actions-performance linkage. This study yields additional insights by suggesting that IOC based innovation activities serve as important strategic actions upon which SMEs can capitalise to leverage the value of AMC for internationalisation performance.

Third, from an empirical perspective, this study considers the notion of AMC in the context of SMEs. Earlier studies on SMEs examine the decisions to build IOC and many address the management decisions at different stages of the evolution of the relationship (Lee, 2007; Swoboda, Meierer, Foscht, & Morschett, 2011), without questioning the importance of AMC for SMEs and linking to strategic actions and internationalisation performance of SMEs.

Finally, the study adds to the AMC literature by considering the moderating effect of alliance partner diversity. Earlier scholars have found that distinct alliance partners require a different level of AMC for new product development (Rothaermel & Deeds, 2006). However, research to date fails to test empirically the moderating effect of alliance partner diversity on the relationship between AMC and other performance factors, despite the future research recommendations (Schilke & Goerzen, 2010). Accordingly, the moderating effect of alliance partner diversity is proposed for the relationship between AMC and strategic actions.

From a methodological perspective, the scales for strategic actions are developed and validated. Although the concept of co-exploration and co-exploitation is developed and empirically tested (Kauppila, 2015), previous literature lacks the empirical examination of radical co-innovation and incremental co-innovation. Accordingly, measures for radical and incremental co-innovation are developed for this study and empirically tested.

## **1.6     *Structure of the thesis***

As shown in Figure 1-1, the structure of this thesis is organised as follows.

### **Chapter 1 – Introduction**

The objective of introduction chapter is to set the scene of current research. This chapter is composed of justification for the study. A summary of the research contribution is also provided.

## **Chapter 2 – Systematic literature review**

The main objective of the systematic literature review chapter is to illuminate the foundation upon which the present study is based. The studies relating to the relationship between IOC, innovation and internationalisation performance of SMEs are reviewed. The structure of this chapter is three-fold. First, the review methodology is outlined. Second, substantial findings of the studies and the dominant theories within these relationships are discussed. Third, research gaps are identified and the future research direction are provided.

## **Chapter 3 – Alliance management capabilities: a critical review**

The primary objective of this chapter is to position the research. Therefore, this chapter introduces the concept of AMC and dimensions of AMC. This chapter also demonstrates the relationship between AMC and performance.

## **Chapter 4 – Conceptual framework**

This chapter is devoted to the development of the conceptual framework. The link between AMC, strategic actions and the internationalisation performance of SMEs is established, based on RBV theory and existing literature, and thus corresponding hypotheses are suggested.

## **Chapter 5 – Study context**

The aim of this chapter is to provide the background information about the context of study, that is SMEs in the UK manufacturing industry. Further, it justifies the choice of the UK economy and manufacturing industry in the UK.

## **Chapter 6 – Research methodology**

This chapter describes the research methodology with an overview of research philosophy, research logic and research approach. In addition, this chapter introduces the measures of constructs, sampling procedure, pre-testing techniques, data collection through survey and initial data screening.

## **Chapter 7 – Data analysis and findings**

The primary objective of the data analysis and findings chapter is to construct a complete picture of the research problem. This chapter is devoted to the analysis of the data, which entails a detailed descriptive analysis and validation and assessment of measurements. In addition, the conceptual model of the study is tested using structural equation modelling.

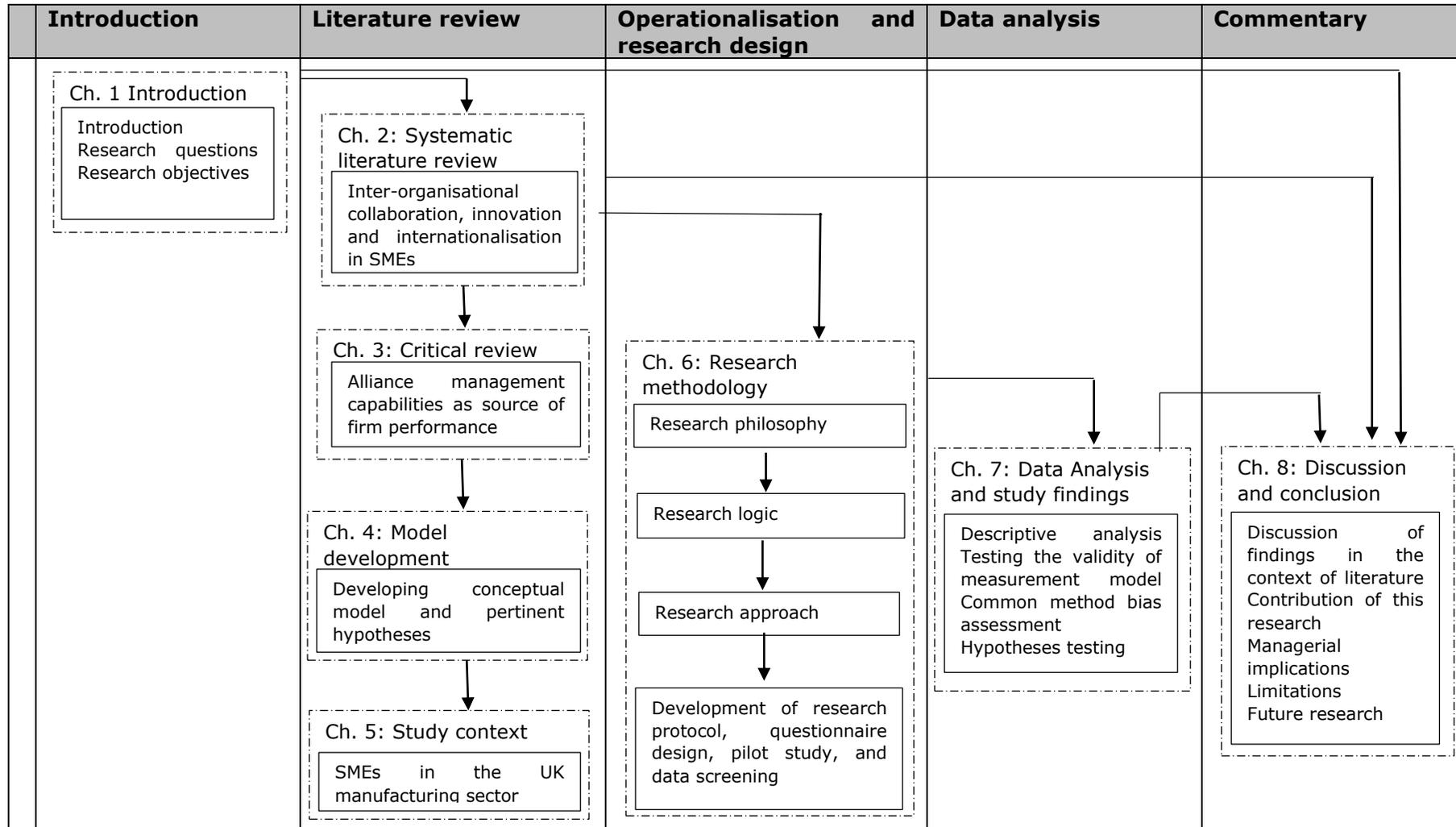


Figure 1-1: Structure of the thesis

**Notes:**

1: indicates the flow of each section to the next section

2: represents each chapter of the thesis

## **Chapter 8 – Discussion and conclusion**

The discussion chapter is dedicated to the integration and interpretation of the insights from the data analysis relating to the research question. The structure of this chapter is three-fold. First, the main findings of the study are summarised and mapped to the existing literature. Second, the key contributions of the study are underlined and potential practical implications are highlighted. Third, the limitations of the study are highlighted and possible directions for future research are recommended.

### **1.7 Conclusion**

This chapter provided the introduction for the study. It provided the research background and, detailed the research gaps and justification for this study. The chapter also introduced the purpose of study with a clear statement of research question and objectives. The research approach of this study was proposed. In addition, the study contributions were outlined. Finally, an overview of the thesis structure was presented.

The next chapter, Chapter 2, provides the systematic review of literature concerning the relationship between IOC, innovation and internationalisation performance in the context of SMEs.

This is that part of the earlier Figure 1-1 that is being addressed in the forthcoming chapter.

Introduction	Literature review	Operationalisation and Research Design	Data Analysis	Commentary
<div style="border: 1px dashed black; padding: 5px;"> <p>Ch. 1 Introduction</p> <div style="border: 1px solid black; padding: 2px;"> <p>Introduction Research questions Research objectives</p> </div> </div>	<div style="border: 2px dashed black; padding: 5px;"> <p><b>Ch. 2: Systematic literature review</b></p> <div style="border: 2px solid black; padding: 2px;"> <p>Inter-organisational collaboration, innovation and internationalisation in SMEs</p> </div> </div>			

**Notes:**

1: The bold line indicates the section going to be considered next

## **Chapter 2. IOC, innovation and internationalisation of SMEs: A Systematic Literature Review**

### **2.1 Introduction**

SMEs make a significant contribution to economies in terms of job creation and economic growth (Ayyagari, Demirguc-Kunt, & Maksimovic, 2014; de Wit & de Kok, 2014). However, there is a persistent empirical research theme that pressure on chances of survival in an industry is certainly greater for smaller firms vis-à-vis their large counterparts (Cowling, Liu, Ledger, & Zhang, 2014). Most research assumes that small firms suffer a liability of smallness and newness (Fernández-Olmos & Ramírez-Alesón, 2017; Partanen & Goel, 2017), inability to capture economies of scale (Brustbauer, 2014; Prajogo & McDermott, 2014), a greater risk of failure than larger firms due to low level of legitimacy and inability to compete against established organisations (Rhee et al., 2010; Tang & Hull, 2012). Given the aforementioned challenges, SMEs continually look for ways to survive and grow. Accordingly, literature highlighted the IOC as a strategy for small business development (Huggins & Johnston, 2009; Lin & Lin, 2016; Schoonjans, Van Cauwenberge, & Vander Bauwhede, 2013). Specifically, IOC refers to the building of tighter relationships with other companies (Rosenfeld, 1996) to achieve greater economies of scale and exploit new opportunities (Lee, Kelley, Lee, & Lee, 2012; Lee, Park, Yoon, & Park, 2010).

The literature also reveals that the establishment of IOC is capable of providing specific performance benefits that are vital to survive in today's global markets, namely, innovation (Brunswicker & Vanhaverbeke, 2015; Iturrioz, Aragón, & Narvaiza, 2015) and internationalisation (Ciravegna et al., 2014; Musteen, Datta, & Butts, 2014). Within this body of research, one stream of literature has focused on the use of IOC to reduce the risks of innovation, shorten the innovation time frames (Narula, 2004; Partanen, Chetty, & Rajala, 2014) and create innovative products and services (Verbano, Crema, & Venturini, 2015). In contrast, another stream has attempted to define the role of the IOC for reducing uncertainty and cost (Oparaocha, 2015) typically associated with the SMEs' internationalisation (Ling-yee & Ogunmokun, 2001). There is also an emerging research approach to associate the IOC with innovation and internationalisation of SMEs simultaneously (Stoian et al., 2017).

The empirical research on IOC, innovation and internationalisation relationship has largely focused on studying the variations in outcomes; however, there are a series of limitations that prevent the field from advancing further. While there is a proliferation of studies considering different innovation and internationalisation outcomes, it is not easy to understand the reasons

for contradictory findings. Several studies have argued that a better understanding of how IOC influence innovation and/or internationalisation in SMEs is necessary and that such an understanding can be obtained by investigating enablers of IOC, and facilitators/inhibitors of IOC, innovation and internationalisation relationship (Brunswicker & Vanhaverbeke, 2015; Cooke & Wills, 1999; Michaelides, Morton, Michaelides, Lyons, & Liu, 2013; Tomlinson, 2011).

This study, therefore, decides to conduct the review of literature in a systematic way. The systematic review of literature helps to develop a better understanding of the impact of IOC on innovation and internationalisation by simultaneously reviewing and assessing the literature on IOC-innovation (IOC-INN), IOC-internationalisation (IOC-INT) and IOC-innovation-internationalisation (IOC-INN-INT). In this process, this study makes two contributions.

Firstly, the first review is provided to synthesise the literature on the link between IOC, innovation and internationalisation in SMEs. With a general focus, some contributions have reviewed existing literature on specific strategy topics, such as networks and innovation (Pittaway, Robertson, Munir, Denyer, & Neely, 2004), the role of university-industry collaboration for innovation (Perkmann & Walsh, 2007) and inter-firm R&D partnerships (Hagedoorn, 2002). This indicates an important gap to the best of researcher's knowledge, as small firms have unique characteristics as well as idiosyncrasy in developing and managing IOC. Other reviews have focused on international involvement of SMEs (Martineau & Pastoriza, 2016) and innovation, exporting and growth of small firms (Love & Roper, 2015). Indeed, the previous academic efforts suggest an interlinkage between IOC, innovation and internationalisation of SMEs. However, to date, there is lack of review to summarise evidences on the relationship between IOC, innovation and internationalisation of SMEs, enduring an issue of interest for academics and practitioners. This study, therefore, considers evidences on the interaction of SME IOC, innovation and internationalisation.

Secondly, this study adopts the broader perspective and capture the complexity of field by considering different innovation and internationalisation outcomes (i.e., product innovation, process innovation, internationalisation performance, internationalisation speed etc.). In addition, the current state of knowledge is summarised regarding the enablers, moderators and mediators associated with each outcome. This focus has important implications to move the research forward.

This systematic review analysed 117 articles published between 2000 and 2016 that considered SMEs as their empirical setting. During the review, the main inquiry was set as: how can IOC influence innovation and internationalisation in SMEs?

This chapter is structured in the following manner. The next sub-section describes the methodology used to perform the review. The findings sub-section integrates the evidences into three research relationships. A discussion of the research along with the future research avenues are offered in the final sub-section.

## **2.2 Methodology**

Given the dispersed nature of the literature, this study adopts a systematic review methodology to deepen the understanding of the interrelatedness between IOC, innovation and internationalisation in SMEs setting. This review relies on Denyer and Tranfield's (2009) systematic approach and Popay et al.'s (2006) principles for narrative synthesis to develop the review protocol, as outlined in Figure 2-1.

### **2.2.1 Review question**

The review started by defining the objective, which was to establish what is known about key aspects of the dynamics between the three constructs, and to find out how these aspects may be conceptually related. Therefore, the review question was set as: How can IOC influences innovation and internationalisation in SMEs setting?

### **2.2.2 Review scope**

The review was restricted to published peer-reviewed journal articles as a validated source of knowledge with high impact on the field (Ordanini, Rubera, & DeFillippi, 2008). Similar to previous studies (e.g., Nolan and Garavan (2016); Paul, Parthasarathy, and Gupta (2016) and Rowlinson, Harvey, Kelly, and Morris (2011)), this study chose to target the articles published in journals listed in the academic journal quality guide of the Association of Business Schools (ABS) (see Appendix 1). Though, this study limited the scope of review by constricting the search to high grade journals (described as 3, 4 or 4\* journals), this measure mitigates potential reliability/validity concerns (Matthews & Marzec, 2012; Nguyen, de Leeuw, & Dullaert, 2016). To build a comprehensive database, the researcher explored databases including EBSCOhost Business Source Complete, Science Direct, SAGE Journals and Wiley Online Library. The search period included the year 2000-2016. This cutting point was selected as some review studies on this topic can be found before 2000 (e.g., Leonidou, Katsikeas, & Piercy, 1998; Nootboom, 1999). Every database was searched using the wide-ranging keywords that were divided into three categories: IOC, innovation (INN) and internationalisation (INT). The expert advice was sought, which led to exclusion of terms joint ventures, mergers and acquisitions due to different theoretical meaning (Agostini & Nosella, 2017; Street & Cameron, 2007).

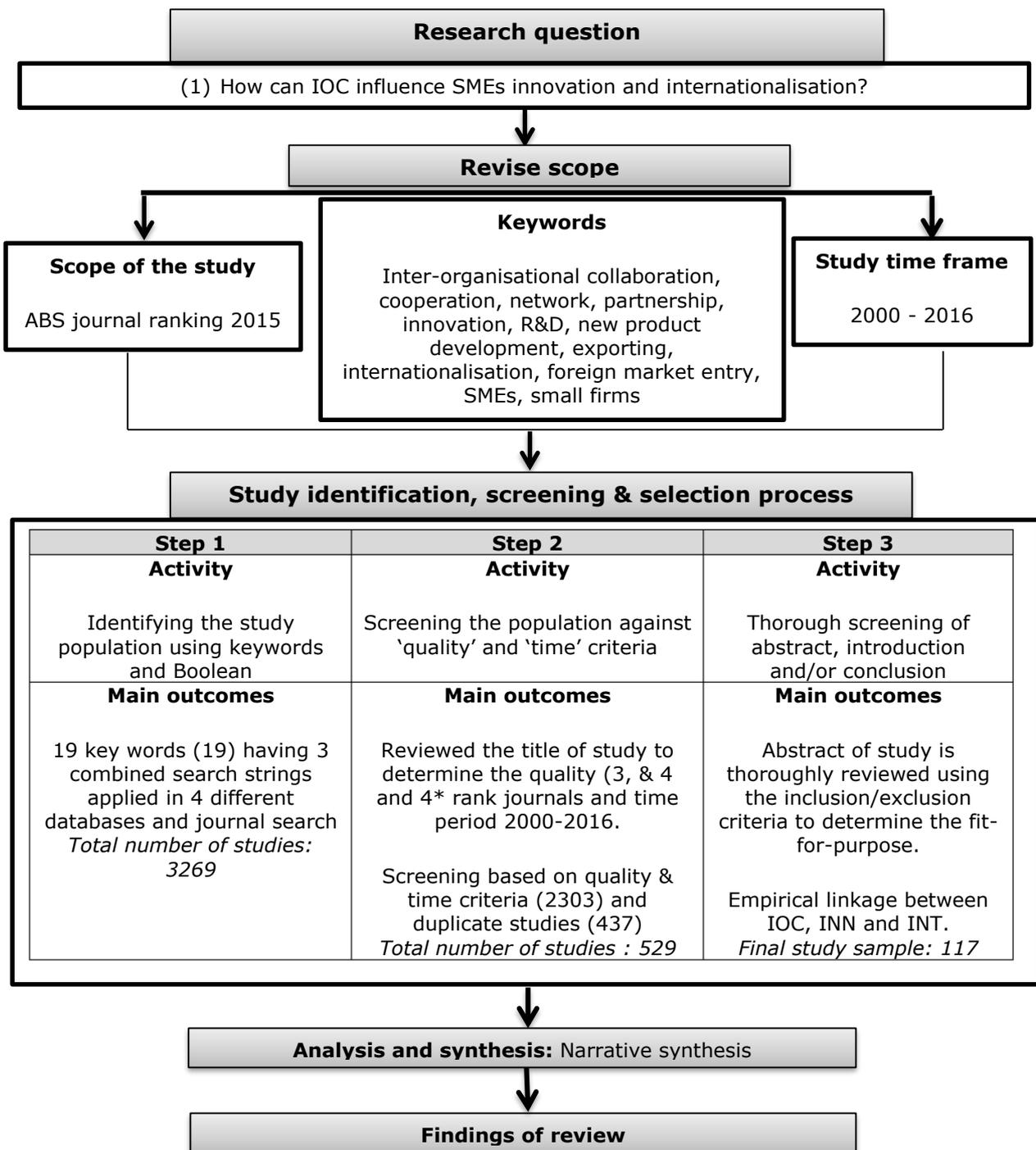


Figure 2-1: Summary of the systematic review methodology

In particular, the keywords for each of the three categories as well as the settings (SMEs) were defined, see 'group string' in Appendix 2. Then, the researcher combined between the four groups to create three research combinations (as illustrated in the 'combined strings', Appendix 2. For example, combined string 1 integrates "Inter-organisational collaboration" OR "Inter-firm cooperation" OR "Strategic alliances" OR "Network" OR "Partnership" OR "Cooperation" AND "Innovation" OR "Innovativeness" OR "New product development" OR "Research & Development" OR "R&D" AND "Small and medium-sized enterprises" OR "SMEs " OR "Small Enterprises" OR "Small companies" OR "New small ventures".

### 2.2.3 Study identification, screening and selecting process

The identification, screening and selection process of articles was conducted in three steps, as summarised in Figure 2-1. As a first step, the keywords were used in the three combined strings to search the databases, which yielded a total of 3269 potentially relevant studies. It is worth to mention that SMEs' internationalisation literature focused on exporting and international performance, while neglecting the choice of foreign direct investment (J. A. Wolff & T. L. Pett, 2000). The identified studies were imported into bibliographic software EndNote.

Second, the selected studies were checked against the 'quality' and 'time' screening criteria, Table 2-1, to refine the sample. Duplicate papers were removed using the 'find duplicate' function in EndNote. At this step, 2303 items were excluded based on quality and time criteria, as well as 437 due to duplication, leaving 529 articles for further screening.

Table 2-1: Inclusion and exclusion criteria

Description	Reason for inclusion	Reason for exclusion
Quality	<ul style="list-style-type: none"> <li>ABS 3/4 start journals</li> </ul>	All non-scholarly peer-reviewed articles, books, and non-published materials.
Time period	<ul style="list-style-type: none"> <li>Study period 2000 to 2016</li> </ul>	All articles published before the selected time period.
Abstract screening (fit-for-purpose)	<ul style="list-style-type: none"> <li>Indicates a relationship between elements of IOC and innovation in the context of SMEs</li> <li>Innovation can be product/process as well as radical/incremental</li> <li>Indicates the influence of IOC for internationalisation of SMEs</li> <li>Internationalisation in terms of entry in foreign markets, rapid internationalisation and internationalisation performance</li> <li>Indicates the linkage between IOC, innovation and internationalisation of SMEs</li> </ul>	<ul style="list-style-type: none"> <li>Conceptual paper</li> <li>This does not refer directly to determine the relationship between factors of interest (i.e., IOC, innovation and internationalisation).</li> <li>The papers focuses on large enterprises rather than SMEs.</li> <li>Paper looking at learning as a proxy for innovation.</li> <li>Exclude articles looking at IOC for overall performance of firm in terms of return on assets.</li> </ul>

Finally, and as the third step, the researcher thoroughly scrutinised the abstracts of the 529 articles by using the fit-for-purpose inclusion/exclusion criteria (Adams, Jeanrenaud, Bessant, Denyer, & Overy, 2016), as illustrated in Table 2-1. In a number of cases, it was difficult to clearly identify the study aim, theory, research method, and findings (Thorpe, Holt, Macpherson, & Pittaway, 2005), therefore articles introduction and/or conclusion was examined. In general, fit-for-purpose criterion concerns about the validation of studies to meet the intended purpose of review (Boaz & Ashby, 2003), and is used when the important consideration is the contribution of the studies to synthesis and understanding (Macpherson & Jones, 2010; Van Aken & Romme, 2009). Therefore, in this study case, this criterion was set to define the role of the IOC for innovation and internationalisation in SMEs. For this review, IOC was defined as the partnership between two or more organisations, that remain independent organisations, to share some resources and costs (Hagedoorn, 2002). Innovation has been defined based on Edwards & Gordon's innovation concept that refers to "a process that begins with an invention, proceeds with the development of the invention and result in the introduction of a new product, process or service to the marketplace" (Edwards & Gordon, 1984, p. 1). Here it is important to mention that, to be considered for this review, an innovation can be capability to innovate, technological innovation, new product/process and also minor/major change in product and process (Narula, 2004). Finally, internationalisation refers to the process of increasing involvement in international markets (Welch & Luostarinen, 1993). The application of this term provided two different advantages. First, it allowed to differentiate between two distinct dimensions of internationalisation: internationalisation speed (elapsed time between the year of firm's founding and the year of the first international venture), internationalisation performance (attainment of desired objectives and revenue in international markets). Second, it was possible to focus on export, which is a common entry mode used by small firm to enter international markets (Haahti, Madupu, Yavas, & Babakus, 2005; J. A. Wolff & T. L. Pett, 2000). By relying on these definitions, the researcher included the studies that empirically studied IOC and hence best illustrate the link with innovation and/or internationalisation in SMEs. In addition, the researcher specifically excluded the studies that primarily address the role of IOC, innovation and internationalisation for general firm performance, as this study explicitly focuses on the relationship between the IOC, INN and INT. As such, these studies were not falling within the realm of fit-for-purpose criteria. In case of ambiguity, the researcher closely discussed the study with supervisors and relied on the fit-for-purpose criteria to make the final decision. Eventually, this process resulted in 117 papers, which constituted the final sample.

#### **2.2.4 Analysis and synthesis**

Since avoidance of undue emphasis on one study relative to another requires the transparent synthesis process (Mulrow & Cook, 1998; Tranfield, Denyer, & Smart, 2003), this study

considered narrative synthesis (Dixon-Woods et al., 2006) to combine findings from 117 studies. The narrative synthesis gives the flexibility to reviewers to thematically explore the relationship between and inside studies with the aim to tell the story of findings from a diverse body of literature (Bailey, Madden, Alfes, & Fletcher, 2015; Nijmeijer, Fabbrocotti, & Huijsman, 2014). The approach to narrative synthesis is guided by Popay et al. (2006) recommendations as follows. First, the researcher started by analysing each study based on the investigated relationship, context of SMEs, types of outcomes, theoretical perspective, geographical location, sector, industry and methodology. A worksheet was designed to record this information and carefully scrutinise the information for potential errors (Bailey et al., 2015). This worksheet, thus, allowed to create the map of the field in terms of density, frequency and emerging patterns (Macpherson & Holt, 2007). Second, as informed by the analysis above, the articles were grouped in three categories: (1) IOC-INN, (2) IOC-INT and (3) IOC-INN-INT, as depicted in Figure 2-2. Using the Nvivo, the researcher started an in-depth line-by-line coding process to search in the studies for the themes and concepts that are central in three research categories. This approach resulted in four major clusters under each category: (1) relationship enablers (2) relationship moderators, (3) relationship mediators, and (4) relationship outcomes.

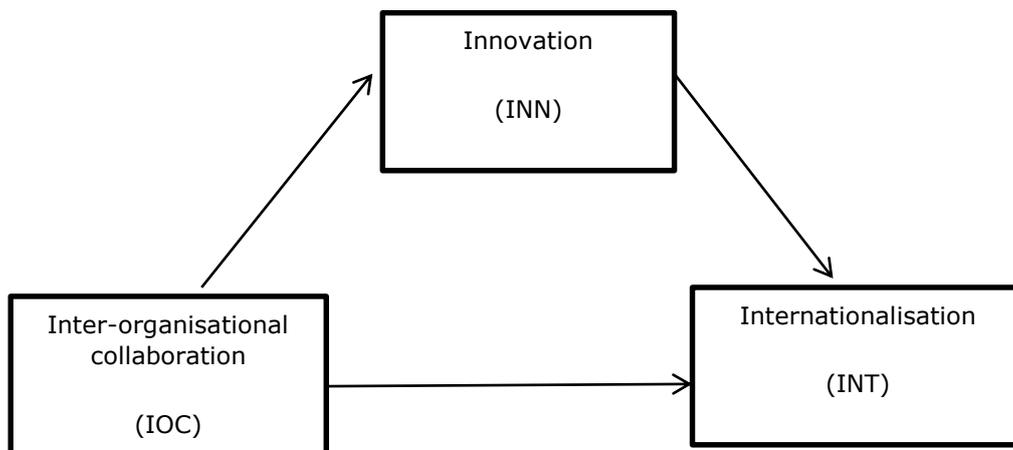


Figure 2-2: Framework of IOC, innovation and internationalisation research in SMEs settings

Third, the researcher determined the sub-clusters by searching in studies for the information that is central in three major clusters. For example, from resource-based view, capabilities to manage a relationship facilitate the establishment and success of external linkages, which untimely result in innovation. From this perspective, alliance capability is identified as a sub-cluster.

Finally, the heterogeneity/homogeneity was described in the outcomes of all the articles. For example, some studies have distinguished between the types of innovation outcomes, such as product, process, radical and incremental innovation. In addition, the studies reported the different enablers, moderators and mediators for each of the above-mentioned outcomes.

## **2.3 Findings of review**

This section reports the findings of the systematic review in two main sub-sections. The first comprises the main trends in empirical research and the second integrates the findings for relating IOC, INN, and INT in SMEs context.

### **2.3.1 Main trends in empirical research**

Examining the distribution of papers foci across the three research streams, the IOC-INN relationship was dominating ( $n = 73/117$ ), in comparison to IOC-INT link ( $n = 37/117$ ). However, research into IOC-INN-INT was limited ( $n = 7/117$ ). For publication pattern, this study sorted the publications by year as in Figure 2-3. Since the research for IOC-INN and IOC-INT relationships was published almost every year, it is worth considering that number of publications was rapidly increased in the last five years, specifically for IOC-INN ( $n = 33$ ) and IOC-INT ( $n = 16$ ). Also, it is evident that IOC-INN-INT relationship ( $n = 4$  in) has gained prominence during last five years, which highlights this combination as an emerging future research.

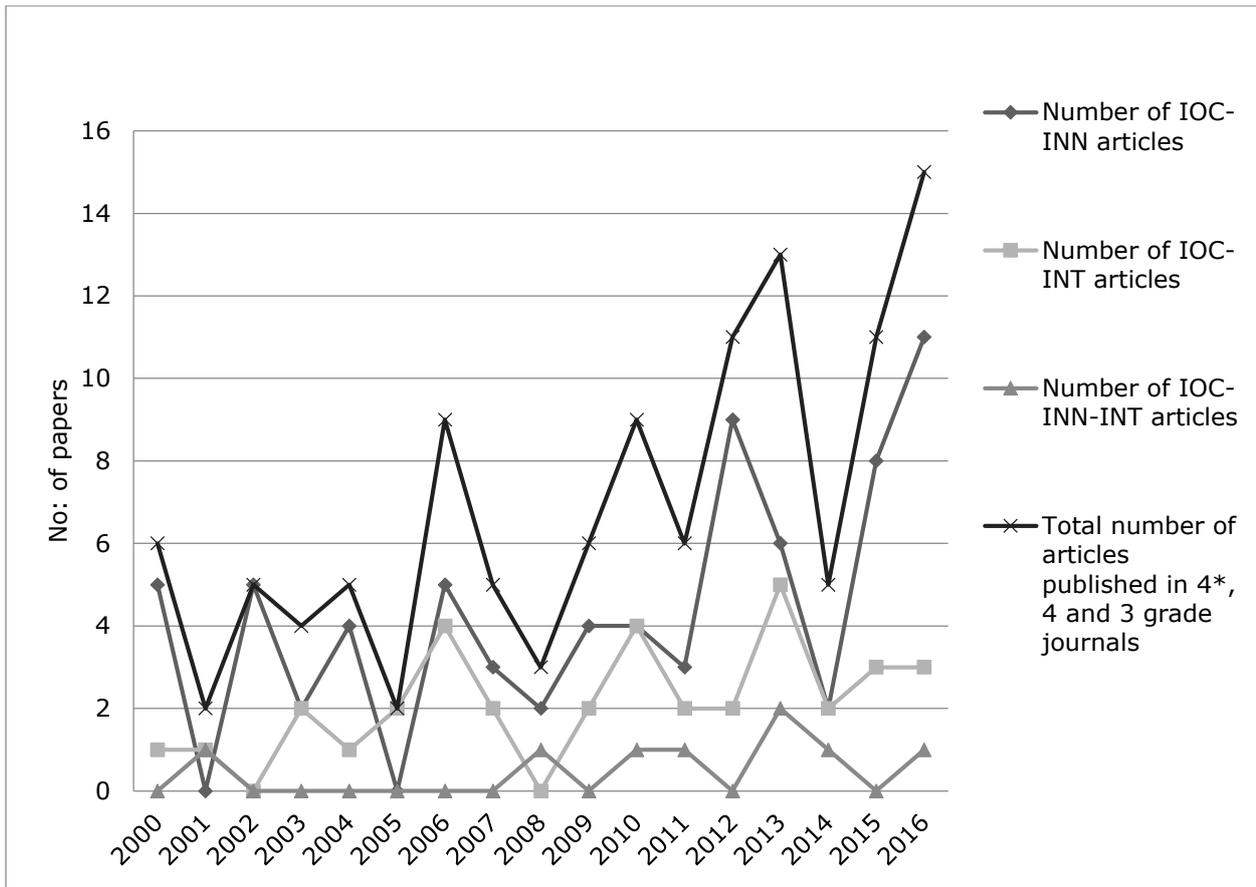


Figure 2-3: Number of publication by research field, from 2000 to 2016

**Note:**

1: Publication period covers Year 2000 – Year 2016

In terms of industry, there was a substantial bias towards manufacturing industry ( $n = 42$ ) and high-technology/low-technology industry ( $n = 32$ ). A number of studies considered manufacturing and services industry ( $n = 19$ ) as well as multiple industries ( $n = 7$ ) as empirical setting. Despite the changes in the structure of developed countries (Liddle & Lung, 2010; Lin, Sun, & Jiang, 2013), there is a lack of research focus on trade, retail and media industries. The research clearly favours manufacturing and technology industries, which suggests that innovation is the primary activity of manufacturing industries in SMEs. In addition, there is pronounced research gap in the setting of new ventures ( $n = 12$ ), albeit IOC is an attractive activity for new small businesses (Marion, Eddleston, Friar, & Deeds, 2015).

With respect to type of outcomes, innovation performance ( $n = 54$ ), product/process innovations ( $n = 16$ ) and radical and incremental innovations ( $n = 6$ ) were the most frequently investigated outcomes for IOC-INN relationship. On the other hand, internationalisation success/performance

(n = 36) and internationalisation speed (n = 7) were mostly considered in studies that investigated outcomes for IOC-INT relationship.

For research methodology, survey design was dominating (n = 60), where method of analysis varies from regression analysis (n = 60) to complex structural modeling (n = 23). In addition, the response size varies in the studies with a low of 41 responses to a high of 830 responses, but most survey studies had respondents ranging from 100 to 275. Other methodologies involved longitudinal quantitative data (n = 17), secondary data (n = 10), single case study (n = 21), and longitudinal case study (n = 4). A small number of studies used a mixed method approach (n = 5).

The primary geographic source of the studies was the Europe (58), followed by Asia (n = 20), the United Kingdom (n = 14), America (n = 11), Australia (8), Africa (n = 4) and Ireland (n = 2). In terms of diversity of countries in a research, most of the papers considered one country (n = 101), two countries (n = 3) and three countries or more (n = 13). The prevalence of countries' diversity suggests the universal research cooperation. Overall, the research was conducted in 32 different countries. Some studies focused on the emerging markets, yet research into these economies is still limited. This study investigated the correlation between the location and method of study. This established that the European countries are using both methods – quantitative and qualitative. However, there is a discrepancy between the UK and Asia, where the former relies on quantitative method while the latter uses qualitative method. Notably, the dominance of quantitative method can be an indicator of the fact that rigorous proxies are available to measure the concept of IOC, innovation and internationalisation.

Considering publications outlets, as illustrated in Appendix 1, most articles were published in entrepreneurship and small business, innovation and operations research and international business journals. Yet, it is apparent that research is lacking in general management journals like Strategic Management Journal (n = 4), Academy of Management Journal (n = 1) and Journal of Management (n = 1). It is debatable that general management research is biased towards large enterprises despite the fact that SMEs play an important role in the economic development (OECD, 2013). Consequently, it is an important area of research, which requires theoretically enriched research in the future.

Despite the fact that research is moving away from a phenomenological focus towards greater emphasis on theory (Ruzzier, Hisrich, & Antoncic, 2006), surprisingly this study counted 12 empirical studies with no theoretical foundation at all. These studies relied on the collaboration, innovation and internationalisation literature to suggest testable hypotheses. For the rest of empirical studies, several different theoretical frameworks have been identified. However, the

majority of the articles build upon Resource-Based View (RBV) (e.g., Ling-ye & Ogunmokon, 2001; Subramanian, Angappa, Muhammad, & Crystal, 2016a; Tang, 2011a), transaction cost economics (e.g., Freel & Harrison, 2006; Quintana-García & Benavides-Velasco, 2004), organisational learning theory (e.g., Bruneel, Yli-Renko, & Clarysse, 2010; Inemek & Matthyssens, 2013), and social-exchange theory (e.g. Chetty & Blankenburg Holm, 2000; Eberhard & Craig, 2013; Wu, Wu, & Si, 2016) as theoretical perspective. From a relationship perspective, IOC-INN was studied mainly using RBV followed by transaction cost economics and social exchange theory. Yet, RBV, social exchange theory and organisational learning theory were dominating IOC-INT research. Studies on IOC-INN-INT relationship considered social exchange theory as a principal theoretical lens. Notwithstanding, a small proportion of studies have used various combinations of theories. For example, Tolstoy and Agndal (2010) integrated resource-based view with network theory. They argued that resources are critical success factor for global competitiveness; however, resource accumulation process often span organisation boundaries, providing the small firms advantage over their competitors.

Table 2-2 provides a consolidated review of the theoretical perspectives as applied in studying the relationships between collaboration, innovation, and internationalisation.

Table 2-2: Summary of theoretical perspectives used in SMEs setting

<b>Theory</b>	<b>Research relationship</b>	<b>How theory is used in studying the relationship?</b>	<b>Selected examples</b>
Resource-based view	IOC-INN	Firms are heterogeneous units containing of idiosyncratic resources that are rare, valuable, inimitable and non-substitutable. Therefore, the strategic use of external resources can provide competitive advantage.	Kang and Park (2012); Lee et al. (2010); Subramanian et al. (2016a)
	IOC-INT	The firm's ability to exploit heterogeneous IOC is an intangible resource that creates value in terms of entering new markets.	Boehe (2013); Chetty and Wilson (2003)
Social exchange theory	IOC-INN	The social interaction between collaboration partners focus on the role of frequent linkage, which improves the culture of trust and commitment among partners for innovation development.	S. Gronum, M.-L. Verreyne, and T. Kastle (2012a); Wu et al. (2016)
	IOC-INT	Close personal ties among partners create the new contacts and allow the small firms to explore international opportunities.	Eberhard and Craig (2013); Ojala (2009)

	IOC-INN-INT	IOC is conducive of generating efficient innovation, which is important determinant of internationalisation.	Boso, Story, Cadogan, Micevski, and Kadić-Maglajlić (2013)
Organisational learning theory	IOC-INN	IOC is a channel of new ideas through which organisational learn new skills and apply new ideas for innovation.	Baker, Grinstein, and Harmancioglu (2016); Inemek and Matthyssens (2013)
	IOC-INT	SMEs can build the knowledge and capabilities that are needed for the internationalisation.	Bruneel et al. (2010)
Transaction cost economics	IOC-INN	IOC is an intermediate governance mechanism between markets and hierarchies.	Freel and Harrison (2006); Nieto and Santamaría (2007)

### 2.3.2 Relationships between IOC, INN, and INT in SMEs context

As described in synthesis and analysis section, there are three categories: IOC-INN, IOC-INT, and IOC-INN-INT. In each category, there are four clusters, such as outcomes, enablers, moderators and mediators with some sub-clusters as the contents of these clusters. This study has mapped all these clusters and sub-clusters in Table 2-3 – Table 2-5.

#### 2.3.2.1 IOC-INN relationship

In this section, the empirical evidences are combined about IOC-INN relationship as found in the literature review. Table 2-3 provides a holistic view of the various elements underpinning the IOC-INN relationship.

Table 2-3: Streams of IOC-INN research

No:	Outcomes	Description	Enablers	Moderators	Mediators	Reference
1	Product innovation (35)	A good or service that is significantly new or improved like changes in technical specifications	<ul style="list-style-type: none"> <li>▪ Cost minimisation</li> <li>▪ Design office (3)</li> <li>▪ R&amp;D intensity (5)</li> <li>▪ Knowledge similarity (3)</li> <li>▪ Social qualification (9)</li> <li>▪ IOC experience (3)</li> <li>▪ SVA (1)</li> <li>▪ Relational capital (10)</li> <li>▪ Structural capital (4)</li> <li>▪ Cognitive capital (3)</li> <li>▪ Environmental characteristics (1)</li> </ul>	<p><u>Firm level</u></p> <ul style="list-style-type: none"> <li>▪ Absorptive capacity (3) [+]</li> <li>▪ * Obstacles to innovation (1) [+]</li> <li>▪ * <u>Network level</u></li> <li>▪ Search diversity (1) [+]</li> <li>▪ * Collaboration diversity (1) [+]</li> <li>▪ * Strength of ties (3) [+]</li> </ul>	<p><u>Firm level</u></p> <ul style="list-style-type: none"> <li>▪ Internal collaboration (1)</li> </ul>	Howard, Steensma, Lyles, and Dhanaraj (2016); Subramanian et al. (2016a)
2	Process innovation (16)	A new or significantly improved method of production or delivery	<ul style="list-style-type: none"> <li>▪ Relational capital (3)</li> <li>▪ Structural capital (4)</li> </ul>	<p><u>Firm level</u></p> <ul style="list-style-type: none"> <li>▪ Obstacles to innovation (1) [+]</li> <li>▪ * <u>Network level</u></li> <li>▪ Proximity (2) [+]</li> <li>▪ * Strength of ties (1) [+]</li> </ul>	No empirical evidence	Hanna and Walsh (2002); Wincent, Anokhin, and Örtqvist (2010); Hervas-Oliver, Boronat-Moll, and Sempere-Ripoll (2016)
3	Radical innovation (18)	A nonlinear paradigmatic change, repressing significant departure from existing products and processes	<ul style="list-style-type: none"> <li>▪ Specialist qualification (4)</li> <li>▪ Relational capital (2)</li> <li>▪ Cognitive capital (2)</li> <li>▪ Knowledge similarity (2)</li> </ul>	<p><u>Firm level</u></p> <ul style="list-style-type: none"> <li>▪ Entrepreneurial orientation (2) [-]</li> <li>▪ ~ <u>Network level</u></li> <li>▪ Relational governance (3) [+]</li> <li>▪ * Transactional governance (2) [-]</li> <li>▪ ~</li> </ul>	No empirical evidence	Wincent et al. (2010); Inemek and Matthyssens (2013); Bouncken and Kraus (2013)

No:	Outcomes	Description	Enablers	Moderators	Mediators	Reference
				<ul style="list-style-type: none"> <li>▪ Collaboration scope (1) [-] ~</li> <li>▪ Frequency of interaction (1) [+]*</li> <li>▪ Sharing knowledge with partners (1) [+]*</li> <li>▪ Proximity (1) [+]*</li> </ul> <u>Environmental level</u> <ul style="list-style-type: none"> <li>▪ Technology uncertainty (1) [+]*</li> </ul>		
4	Incremental innovation (11)	A liner cumulative change in a product or process	No empirical evidence	<u>Network level</u> <ul style="list-style-type: none"> <li>▪ Relational governance (2) [+]*</li> <li>▪ Frequency of interaction (1) [+]*</li> <li>▪ Collaboration scope (1) [-]~</li> </ul>	No empirical evidence	Poorkavoos, Duan, Edwards, and Ramanathan (2016); Radas and Božić (2009a)
5	Technology innovation (5)	The generation of ideas for the development of products and processes	<ul style="list-style-type: none"> <li>▪ Strategic intent (1)</li> <li>▪ Specialist qualification (2)</li> <li>▪ Technological capability (1)</li> </ul>	<u>Network level</u> <ul style="list-style-type: none"> <li>▪ Strength of ties (1) [+]*</li> </ul>	No empirical evidence	Fukugawa (2006); Nordman and Tolstoy (2016)
6	Innovation capability (1)	The skills and knowledge needed to create new technologies and improve existing ones	No empirical evidence	No empirical evidence	No empirical evidence	Romijn and Albaladejo (2002)

**Notes:**

1: The numbers in the brackets indicates the number of articles in multiple clusters/sub-clusters

2: \* Indicates the positive moderating effect

3: ~ Indicates the negative moderating effect

**Outcomes.** Research on IOC-INN relationship has assessed how IOC can affect the innovation of SMEs (Propris, 2002; Zeng, Xie, & Tam, 2010). However, outcomes have been defined and conceptualised in different ways, such as product innovation (Freel, 2000; Rese & Baier, 2011), process innovation (Freel & Harrison, 2006; Subramanian et al., 2016a), radical innovation (Parida et al., 2012; Radas & Božić, 2009a), incremental innovation (Partanen et al., 2014; Poorkavoos et al., 2016), technological innovation (Fukugawa, 2006) and innovation capability (Romijn & Albaladejo, 2002). Besides, there has been an assumption that customers, suppliers, competitors and research organisations act as partners and provide the basis for innovation outcomes (Fliess & Becker, 2006; Freel, 2003). However, the broadening of the innovation outcomes has led to an uneven portfolio of enablers, moderators and mediators: some outcomes have received undue attention, while others have been neglected (see Table 2-3).

**Enablers.** The cluster 'enablers' basically refers to essential factors that allow SMEs to develop innovation-centric collaboration. On this premise, four sub-clusters emerged: IOC motives, alliance capability, social capital and partner fit. While all the enablers are vital for successful collaboration, it is evident that certain sub-clusters result in specific innovation outcomes. In the following section, the patterns found in the narrative review are described.

IOC motives reflect organisation aim when seeking collaboration activity, which are disaggregated into cost-economisation benefits, environmental uncertainty and strategic intent. Studies have found that cost-economisation (Subramanian et al., 2016a) and environmental uncertainty (Bouncken, Clauß, & Fredrich, 2016) applies for SMEs' collaboration intent for product innovation. Rather than one being preferable to other, scholars argued that environmental uncertainty constraint the financial resources of SMEs, which ultimately requires collaboration to share the product innovation cost with the partners (Baker et al., 2016). However, strategic intent to form collaboration play a role in technological innovation as SMEs wants to reduce the risk of duplication of R&D efforts and achieve synergy for R&D (Okamuro, 2007).

Alliance capability, refers as the efficient routines or skills to manage the collaborative relationship, typically increases the success of collective innovation practice (Ritter & Gemünden, 2003), thus arose as a stimulating factor for collaboration. This can be further disaggregated into design office, R&D spending, attributes of top management (specialist qualification/social qualification), previous IOC experience and strategic value assessment (SVA). Studies suggest that the existence of design office (Kaufman, Wood, & Theyel, 2000), R&D intensity (Kang & Park, 2012), social qualification (Ritter & Gemünden, 2003), IOC experience (Nieto & Santamaría, 2007) and SVA (Nijssen, Hillebrand, de Jong, & Kemp, 2012) is related to product

innovation outcome. For example, studies have assumed that the existence of design office provides qualified staff who are better able to understand the product information, which is transmitted through collaboration (Bougrain & Haudeville, 2002). In terms of R&D intensity, a number of studies have argued that R&D intensity allows the small firms to overcome the geographic distance of knowledge partners (Kang & Park, 2012; Teirlinck & Spithoven, 2013), ultimately leading to product innovation outcome. Specialist qualification equally persists even when distinguishing between radical innovation and technology innovation (Collinson, 2000; Muzzi & Albertini, 2015). By displaying technical skills, economic skills about competition, legal experience to set up contracts and experiential knowledge of collaboration, SMEs attract the attention of right collaboration partners and widen the possibilities of radical/technology innovation (Ritter & Gemünden, 2003; Sammarra & Biggiero, 2008).

Social capital, the set of resources available to a group through social relationships, is also found as a critical enabler for IOC-INN relationship (Iturrioz et al., 2015). While in the review sample only Camps and Marques (2014) and Iturrioz et al. (2015) draw on the three dimensions of social capital (relational, structural and cognitive), most scholars draw on one or two of these dimensions. The patterns of findings for this body of research appears to be more mixed than for alliance capability. Scholars have reported that relational capital - that is trust, norms, reciprocity and commitment - is needed to subordinate the desires of SMEs to joint product, process and radical innovation goals (Gronum et al., 2012a; Wincent et al., 2010). It allows the small firms to avoid opportunistic activities, which ultimately makes them an attractive partner in the exchange of resources and capabilities (Iturrioz et al., 2015; Wang & Chen, 2016). Where structural capital is at play, it increases the collaboration intensity for product and process innovation as having several weak holes can facilitate the allocation of appropriate partners (e.g., prospect partners with complementing knowledge or learning potentials) (Fukugawa, 2006; Lee, 2007). Finally, cognitive dimension allows the partners to seek shared vision, shared codes and language as well as shared narratives (Ceci & Iubatti, 2012), which facilitates the visualisation of potential collective product and radical innovations (Camps & Marques, 2014; Dooley, Kenny, & Cronin, 2016).

Similarly, a small number of studies have reported partner fit as an enabler of SMEs' innovation purpose. The concept of partner fit has been stressed in terms of technological capability, resource complementarity and resource similarity (Fukugawa, 2006; Verbano et al., 2015). Some authors have argued that knowledge similarity is related to product and radical innovation due to ease of recognising and evaluating knowledge in areas of prior familiarity (de Jong & Vermeulen, 2006; De Mattos, Burgess, & Shaw, 2013; Sammarra & Biggiero, 2008), while others have concluded that technology capability is associated with radical and technology innovation

because it creates synergies for both collaborating partners (Nordman & Tolstoy, 2016; Rese & Baier, 2011).

**Moderators.** The review revealed a number of moderators to the IOC-INN relationship, which are structured at three levels of analysis: firm, network, and environmental. Firm level involves moderating factors that reside within the firm, namely absorptive capacity and entrepreneurial orientation. Interestingly, this review has observed some inconsistencies in the literature where some moderators are related to specific outcomes. For instance, absorptive capacity, which describes the organisation's ability to use prior knowledge to recognise, assimilate and use external knowledge, fosters IOC and product innovation relationship (Tsai, 2009). Since the collaboration requires the exchange of information, SMEs with a stronger absorptive capacity can be better at generating new ideas during the information exchange process, recognise their value and integrate them in their product development (Kang & Park, 2012). In contrast, entrepreneurial orientation, refers to the degree to which organisational culture is related to aggressive strategic attitude, allows the SMEs to make significant use of collaboration for radical innovation (Marion et al., 2015). In this vein, it is suggested that the weak entrepreneurial orientation is likely to generate more benefits of collaboration for innovation because weak entrepreneurship does not allow the small firms to take risky innovation actions rather rely on external linkages (Baker et al., 2016).

At the network level, there are certain factors to influence IOC-INN relationship, namely governance mechanisms, strength of ties, search diversity, collaboration scope, strength of ties, proximity, frequency of interaction and geographic location. The evidences of network level moderators are more apparent for product and radical INN (see Table 2-3), thus leaving the room for research related to process, incremental and technology innovation. In particular, a positive relationship between IOC-product INN is more likely when there is diversity of collaboration partners (Hottenrott & Lopes-Bento, 2016), diversity of information from different partners (Ebersberger & Herstad, 2011) and strong ties between partners (Poorkavoos et al., 2016). While, Wang and Chen (2016) argue that strong ties prevent novel innovations, such ties can allow the partners to know the right person to contact in case of problem and exploit information for modifying the existing innovations (Fukugawa, 2006; Wincent et al., 2010). Evidence also suggests that relational governance (Bouncken, Clauß, et al., 2016), frequent interaction of partners (Wincent et al., 2010), knowledge sharing with partners (Bouncken & Kraus, 2013) and geographical as well as cognitive proximity (Freel, 2003) positively moderates the IOC-radical INN relationship. Few studies have found the negative moderation effect of transactional governance (Marion et al., 2015) and collaboration scope (Hottenrott & Lopes-Bento, 2016) for IOC-radical INN due to greater tension between partners and difficulty to manage information from a diverse range of partners. While collaboration scope negatively

influence IOC-incremental INN (Hottenrott & Lopes-Bento, 2016), few studies have found that relational governance (Camps & Marques, 2014) and frequent interaction among partners (Freel & Harrison, 2006) positively moderates the relationship IOC-incremental innovation.

At the environmental level, an implicit assumption is that changing and enduring conditions in the external environment of SMEs, including technological dynamism, market uncertainty and competition intensity are associated with amplification of IOC-radical INN relationship. For instance, the prevalence of technology uncertainty forces the small firms to seek IOC for the development of technological innovations in a timely and efficient manner (Bouncken, Clauß, et al., 2016). See Table 2-3 for a full summary of these moderators and their effect on collaboration outcome.

**Mediators.** Unlike the moderators, this review found limited evidence regarding the role of mediators in the IOC-INN relationship. In this vein, internal collaboration (at firm-level) is considered as a mediator between IOC-INN. For instance, Howard et al. (2016) argue that firms learn from outside partners and then form an internal collaboration to share information, which ultimately result in improved product innovation.

### **2.3.2.2 IOC-INT relationship**

Besides IOC-INN, IOC-INT appears the second dominating relationship. Studies show four clusters (with a number of sub-clusters), namely outcomes, enablers, moderators and mediators. This study has systematically mapped all these clusters in Table 2-4.

Table 2-4: Streams of IOC-INT research

No:	Outcomes	Description	Enablers	Moderators	Mediators	Reference
1	Internationalisation success (28)	The achievement of legitimacy and sales growth in international markets.	<ul style="list-style-type: none"> <li>▪ Exploitation of partner's knowledge (4)</li> <li>▪ First mover advantage (2)</li> <li>▪ Stability motive (3)</li> <li>▪ Network resource combination capability (3)</li> <li>▪ Managerial work experience (3)</li> <li>▪ Attitude towards collaboration (2)</li> <li>▪ Relational capital (5)</li> <li>▪ Cognitive capital (3)</li> <li>▪ Structural capital (2)</li> </ul>	<p><u>Firm level</u></p> <ul style="list-style-type: none"> <li>▪ Family ownership (4) [-] ~</li> </ul> <p><u>Network level</u></p> <ul style="list-style-type: none"> <li>▪ Distance from network (4) [-]~</li> </ul>	<p><u>Firm level</u></p> <ul style="list-style-type: none"> <li>▪ Information acquisition capability (3)</li> <li>▪ Adaptive capability (1)</li> <li>▪ Knowledge intensity (5)</li> </ul>	Haahti et al. (2005); Lu, Zhou, Bruton, and Li (2010)
2	Internationalisation speed (11)	It refers to the time that elapses from a firm's year of foundation until its first entry to international market.	<ul style="list-style-type: none"> <li>▪ Relational capital (3)</li> <li>▪ Cognitive capital (2)</li> <li>▪ Structural capital (2)</li> </ul>	<p><u>Firm level</u></p> <ul style="list-style-type: none"> <li>▪ Family ownership (1) [+] *</li> </ul> <p><u>Network level</u></p> <ul style="list-style-type: none"> <li>▪ Distance from network (2) [-] ~</li> </ul>	No empirical evidence	Kalinic and Forza (2012); Tang (2011a)
3	Internationalisation scope (3)	A firm's international performance in terms of export in multiple international markets.	No empirical evidence	<p><u>Firm level</u></p> <ul style="list-style-type: none"> <li>▪ Experiential learning (1) [-] ~</li> </ul>	No empirical evidence	Bruneel et al. (2010); Felzensztein, Ciravegna, Robson, and Amorós (2015)

No:	Outcomes	Description	Enablers	Moderators	Mediators	Reference
4	Internationalisation advantage (1)	The performance in international markets compared to competitors.	No empirical evidence	No empirical evidence	No empirical evidence	Ling-yee and Ogunmokun (2001)

**Notes:**

1: The numbers in the brackets indicates the number of articles in multiple clusters/sub-clusters

2: \* Indicates the positive moderating effect

3: ~ Indicates the negative moderating effect

**Outcomes.** The analysis shows that IOC positively influence internationalisation (Francioni, Vissak, & Musso, 2016; Ghauri, Lutz, & Tesfom, 2003a; Kim & Hemmert, 2016). Within this research, four forms of outcomes emerged: internationalisation speed (Ciravegna et al., 2014; Musteen, Francis, & Datta, 2010), internationalisation success (Haahti et al., 2005; Oparaocha, 2015), internationalisation scope (Felzensztein et al., 2015) and internationalisation advantage (Ling-yee & Ogunmokun, 2001). Studies on the outcomes of internationalisation speed and internationalisation success were the most common. For IOC-INT relationship, internationalisation is considered as an outcome of collaboration with customers (Bradley, Meyer, & Gao, 2006), suppliers (Chetty & Wilson, 2003; Ojala, 2009), competitors (Freeman, Edwards, & Schroder, 2006) and commercial agents (Nassimbeni, 2001). Perhaps surprisingly, this descriptive outcome cluster does not offer an insight about the consideration of the particular partner type as novel for different forms of internationalisation outcome.

**Enabler.** In this cluster, the studies can be differentiated that theorised the enablers of IOC-INT relationship. The studies considered three sub-clusters including, IOC motives, alliance capability and social capital. IOC motives are primarily studied for internationalisation success, which are disaggregated into exploitation of partner's knowledge (Bruneel et al., 2010; Richardson, Yamin, & Sinkovics, 2012), first mover advantage (Chetty & Wilson, 2003; Freeman et al., 2006) and stability motives (Crick & Spence, 2005). Arguments in favour of the motivation for IOC are that the modern era of globalisation is dominated by competition and environmental uncertainty (Matanda & Freeman, 2009), which requires SMEs' to take the initiative to establish collaboration to be fare better in obtaining partner's knowledge, entering into foreign markets and stabilising business operations (Kim & Hemmert, 2016; Ojala, 2009).

Alliance capability – as a firm's ability to manage relationship – research has been directed toward internationalisation success. It is conceptualised in terms of network resource combination capability, managerial work experience and attitude towards collaboration. The central premise of network resource combination capability is that responsive SMEs are better able to coordinate the activities with the alliance partners and combine resources, ultimately facilitating the entry in foreign markets (Tolstoy & Agndal, 2010). In terms of managerial work experience, the idea is that previous experience of SMEs' manager helps to access the information and resources from collaboration partners, which support the internationalisation success (Francioni et al., 2016; Kim & Hemmert, 2016). Attitude towards collaboration suggests that favourable attitude due to unambiguous benefits encourages the additional collaborations and supports the internationalisation success (Bradley et al., 2006).

Social capital, which is the sum of actual and potential resources possessed by an individual firm, has been studied for both outcomes internationalisation success and internationalisation

speed, although results are mixed. Considering the relational capital, close personal ties with partners provide rich information and help to mitigate the risks associated with early internationalisation (Ibeh & Kasem, 2011), while distant ties help the collaboration partners to rapidly process the information and improve internationalisation success (Musteen et al., 2010). Relative to cognitive capital, scholars are in agreement that common language between partners minimises the risks of misunderstandings that facilitate internationalisation success as well as internationalisation speed (Francioni et al., 2016; Salvador, De Villechenon, & Rizzo, 2014). Research on structural diversity suggests that closely located partners have high density to provide redundant information, facilitating the internationalisation speed, but geographically distant partners facilitates the collaborators to examine the trade-offs associated with entering into markets and translate into internationalisation success (Zhang, Ma, Wang, Li, & Huo, 2016).

**Moderator.** SMEs literature has provided evidence for the moderating factors (or sub-clusters) between IOC-INT relationships, which are also divided into three analytical levels: firm, network, and environment. Table 2-4 provides an integrative summary of the effect of these moderators.

At the firm-level, these include family ownership and experiential learning. First, relative to family ownership, this review sample has yielded conflicting evidence. For instance, a group of studies argue that family ownership negatively moderates the relationship between IOC-INT success due to the autocratic and paternalistic culture of family firms to distrust collaboration partners (D'Angelo, Majocchi, Zucchella, & Buck, 2013; Eberhard & Craig, 2013), while another group contended that family ownership has positive moderating effect for IOC-INT speed due to the succession and provision of earlier network ties (Francioni et al., 2016). Second, experiential learning negatively moderates the relationship between IOC-INT scope due to the fact that more experiential learning forces the small firm to reduce the reliance on the IOC for international expansion (Bruneel et al., 2010).

At the network level, distance to the network has been highlighted as a moderating factor. There is consensus that higher geographic and psychic distance negatively moderates the relationship between IOC-INT success and INT speed due to lack of reliable information and common language, which ultimately hinders the nurture of trust for internationalisation (Boehe, 2013; Musteen et al., 2010; Ojala, 2009). The reviewed studies are particularly lacking the evidence for the moderators at environmental level in the IOC-INT relationship, which require future research attention.

**Mediators.** A number of scholars have considered the mediating factors in IOC-INT relationship. At the firm level, three mediating factors stand out between IOC-INT success relationship: information acquisition capability to collect and analyse the information about product attributes

(Alvarez, 2004), adaptive capability to become flexible in responding to changing needs of customers (Lu et al., 2010), knowledge intensity to collect, create and disseminate knowledge in organisation (Haahti et al., 2005). However, INT scope and INT advantage literature does not explicitly grapple with the moderating and mediating factors; yet these are important, as these outcomes are completely different and requires certain environmental, institutional and network conditions for the pronounced IOC affect. In addition, the research has neglected the moderating/mediating role of environmental factors. That is, while technology, competition and institutional conditions vary in different contexts, the extent to which the changes in such conditions impact IOC-INT relationship needs to be considered.

### **2.3.2.3 IOC-INN-INT relationship**

Distinct from the studies above, another research focuses simultaneously on the relationship between the three constructs: collaboration, innovation, and internationalisation. However, this research stream was the lowest in density (as demonstrated in Table 2-5). As a specific note, this study realised only IOC-INN-INT path, where the IOC proved to enhance innovation, and thus the internationalisation of SMEs. Stating differently, the reviewed studies considered that SMEs leverage innovation in order to capitalise on the IOC for internationalisation. The findings of this section are summarised in the Table 2-5.

Table 2-5: Streams of IOC-INN-INT research

No:	Outcomes	Description	Enablers	Moderators	Mediators	Reference
1	Internationalisation success (6)	The achievement of legitimacy and sales growth in international markets.	No empirical evidence	<u>Firm level</u> <ul style="list-style-type: none"> <li>Organisation structure (1) [+] *</li> </ul>	<ul style="list-style-type: none"> <li>Innovation performance (2)</li> <li>Collective efficiencies (1)</li> </ul>	Mesquita and Lazzarini (2008); Stoian et al. (2017)
2	Internationalisation speed (3)	It refers to the time that elapses from a firm's year of foundation until its first entry to international market.	<ul style="list-style-type: none"> <li>Environmental uncertainty (1)</li> </ul>	<u>Firm level</u> <ul style="list-style-type: none"> <li>Innovation complexity (1) [+] *</li> </ul> <u>Environmental level</u> <ul style="list-style-type: none"> <li>Industry clock-speed (1) [+] *</li> </ul>	<ul style="list-style-type: none"> <li>Innovation performance (2)</li> </ul>	Andersson, Evers, and Griot (2013); Patel, Fernhaber, McDougall-Covin, and van der Have (2014)

**Notes:**

- 1: The numbers in the brackets indicates the number of articles in multiple clusters/sub-clusters  
 2: \* Indicates the positive moderating effect  
 3: ~ Indicates the negative moderating effect

**Outcomes.** Similar to the IOC-INT relationship, IOC-INN-INT outcome is a multifaceted concept. In particular, the researcher realised two sub-clusters: internationalisation speed (Patel et al., 2014) and internationalisation success (Stoian et al., 2017). The studies are almost unanimous about the significant impact of collaboration for radical and incremental innovations, which ultimately lead to internationalisation speed and success (Chetty & Stangl, 2010). However, it is not clear which type of partners is required to develop more extensive loci of product attributes that fits with the requirement of international markets. In addition, the domain remains under-investigated to determine the causality between IOC-INN-INT. Actually, in line with Stoian et al. (2017), the literature relying on longitudinal data remains overlooked compared with the high volume of survey based studies.

**Enablers.** This research seems to provide attention to internationalisation speed. In this premise, environmental uncertainty emerged as an enabler of IOC-INN-INT relationship. The studies consistently show that changes in technology, competition and customer needs can make the current products and processes as obsolete and require the development of new ones (Chetty & Stangl, 2010). To minimise the threat of innovation disuse, small firms may capitalise on collaboration to create new products and explore new market niches and achieve internationalisation speed (Patel et al., 2014).

**Moderators.** During the review of moderators for this tripartite relationship, there is an inconsistent degree of attention towards internationalisation speed and internationalisation success. For instance, at firm-level, the positive moderating effect of organisational structure is exemplified for INT success. Specifically, it has been argued that organic organisational structure – that is decentralised and informal – gives employees' opportunity to interact frequently and bring ideas for development of new innovation and successful commercialisation of innovation in international markets (Boso, Story, Cadogan, Micevski, & Kadić-Maglajlić, 2013). In contrast, environmental-level moderators (like industry clock-speed and innovation complexity) are well documented for internationalisation speed. First, industry clock-speed (i.e., the rate of change in industry in terms of products and processes) positively moderates IOC-INN-INT speed relationship because the high rate of change in the industry demands IOC for the development of innovation (Chetty & Stangl, 2010). However, it is not clear whether industry clock-speed is a proxy of environmental uncertainty. Second, innovation complexity positively moderates IOC-INT speed, considering that increased innovation complexity requires collaboration to combine diverse knowledge for rapid internationalisation (Patel et al., 2014).

**Mediators.** Within firm level sub-cluster, authors pay attention mainly to innovation performance (Nassimbeni, 2001) and collective efficiencies (Mesquita & Lazzarini, 2008). The

mediating role of innovation performance is equally evident in INT speed and success literature. The idea is consistent with the view that small firms can get access to resources of collaboration partners for the development of innovation, which ultimately leads to internationalisation speed as well as internationalisation success (Andersson et al., 2013; Ganotakis & Love, 2011). Scholars have reported the existence of some degree of heterogeneity between different kinds of SMEs' with micro-multinational enterprises possessing a strong entrepreneurial culture to manage IOC and yield stronger internationalisation outcomes, whereas exporting SMEs tend to avoid the exposure to dense collaborations that restrains their exposure to advanced level of activities in international markets (Stoian et al., 2017). Unlike innovation performance, collective efficiencies – that include collective sourcing of resources, manufacturing productivity and product innovation – mediate the relationship between IOC-INT success (Mesquita & Lazzarini, 2008). SMEs' collaboration guarantees the exchange of information, provision of efficient production processes and development of products; ultimately leveraging internationalisation success (Nassimbeni, 2001).

## **2.4 Discussion**

As noted in the introduction, interest in IOC has grown by leaps and heightens over the past several decades, where such organisational arrangement is largely perceived as fundamental for SMEs' innovation and internationalisation (Hervas-Oliver et al., 2016; Kaminski, de Oliveira, & Lopes, 2008; Richardson et al., 2012). Yet to date, the body of knowledge in this area is still fragmented and characterised by mixed findings. This review is necessarily representative and exhaustive, as the evidences are collected from the top journals of several fields. The first contribution to strategy literature is the integration of three broad spectrums into the analysis: IOC, innovation and internationalisation. The second contribution pertains to the demonstration of broad spreads of outcomes for almost every research relationship. Further, this review shows that heterogeneity of outcomes is dependent on the enablers of IOC and moderators/mediators of innovation and/or internationalisation relationship with IOC.

It is noteworthy that although that the innovation outcomes differ based on the nature (product vs. process) and complexity (radical vs. incremental), this review does not reveal a dissimilar effect among IOC and innovation outcomes. In a similar vein, internationalisation outcomes vary based on the scope and success, but IOC has similar impact on all types of internationalisation outcomes. In addition, it was found that IOC of SMEs allows them to deploy cooperative strategies that positively impact on different innovation/internationalisation outcomes.

Proposition 1: In SMEs, the impact of IOC on innovation/internationalisation do not differ with different degree of scope, complexity and nature.

The results showed that the innovation and internationalisation outcomes of IOC seem to vary depending on certain factors. Table 2-3, Table 2-4, and Table 2-5 depict how innovation and internationalisation outcomes varies based on the antecedents, moderators and mediators. Although a number of propositions can be suggested, a more general observation is:

Proposition 2: IOC related innovation and internationalisation in SMEs depend on the antecedents, moderators and mediators.

Prior research recommends that a firm must pay attention to competencies and values to embolden collective actions (Baker et al., 2016; Ebersberger & Herstad, 2011). The researcher believes that such an approach would necessarily entail taking into account the various outcomes, which can then be addressed by certain competencies and values. The review finds that alliance capability, social capital, partner fit and IOC motives are primary antecedents that are often related to the IOC-INN and IOC-INT relationship. Previous studies on IOC-INN acknowledged the alliance capability and social capital for product, process and radical innovation, thus leaving the gap for incremental, technological innovation and innovation capability (Camps & Marques, 2014; Iturrioz et al., 2015). Within IOC-INT relationship, social capital is equally studied for internationalisation success and speed. However, it must be noted that role of alliance capability and IOC motives is not acknowledged for internationalisation scope, speed and advantage. Nevertheless, the findings support previous studies stating that antecedents vary depending on the nature of outcomes (Poorkavoos et al., 2016). Hence:

Proposition 3.1: In SMEs, antecedents related to social capital, alliance capability, partner fit and IOC motives are more accentuated in product, radical and technological innovation than in process and incremental innovation.

Proposition 3.2: In SMEs, antecedents related to alliance capability and social capital are more accentuated in internationalisation success and speed than in internationalisation scope and advantage.

The result reveals the unevenness of moderators and mediators across all three relationships. The main difference was noted at firm level. Entrepreneurial orientation appears to negatively moderate the relationship between IOC and radical innovation because strong entrepreneurial firms insulate rigidity and inertia that limits learning and creates competency traps (Baker et al., 2016). On the other hand, family ownership moderates the relationship between IOC and

internationalisation success as well as speed (Eberhard & Craig, 2013; Francioni et al., 2016). This leads the researcher to propose:

Proposition 4.1: In SMEs, the relationship between IOC and innovation depend on firm-level moderators.

Proposition 4.2: In SMEs, the relationship between IOC and internationalisation depend on firm-level moderators.

## 2.5 Recommendations for future research

The review presented here uncovers gaps that could be addressed if scholars develop new studies. The researcher addresses these possibilities with suggestions for new emerging phenomena and methodological approaches (see Table 2-6).

Table 2-6: Summary of findings and research gaps

Research relationship	Findings	Research gaps
IOC-INN	<ul style="list-style-type: none"> <li>• Alliance capability, social capital and partner fits enables IOC for innovation</li> <li>• Absorptive capacity and entrepreneurial orientation facilitates the relationship between IOC-INN</li> <li>• Product/process and radical/incremental innovation outcomes are result of collaboration with different partners</li> </ul>	<ul style="list-style-type: none"> <li>□ Absence of research on the alliance capability (particularly integrating the dimensions of alliance capability)</li> <li>□ Lack of research on the conceptualisation of IOC</li> <li>□ IOC characteristics (i.e., partner diversity and strength of ties) are regarded as antecedent rather than moderators</li> </ul>
IOC-INT	<ul style="list-style-type: none"> <li>• Distance to foreign market and environmental uncertainty encourages the SMEs to develop IOC for international performance</li> <li>• Geographic proximity promotes the relationship between IOC-INT</li> <li>• Family ownership matters for IOC-INT because family firms are reluctant to collaborate and share information with outsiders</li> <li>• IOC promotes the firm capabilities to acquire the information and adapt with the changing demands of customers, which ultimately promote internationalisation</li> <li>• IOC partners accelerate the speed of internationalisation and improve international performance</li> </ul>	<ul style="list-style-type: none"> <li>□ A need to consider the issue of partner fit for the success of IOC</li> <li>□ Lack of research on the moderating role of institutional environment for IOC and internationalisation speed</li> <li>□ Contextualise IOC for internationalisation speed of young venture from emerging markets to developed markets</li> <li>□ Less interest in the relational governance mechanism</li> <li>□ Need to focus on the effect of strong and weak ties for internationalisation speed and success</li> </ul>

Research relationship	Findings	Research gaps
IOC-INN-INT	<ul style="list-style-type: none"> <li>• Technology uncertainty forces the SMEs to establish IOC</li> <li>• Small firm's organic structure promotes the information sharing, innovation development and internationalisation performance</li> <li>• Uncertain environment requires IOC for innovation generation and international performance</li> <li>• IOC is beneficial for innovation, which ultimately result in internationalisation</li> </ul>	<ul style="list-style-type: none"> <li>□ Very little research in IOC-INN-INT relationship</li> <li>□ Need to consider the role of entrepreneurial proactiveness to enable IOC for INN and INT</li> <li>□ More research is required for moderators like partner diversity, social capital</li> <li>□ Longitudinal research is needed to determine the direction of causality</li> </ul>

### 2.5.1 Addressing theme 1: Conceptualisation of IOC

There is lack of agreement and accuracy over where IOC characteristics (i.e., strength of ties, partner diversity and IOC scope) fit within the wider conceptual sphere. Some studies (e.g. Classen, Van Gils, Bammens, & Carree, 2012) position partner diversity as antecedent of innovation performance, whereas others position partner diversity as moderator (e.g. Ebersberger & Herstad, 2011). Additionally, a small number seem to overwhelm the concept of partner's geographic distance as antecedent (Partanen et al., 2014; Wincent et al., 2010) and moderator (Freel, 2003). This discrepancy is probably an indicative of the lack of agreed definition and conceptualisation of IOC. Specifically, the qualitative case study based research could better contribute to the unveiling of IOC definition. The conceptualisation could be clear through investigation of the following issues:

- How has IOC defined and theorised?
- What is the moderating role of IOC characteristics on the IOC and innovation outcome?

### 2.5.2 Addressing theme 2: Identifying antecedents of IOC

A number of issues have emerged from this review. Considering the antecedent of IOC-INN relationship, a number of studies acknowledged the role of alliance capability. They all concern the different dimensions of alliance capability, i.e., design office, R&D intensity and IOC experience. The studies, however, could go beyond and integrate all the dimensions of alliance capability to facilitate the IOC for the purpose of innovation. This can lead to a comprehensive explanation of the significance of alliance capability for IOC success in small ventures. Also, in an IOC-INT relationship, environmental uncertainty is considered an enabler of IOC (Ghuri et al., 2003a), whereas in IOC-INN they are disregarded, even though environmental

uncertainty encourages the small firms to develop complex innovations through IOC. Along the same line, social capital is considered an important enabler of IOC (Camps & Marques, 2014), however a handful number of studies considered the relationship between all the dimensions of social capital and IOC. On these premises, the following main questions can be considered:

- How environmental uncertainty impacts on IOC?
- To what extent alliance capability can influence the success of IOC in SMEs?

### **2.5.3 Addressing theme 3: Moderating and mediating variables**

The articles in this stream of literature have focused almost exclusively on the enabler, moderators and outcomes, thus treating mediators as a black box. The analysis shows that internal collaboration mediate the relationship between IOC-INN (Howard et al., 2016). Given the fact that IOC involves different partners with different structures, corporate cultures and business goals (Zeng et al., 2010), the successful development of innovation requires certain organisational practices, like a delegation of responsibility and communication. For instance, the delegation of responsibility to the right personnel reduces the cost of transmitting, receiving and processing information because employees know how to identify and assimilate external information and use for innovation projects (Foss, Laursen, & Pedersen, 2010). Moreover, the external partners' knowledge needs to be communicated to the firm units who are involved in the innovation process (van de Vrande, de Jong, Vanhaverbeke, & de Rochemont, 2009).

- What are the organisational practices, which mediate the relationship between IOC-INN?
- How can social capital moderate the relationship between IOC-INN?

When considering the relationship between IOC-INT, it has been stressed that certain factors moderate this relationship (Ling-yee & Ogunmokun, 2001). Some scholars considered firm level moderators (Eberhard & Craig, 2013), while others have identified the moderators at network level (Boehe, 2013). However, earlier scholars have overlooked the important role of intuitional environment despite the fact that intuitional arrangements (i.e., rules and policies of government) legitimise or constraints the internationalisation of small firms (Ciravegna et al., 2014). In other words, the IOC can support the internationalisation of SMEs by mainly erecting institutional barriers in foreign markets (Zhang et al., 2016). To close this gap, future studies can examine how IOC facilitates SMEs to overcome institutional challenges and consequently enter into international markets. This review also encourages future

researchers to investigate this phenomena in the context of young ventures because they have less experience, which may hamper their ability to early internationalise and cope with intuitional challenges (Kiss & Danis, 2008). Along the same line, emerging markets, like India and China have underdeveloped markets as compared to developed countries. It is a potential area of future research to consider the early internationalisation of small firms from emerging markets to international markets (Yamakawa, Peng, & Deeds, 2008).

- Does the institutional environment moderate the relationship between IOC and internationalisation speed in SMEs?
- How IOC encourages the younger ventures to internationalise from emerging markets to developed countries?

Another important issue concerns the strength of ties for the internationalisation of SMEs. There are some controversial findings in this review. One group of scholars argues that strong network ties provide access to foreign market knowledge and information about customers' demands, which ultimately influence their speed of entry into new markets and improve international performance (Musteen et al., 2010; Zhang et al., 2016). In contrast, other researchers argue that strong ties increase the degree of resource dependence and constraint the potential of small firms to recognise international opportunities (Kim & Hemmert, 2016). Therefore, weak ties can enhance international speed and performance by providing the access to information quickly and at low cost than would be the case with strong ties (Wu, Luo, & Zhou, 2007). Considering the fact that strong or weak ties have different implications (Child & Hsieh, 2014), small firms are required to take a number of decisions regarding the scope of IOC. For instance, if partners are relying on strong ties, the issue related to relational governance mechanism could become central. Stating differently, the reliance on strong ties could enhance the requirement for trust, communication and coordination mechanisms in order to enhance the quality of information exchange, which is deemed crucial for access to international markets (Freeman et al., 2006). Even though, all these factors shape the internationalisation speed and success of SMEs, the issue has not received the significant attention. Therefore, following questions are posited for future research:

- How do relational governance mechanisms facilitate the IOC and internationalisation speed?
- Does the requirement for strong and weak ties differ for internationalisation speed and success?

The literature on IOC-INN-INT is not so extensive, but a fruitful area for future research (Stoian et al., 2017). With a shift from the resource-performance link towards capabilities

research, it has been argued that possession of resources is important, but capabilities are source of transforming the resources into products or service superior to competitors (Lu et al., 2010). In this sense, scholars have sometimes presented that articulation of IOC provides resources to attain the innovation competencies and production efficiencies that are unavailable for small firms to obtain alone, which in turn enhance the access to international markets (Mesquita & Lazzarini, 2008). This state of research suggests that there is a long way ahead to develop the understanding of how IOC-INN-INT relationship occurs. The attention can be extended towards the entrepreneurial proactiveness of small firms to seek IOC resources for the innovation development and internationalisation performance.

- How does innovation mediate the IOC and internationalisation performance in new ventures?
- How does entrepreneurial proactiveness encourage IOC for innovation and internationalisation performance?

## **2.5.4 Methodological opportunities**

The following section presents the methodological opportunities for the future research.

### **2.5.4.1 Construct measurement**

This review revealed that innovation is a complex activity, which is measured in various ways. In general, it has been measured by using three different objective indicators: patent counts (e.g., J. A. C. Baum, T. Calabrese, & B. S. Silverman, 2000; Howard et al., 2016), innovation count (i.e., collecting information from databases about product/process offers) (Rothaermel, Hitt, & Jobe, 2006) and sales generated by new products (Tsai, 2009). Although these measures are regarded as a valid source of knowledge, they are not often used in the review sample. This could be due to the fact that small firms have informal innovations (Gronum et al., 2012a). The use of objective data is also not without limitation. For instance, some firms follow appropriability regimes to avoid the high cost of patent registration; therefore some patents may not be registered (Leiponen & Byma, 2009) and act as invalid measure. In addition, a large number of studies in the review sample used subjective measures, particularly in the case of survey (Ritter & Gemünden, 2003). For instance, product/process innovation rate in 3 years (Inemek & Matthyssens, 2013), cost reduction in existing products/processes (Wincent et al., 2010) and increase in the novelty of products/processes (Bouncken, Clauß, et al., 2016). It is worth considering that these measures are developed by the researches and therefore subject to validity issues (Poorkavoos et al., 2016). Also, unlike objective data, subjective data does not allow the researchers to determine the degree

of newness in products/processes. In order to overcome these issues, the researchers can use the combination of both measures: subjective as well as objective.

- How does the use of both subjective and objective measures validate the innovation performance of SMEs?

Considering the internationalisation outcome, internationalisation speed has been measured as the amount of elapsed time (in years) between the year of firm founding and the year of its first international venture (Ciravegna et al., 2014; Musteen et al., 2010); internationalisation success as the ratio of export sales to total sales (Eberhard & Craig, 2013; Kim & Hemmert, 2016) and internationalisation scope as t using number of foreign countries to which SMEs' products are exported (Zhang et al., 2016). Despite the significance of objective measure, it is difficult to get the objective data because firms are reluctant to disclose the figures of international performance (Boehe, 2013). Therefore, the more direct indicator is developed based on firm-level survey by asking questions, such as how satisfied a firm is with venture performance in terms of (a) the realisation of goals and objectives, (b) profits, and (c) sales (Brouthers, Nakos, & Dimitratos, 2015). This measure has also disadvantages because using this measure, all international markets are treated indiscriminately and it is difficult to check the international performance in each of the exporting countries (D'Angelo et al., 2013). It is, therefore, central to upgrade this approach by asking the questions about international performance in individual countries. Future studies can consider the relationship between IOC and internationalisation scope for small venture.

- How does the use of objective and subjective data determine the internationalisation performance in each exporting country?

#### **2.5.4.2 Causality assessment**

The consideration must be dedicated to methodological issues. Previous researchers heavily relied on cross-sectional design, which is not without limitation. First, cross-sectional studies collect data at a single time point and make it difficult to determine the causality. Second, the impact of IOC on innovation and ultimately on internationalisation needs time to take effect; however, cross-sectional studies suggest that the effect takes place immediately. Third, cross-sectional studies collect data for all the variables at a single point in time from one informant usually. This is problematic because the extent of the effect differs for different intervals. Finally, there is reliance on self-report data, which raises the concern of common method bias (CMB). CMB is a measurement error which can undermine the validity of a research (Boehe,

2013). The future research can mitigate the issues of cross-sectional research by using multiple informants, time lags to collect data and objective data. Another future recommendation could be use of longitudinal research because it allows to determine the reverse causality between IOC-INN-INT (Stoian et al., 2017).

## **2.6 Limitations of review**

Although the systematic review of empirical evidences is conducted, there are a number of limitations that should be taken into account. First, the researcher restricted the review to peer-reviewed journal articles (i.e., 3 and 4 grade journals according to ABS Journal ranking). This decision was taken to ensure the quality of review, but will have limited the scope of review. Second, this review did not extend the scope of the search to include general firm performance: for instance, studies that were theorising IOC and innovation with financial performance or firm growth. This decision was taken on practical reason in that number of items may be so vast to be unmanageable. On theoretical reason, these items would have distorted the focus to investigate the interrelationship between IOC-INN-INT. However, future studies could pay specific attention to investigate these bodies of work together.

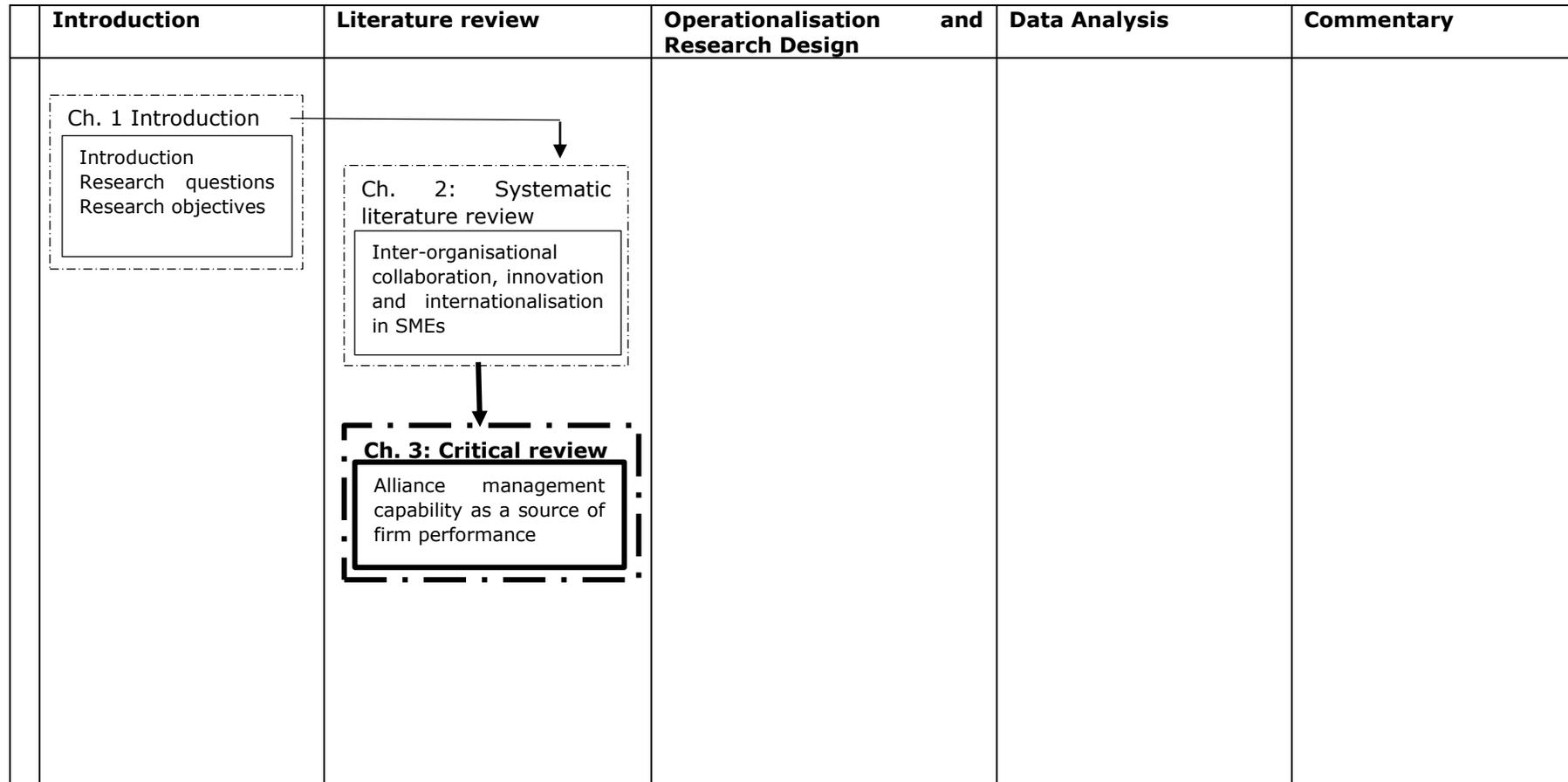
## **2.7 Conclusion**

While innovation and internationalisation related benefits of the IOC are widely acknowledged in SMEs literature, the empirical evidences have been fragmented. This chapter, therefore, systematically reviewed the literature about the interrelationship between IOC, innovation and internationalisation of SMEs. First, the review protocol was established to find and review the relevant studies. Second, main trends in the empirical research are captured along the discussion of theories that inform the different relationships. Further, the empirical evidences were reviewed in relation to IOC, innovation and internationalisation relationship. Going by the empirical evidence from this review, it is sufficient to argue that heterogeneity in outcomes arises due to two reasons: (1) different enabling factors may be needed to establish IOC and (2) moderating/mediating factors are required to capture the innovation and internationalisation benefits that IOC offers (Brunetto & Farr-Wharton, 2007; Vrgovic, Vidicki, Glassman, & Walton, 2012).

In the next part, the key insights from the literature were gathered and discussed. Next, the recommendations were provided for the future research. It is believed that a rehabilitated emphasis on research themes and methodological consideration has great promise for scholars in developing better normative advice for SMEs. The systematic review suggests that the important theme to this research is the proposition that some IOC relationships are more successful than others and provide innovation and internationalisation advantage.

Furthermore, the majority of research highlighted the importance of alliance capability as an important enabler for the success of IOC in SMEs. Therefore, the present study focuses on alliance capability as an enabler of IOC for innovation and internationalisation performance of SMEs. Further discussion of alliance management capabilities is provided in the next chapter to particularly understand the alliance management capabilities and their impact on the performance of firms. The next chapter presents a detailed description of the alliance management capabilities and performance implications.

This is that part of the earlier Figure 1-1 that is being addressed in the forthcoming chapter.



# **Chapter 3. Alliance Management Capabilities: A Critical Review**

## **3.1 Introduction**

The previous chapter provides the systematic review of IOC, innovation and internationalisation of SMEs. The results of systematic review suggest the importance of alliance management capabilities (AMC) as determinant of the success of IOC for innovation and internationalisation performance. It is, therefore, vital to evaluate and critically review the body of literature on AMC, which is at the core of this chapter. This chapter is divided into six sections.

After providing the introduction, the second part of the chapter describes the evolution of AMC. From this, the notion of the AMC is explained by reviewing its fragmented definitions and alternative classifications. In addition, the dimensions of AMC are discussed. Following on from that, the fourth part critical evaluates the previous studies to enhance the understanding of the linkage between AMC and performance outcomes. The fifth part discusses the knowledge gaps in the existing literature and provides the reasons as to why this study should address these gaps. Finally, the last part summarises the chapter by explaining how literature has informed this study.

## **3.2 The emergence of AMC**

Since the 1970s, there is tremendous increase in the number of newly established collaborations (Duysters, De Man, & Wildeman, 1999), which led to the emergence of complex inter-organisational relationships in which firms are connected to each other through direct or indirect ties (Alvarez, 2004). In such an environment, knowledge flows between firms, which make the collaboration as mutually interdependent where each party becomes vulnerable to other partners (Carpenter, Li, & Jiang, 2012; Xia, 2011). According to PwC's 2017 Global CEO Survey, 48% of global CEOs are expecting to make IOC, particularly strategic alliances, in 2017, down only 1% from 2016 (PWC, 2017). According to an estimate, Fortune 500 companies have an average of 50-70 alliances each (The Economist, 2009). This suggests that competition occurs between partnering firms rather than between individual firms. Yet, despite exponential growth, scholars projected that 50% to 60% of the alliance actually fail (Belso-Martínez, 2006; D'Angelo et al., 2013; Park & Ungson, 2001). Previous research also shows that alliance performance differs among firms (Dyer & Singh, 1998). Although some firms experience significant alliance success, many other experience failures (Ahlstrom, Levitas, Hitt, Dacin, & Zhu, 2014; Li, Jiang, Pei, & Jiang, 2017). While parties cooperate at early stage of collaboration, they might compete with

each other at later stage and act opportunistically by withholding important information or cheating the others (Musarra, Robson, & Katsikeas, 2016; Niesten & Jolink, 2017). In addition, the utter complexity of the collaboration relationship can prevent the partners from assessing their contributions, leading to perceptions that their contributions are unbalanced (Muthusamy & White, 2005). As one partner learns faster about the other, dependencies increase and ultimately creates more asymmetry. Even in a complementary relationship, it is a daunting task to manage the organisational dissimilarities and increase the collaboration performance (Albers, Wohlgezogen, & Zajac, 2013; Cui, 2013). In spite of the collaborations failure and challenges, these arrangements are necessary in today's global environment due to lack of resources to achieve a sustainable competitive advantage (Gomes, Barnes, & Mahmood, 2016; Weber, Weidner, Kroeger, & Wallace, 2017).

The IOC researchers, therefore, become interested to investigate the organisational-level factors that determine the success of collaborations (particularly of strategic alliances) (Feller, Parhankangas, Smeds, & Jaatinen, 2013; Hutt, Stafford, Walker, & Reingen, 2000; Kale et al., 2002). These factors include: complementary resources, idiosyncratic resources and alliance capability. First, success of alliance depends on the complementary resources that refers to "*the degree to which firms in an alliance are able to eliminate deficiencies in each other's portfolio resources by supplying distinct capabilities and knowledge*" (Lambe, Spekman, & Hunt, 2002, p. 144). In this context, scholars assert that complementary resources can create mutual interdependent and facilitates the formation, development and collaborative effectiveness of alliance success (Harrison, Hitt, Hoskisson, & Ireland, 2001; Sarkar, Echambadi, Cavusgil, & Aulakh, 2001). Second, idiosyncratic resources – that are developed during the lifetime of the alliance, created by combining respective resources of partners and unique to the alliance-facilitates the integration of the partner resources and leads to greater joint alliance success (Wittmann, Hunt, & Arnett, 2009). Based on RBV, Das and Teng (2000) suggest that the alliance partners develop idiosyncratic resources, which may create a synergistic effect such that more value is created in partnership as compared to separate value created by individual firms. Since idiosyncratic resources are exclusive to the collaborative relationships and constantly evolve, they allow the collaborations to sustain the resilience and inimitability of the resource advantage (Hunt, Lambe, & Wittmann, 2002). Finally, within an organisational level domain, scholars explicitly considered the firm capabilities that are significantly associated with alliance success (Heimeriks & Duysters, 2007). These capabilities are termed as 'alliance management capabilities' (AMC). In an individual alliance context, AMC are defined as the ability of an organisation to manage individual alliances that increases the chances of alliance success in each of these alliances (Sluyts, Matthyssens, Martens, & Streukens, 2011). AMC allow the firms to work across partner's organisational boundaries and thereby engage in effective joint actions (Schreiner et al., 2009). Also, AMC facilitates a firm to improve its own knowledge about the

idiosyncrasies and alliance goals of partner firms (Leischnig et al., 2014), which help to realise joint business opportunities (Kale et al., 2002).

Despite the proliferation of studies about complementary and idiosyncratic resources, there is an emerging preference for the AMC to effectively manage the alliance in order to realise the alliance benefits (Anand & Khanna, 2000; Draulans, deMan, & Volberda, 2003). The research trend for AMC is justified on the following grounds. First, from the resource-based view, AMC can be regarded as valuable, rare, inimitable and nonsubstitutable resources that are possessed by an organisation, and thus, they can be a source of competitive advantage (Barney, 1991). Particularly, AMC are valuable because they determine the alliance success (Kale & Singh, 2007) and expedite the realisation of alliance objectives (Ireland, Hitt, & Vaidyanath, 2002). Yet, AMC are rare (Dyer & Singh, 1998) because some firms fail to reap the benefits of alliances (Chao, 2011). Indeed, AMC are inimitable (Gulati, 1998) because firms build these capabilities through the repeated alliance experience along a unique path (Heimeriks & Duysters, 2007) that is difficult for competitors to imitate (Barney, 1991). AMC as organisational resources are nonsubstitutable as they are difficult to imitate (Crook et al., 2008; Sluyts et al., 2011). Taking together, value, rarity, inimitability and nonsubstitutability of AMC make these capabilities a source of competitive advantage (Barney, 1991). Second, since complementary or idiosyncratic resources help the firms to sustain or develop alliance performance, firms need to search for specific partners having specialised resources that are not readily available in other firms (Jones, Hesterly, Fladmoe-Lindquist, & Borgatti, 1998). Improper partner selection and variation in the expected alliance value make the resources ineffectual for alliance success (Ireland et al., 2002). Pekar and Allio (1994) further add to this argument by saying that partnering firms may face difficulty in linking alliance objectives with the complementary and idiosyncratic resources due to lack of focus on partner selection and relationship building. Thus, the significant alliance success factor is not the characteristics of the alliance, but the skills of partners to manage the alliance. Nevertheless, without the necessary AMC, the potential that is present in alliances of an organisation cannot be fully realised.

With a growing interest in AMC, different streams of research seem to have materialised. The next section brings together the insights about different streams of AMC literature along the most salient elements encompassing these streams.

### **3.3 Conceptualisation of AMC**

The concept of the AMC is defined differently, where three different streams of research can be realised, as summarised in Figure 3-1. While first stream focused on the deliberate actions to develop AMC, second stream considered structural mechanisms to develop AMC and third stream

considered the constituent elements of AMC. Each of these three streams change the essential meaning of AMC and the expected empirical results considerably.

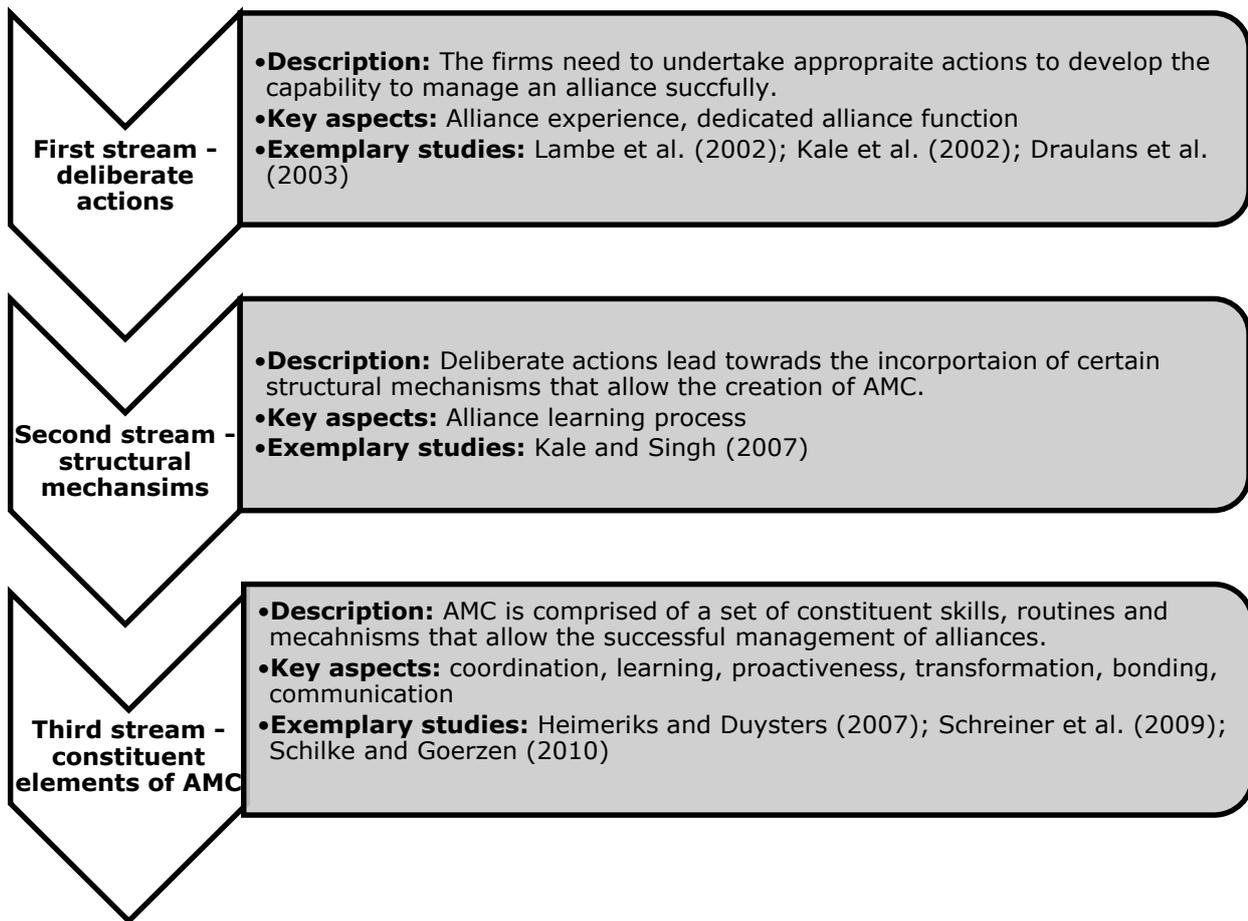


Figure 3-1: Summary of fundamental research streams pertaining to AMC conceptualisation

In the first stream, deliberate actions appear to be the determinant of AMC's development. The deliberate actions refer to the learning efforts that help to build the expertise needed for alliance success (Dyer, Kale, & Singh, 2001). As mentioned in Figure 3-1, alliance experience and dedicated alliance function appeared to be the dominant deliberate actions within the first stream of literature. For instance, Lambe et al. (2002) followed the logic of resource-based view and viewed AMC as a higher-order resource that is the combination of lower order resources namely, alliance experience, alliance manager development capability and partner identification propensity (Harbison & Pekar Jr, 1998; Hoang & Rothaermel, 2005; Lambe et al., 2002). On the surface, there is abundance of explanation that accumulation of alliance experience helps the firms to learn as to how create value and therefore, allows the success of an alliance (Anand & Khanna, 2000). However, Kale et al. (2002) argued that alliance experience is important, but it is still unclear as to what firms do with alliance experience that allows them to achieve greater

alliance success. Indeed, there is ample anecdotal evidence suggesting that firms, on the basis of repeated alliance experience, develop the capabilities to manage the alliances (Dyer & Singh, 1998). Accordingly, it has been stressed that alliance capability rests upon how efficiently a firm is being able to capture, share and disseminate the alliance management know-how related with the earlier alliance experience (Zollo & Winter, 2002). Kale et al. (2002, p. 750), therefore, suggest that *"a firm can capture, integrate and disseminate alliance management know-how through the creation of a separate, dedicated alliance function with the responsibility to capture prior experience"*. The central argument was based on the notion of dedicated alliance function, which act as a focal point to learn and leverage lessons from prior and ongoing alliances (Dyer et al., 2001; Kale & Singh, 1999). In addition, the alliance function unit increases the tacit knowledge of the firm with regard to alliance management (Draulans et al., 2003; Dyer et al., 2001). For instance, managers in the alliance function can develop the first-hand experience with regard to alliance formation to termination (Doz & Hamel, 1998). Draulans et al. (2003) extend the work of Kale, Dyer and Singh by incorporating three mechanisms: dedicated alliance function, alliance training and alliance evaluation. Considering the case of experienced and inexperienced firms, Draulans et al. (2003) suggest that regular evaluation of alliance, use of alliance specialist and provision of training raises the alliance success potential for inexperienced firms. Not surprisingly, scholars in this stream explained the creation of AMC through alliance experience and most importantly through investment in dedicated alliance function. Despite the intuitive appeal of the first stream, scholars suggested the need to extend the conceptualisation further by incorporating other factors that may also play a role in the creation of AMC.

The second stream of research focused on the firm-level structural mechanisms, as exhibited in Figure 3-1. In particular, structural mechanisms refer to hierarchical structures, teams, and rules and directives for learning and the accumulation of knowledge relevant to managing tasks (Zollo & Winter, 2002). As a case example, building on the notion of dynamic capability and knowledge-based view, Kale and Singh (2007) proposed the concept of alliance learning process. Alliance learning process is defined as a process to articulate, codify, share and internalise alliance management know (Kale & Singh, 2007). For instance, articulation of alliance management knowledge helps to keep the record of prior alliance history and ex-post sense making of actions in prior alliances (Zollo & Winter, 2002). On the other hand, codification allows the managers not only to replicate and transfer alliance best practices, but also to identify what those practices are. Sharing is concerned with the exchange and dissemination of alliance management knowledge through interpersonal interaction within the organisation (March, Sproull, & Tamuz, 1991). Finally, internalisation places emphasis on the absorption of relevant knowledge by receivers (Cohen & Levinthal, 1990). In a nutshell, all aspects are distinct where each facilitates learning and the accumulation of alliance know-how. The alliance learning process is directed towards having the alliance management capability by helping firms learn, accumulate, and

leverage alliance management know-how (Kale & Singh, 2007). It is worthwhile to mention that alliance learning process is distinct from dedicated alliance function and alliance experience. Dedicated function, as part of its core responsibilities, can lead to the implementation and institutionalisation of the alliance learning process in order to articulate, codify, share, or internalise alliance management know-how and best practices in the firms and, consequently enable the firms to achieve greater alliance success (Kale & Singh, 2007). Also, alliance experience enables a firm to accumulate experiential knowledge from a diverse portfolio of alliances, which aids in building alliance learning processes (Heimeriks & Duysters, 2007). While the extended literature apprehended the role of deliberate actions to establish certain structural mechanisms or organisational processes to develop AMC, the direct conceptualisation of AMC was virtually non-existent. Therefore, the researchers tend to focus on defining the AMC.

Finally, the third stream of literature focus on the constituent elements that actually comprise the AMC rather than the structure of the alliance, as in Figure 3-1. These constituent elements are considered as the building blocks of AMC that help a firm to manage an alliance (Schilke & Goerzen, 2010). Here, the constituent elements were studied at two levels: (1) portfolio of alliances and, (2) individual alliance (Kale & Singh, 2007). The first tier of research argues that firms need to manage entire alliance portfolio and see AMC as comprising skills such as, (1) ability to form alliances that so not compete with existing alliances, (2) select partners that are compatible with other existing partners, (3) firm-level monitoring mechanism, or (4) coordinate activities across individual alliances in the portfolio (Hoffmann, 2005). The second tier of research suggests that AMC can be understood in terms of constituent skills to successfully *manage a single alliance* through different stages of its life cycle (Gulati, 1998). Various researchers have asserted that an individual alliance goes through three different stages: (1) pre-formation stage, wherein a firm has to choose appropriate partner, (2) design stage, wherein the appropriate governance structure has to set up an alliance and (3) post-formation stage, wherein firm has to manage an alliance after it is running (Contractor, 2005; Donada, Nogatchewsky, & Pezet, 2015; Niesten & Jolink, 2015). Based on this rationale, firms require distinct capabilities to manage each of these stages. For example, some close observers argued that firms need to have screening capabilities to find suitable and complementary (Sarkar, Echambadi, & Harrison, 2001). Other researchers believe that firms need to have the transformative capability in order to adapt to changing conditions and alteration in contract alliance (Gulati, Lawrence, & Puranam, 2005; Hennart & Zeng, 2005). The third group suggests that relevant coordination and communication capabilities are necessary to manage tasks, share relevant know-how and resolve conflicts (Madhok et al., 2015; Schreiner et al., 2009).

Since the literature on alliance formation and design reached the momentum (Das, 2005; Hung, 2006; Reid, Bussiere, & Greenaway, 2001), researchers purport to investigate the mechanisms,

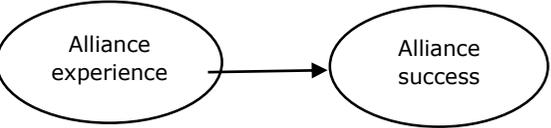
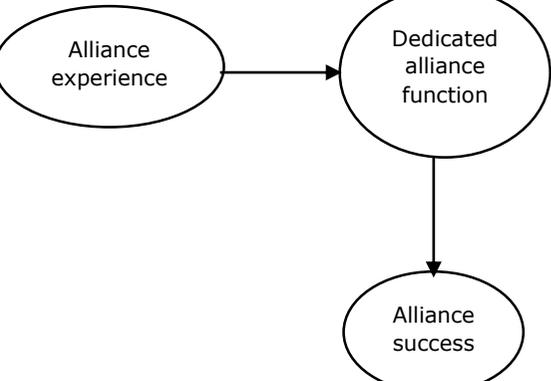
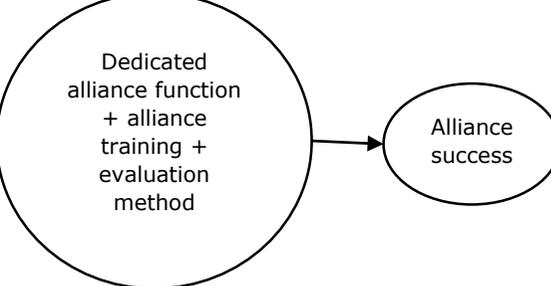
routines and skills that are required to manage the individual alliance at the post-formation phase (see Figure 3-1– third stream). For instance, for the purpose of explaining the relevance of alliance experience for the alliance capability, Heimeriks and Duysters (2007) define AMC as a higher-order resource, which is difficult to obtain or imitate, that consists of two first-order factors: learning mechanisms and routines. First, the learning mechanisms can increase the ability of a firm to perform repeatable patterns, such as identification of partners, building alliances or reforming the alliances (individual as well as a portfolio) (Duysters, Heimeriks, Lokshin, Meijer, & Sabidussi, 2012; Spekman, Kamauff, & Spear, 1999). The learning mechanisms include the four categories: functions (e.g., alliance manager and alliance department); tools (e.g., protocols for partner selection, joint business planning and codification of best practices); control and management processes (e.g., alliance metrics); and external parties (e.g., use of external consultants) (Heimeriks & Duysters, 2007). Second, alliance capability is rooted in organisational routines that are repetitive activities and individual skills that a firm develops in order to deploy the alliance resources (Nelson & Winter, 1982). Within this context, it has been posited that learning mechanisms help to transfer the knowledge throughout the firm in order to induce the creation of organisational routines. Despite the dichotomy of mechanisms and routines, Heimeriks and Duysters (2007) made no distinction in the measurement of mechanisms and routines.

While in an attempt to conceptualise AMC further, Schreiner et al. (2009) argue that AMC involve the skills that are demonstrated in the practices and activities of persons that are engaged in managing the alliance on an ongoing basis. Relying on the literature on alliance challenges and failure, they conceptualised AMC as a second-order construct that contains first-order skills in terms of coordination, communication and bonding. First, coordination ability contains the skills to meet the nature of interdependence among partners (Gulati et al., 2005). Second, communication ability entails a firm having the skills to transfer related knowledge to partners in an accurate and timely manner (Schreiner et al., 2009). Finally, bonding capability involves the building of strong ties with partners by expressing value to them (Gulati, 1995; Schreiner et al., 2009). However, Schreiner et al. (2009) did not consider the skills to handle the formation or governance aspects in a given alliance, as the authors themselves have acknowledged (Schreiner et al., 2009).

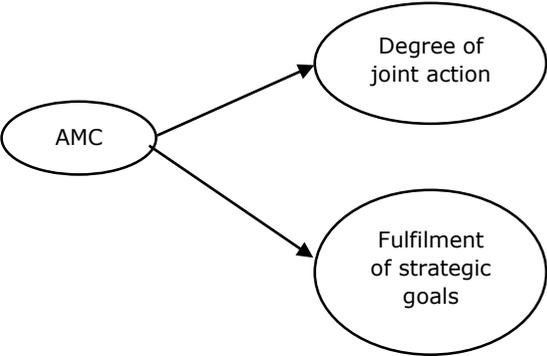
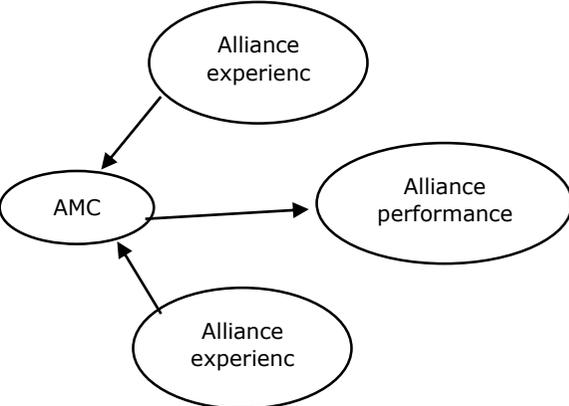
Following on the rudimentary premise of Schreiner et al. (2009), Schilke and Goerzen (2010) further developed the notion of AMC by not only considering the ongoing management of relationships, but also focusing on governance aspect. AMC was defined as a "*type of dynamic capability with the capacity to purposefully create, extend, or modify the firm's resource base, augmented to include the resources of its alliance partners*" (Schilke & Goerzen, 2010, p. 1195). Schilke and Goerzen (2010) perceived AMC as a comprehensive higher-order construct with a

collection of first-order organisational routines by which an organisation makes the effective change in resource bases. Collectively, the four types of organisational routines were focused: coordination, learning, proactiveness and transformation. Their influential work has become an inspiration for many other researchers (Kauppila, 2015; Leischnig et al., 2014). Schilke and Goerzen (2010) pointed out that although coordination of single alliance is important, the management of a focal firm's alliance portfolio is important for alliance portfolio performance. Despite the focus on individual-level as well as on portfolio-level capabilities, Schilke and Goerzen (2010) considered solely the alliance portfolio performance, thus limiting the scope of work. In addition, there is a dearth of explanation as to why they focused merely on portfolio coordination and leaving the room for bonding, transformation and proactiveness of alliance portfolio (Oerlemans, Knobens, & Pretorius, 2013). Table 3-1 summarises the three research streams with information about key aspects.

Table 3-1: An overview of selected AMC-based research within three research streams

Streams	Source	Conceptualisation	Description	Interaction of different conceptualisations
First stream-deliberate actions	Anand and Khanna (2000); Zollo, Reuer, and Singh (2002); Hoang and Rothaermel (2005)	Alliance experience	Alliance experience helps the firms to learn about (a) handling the complexities of alliance process (b) developing knowledge required to develop new products in the specific area of interest, and (c) increasing partner-specific knowledge.	 <pre> graph LR     A([Alliance experience]) --&gt; B([Alliance success])             </pre>
	Kale et al. (2002)	Dedicated alliance function	A dedicated alliance unit attempts to codify alliance-management knowledge by creating guidelines and manuals to help their managers to handle the aspects of alliance life specific (like partner selection, alliance formulation and alliance termination).	 <pre> graph TD     A([Alliance experience]) --&gt; B([Dedicated alliance function])     B --&gt; C([Alliance success])             </pre>
	Draulans et al. (2003)	Dedicated alliance function; alliance training; alliance evaluation	AMC can be built upon dedicated alliance function, alliance training and alliance evaluation. These actions can help to avoid the general pitfalls of partnering and allow to develop alliance capability based on the needs of companies	 <pre> graph LR     A([Dedicated alliance function + alliance training + evaluation method]) --&gt; B([Alliance success])             </pre>

Streams	Source	Conceptualisation	Description	Interaction of different conceptualisations
Second stream – structural mechanisms	Kale and Singh (2007)	Alliance learning process	A process to articulate, codify, share and internalise alliance management know helps to learn and leverage alliance management knowhow to develop a firm’s alliance management skill.	<pre> graph TD     A((Dedicated alliance function)) --&gt; B((Alliance learning process))     B --&gt; C((Alliance success)) </pre>
Third stream – skills that constitute a firm’s alliance capability	Heimeriks and Duysters (2007)	Learning mechanisms	A higher-order resource that consists of learning mechanisms to increase a firm’s ability to perform repeatable patterns of action with respect to, for instance, identifying partners, initiating relationships or restructuring individual alliances as well as alliance portfolios.	<pre> graph TD     A((Alliance experienc)) --&gt; B((Alliance capabilities Mechanism -- -- Routines))     B --&gt; C((Alliance performanc)) </pre>

Streams	Source	Conceptualisation	Description	Interaction of different conceptualisations
Continue:  Third stream-skills that constitute a firm's alliance capability	Schreiner et al. (2009)	AMC	Alliance management capability is a multidimensional construct that comprises three distinct skills, or dimensions: coordination, communication, and bonding.	 <pre> graph LR     AMC((AMC)) --&gt; DJA((Degree of joint action))     AMC --&gt; FSG((Fulfilment of strategic goals))           </pre>
	Schilke and Goerzen (2010)	AMC	It is a distinct dynamic capability that comprised of four generic types of routines namely, coordination, learning, sensing, and transformation	 <pre> graph LR     AE1((Alliance experienc)) --&gt; AMC((AMC))     AE2((Alliance experienc)) --&gt; AMC     AMC --&gt; AP((Alliance performance))           </pre>

Although there exists different conceptualisation of AMC, these are often characterised by lack of interrelation between them (Wang & Rajagopalan, 2014), and despite the handful of studies about capabilities that a firm potentially requires to handle an individual alliance (Schilke & Goerzen, 2010), to date the literature has failed to provide a unifying and yet meaningful conceptualisation of AMC. Some researchers viewed AMC as a combination of mechanisms and routines (Heimeriks & Duysters, 2007), other observed it as skills (Schreiner et al., 2009) or merely routines (Schilke, 2014). A lack of consistent conceptualisation of AMC results in managerially less meaningful construct on the one hand, and academically less rigorous conceptualisation on the other hand. This study, therefore, attempts to address this issue by considering AMC as a capability to manage alliance that consists of several organisational routines. These routines refer to rule-based behavioural patterns of interaction between partners that are developed and refined in the course of repeated interaction (Zollo et al., 2002). The choice of routines is conforming to previous AMC studies, which posit that alliance partners develop inter-firm routines that capture, share and store alliance knowledge (Hoang & Rothaermel, 2005). These routines improve the effectiveness of alliance and strengthen interaction between partners (Schilke & Goerzen, 2010; Zollo & Winter, 2002).

In the previous AMC literature, there is also disagreement among researchers about the nature of AMC, where some considered AMC as a dedicated function (Kale et al., 2002), while others regarded as an established process (Kale & Singh, 2007) or a capability (Schilke & Goerzen, 2010). In order to overcome this dichotomy, the current study considered AMC as a capability to manage an alliance. This is due to the fact that dedicated alliance function or learning processes act as a tool that leads towards the development of AMC (Schilke & Goerzen, 2010), which is excelled through repetitive collaboration. Moreover, SMEs have limited resources, which limits the potential to have a separate alliance dedicated function (Findikoglu & Watson-Manheim, 2015). Therefore, SMEs can develop informal organisational routines, which represents unique AMC.

The aforementioned studies are also limited with regard to integration of all the routines to manage an individual alliance. For example, one stand of literature considered routines to manage any individual alliances on regular basis (Schreiner et al., 2009), while other stand considered alliance portfolio governance routines (Schilke & Goerzen, 2010). These studies clearly indicate the gap to integrate all the necessary routines to manage an individual alliance. This study, therefore, seeks to contribute to fill this void and provides a comprehensive picture of AMC by considering all the routines to effectively manage an individual alliance, that are inter-organisational coordination, inter-organisational learning, alliance proactiveness, alliance transformation and alliance bonding.

This study further elucidates that yet AMC is currently developed for large firms, it can also be applied to SMEs. In this vein, Teece, Pisano, and Shuen (1997) argue that distinctiveness of a firm lies in the way of getting things done. Consequently, it is argued that small firms may not possess good technical skills, but a specific form of idiosyncratic human relationships that can act as a strategic asset for small firms contributing to flexibility and therefore competitive advantage (Yu, 2001). More specifically, small firms recruit employee staff that can easily communicate with and develop mutual understanding, which in turn improves the flexibility of a small firm. The realised flexibility of SMEs' generates appropriate rents to fruitfully access resource bundles required by most modern products (Sirmon & Hitt, 2003). Put differently, the above discussion suggests that despite the limited resource base, small firms have the type of flexibility that yields an advantage, compared to large firms, in building and nurturing distinctive capabilities to manage alliances (Ireland et al., 2001). The next section discusses each dimension in a greater detail.

### **3.3.1 Dimensions of AMC**

This section reviews the key routines that comprise the AMC. The routines are representative dimensions that are used to represent sub-components of AMC. The earlier research conceptualised the AMC by building on the six basic types of routines, namely inter-organisational coordination, inter-organisational learning, alliance proactiveness, alliance transformation, alliance bonding and inter-organisational communication. To date, there is lack of agreement among scholars about the nature of inter-organisational coordination and inter-organisational communication. On one hand, it has been argued that firms need to draw a distinction between coordination and communication (Srikanth & Puranam, 2011). While communication facilitates the transformation of information, coordination allows the firms to match the interdependence between alliance partners (Calvert, 1995). In contrast, some scholars suggested that communication and coordination are interlinked in a mutually interesting way. As an example, within an alliance, firms need to inform each other about each stage of activity and create common knowledge within each stage (Chwe, 2000). Therefore, communication is embedded in coordination in such a way that firms need to understand the constraints on each and then communicate the constraints; afterwards, match the needs of each other and communicate the information in a proper manner (Comfort, 2007). Consequently, it is suggested that when communication action is intended for joint understanding, it is considered as an integration mechanism actually, and also a coordination mechanism (Kwaśnik, Crowston, Im, Yates, & Orlikowski, 2005). It makes sense, therefore, to evaluate the importance of the communication mechanism from the perspective of coordination (Weigand, Van Der Poll, & De Moor, 2003). Following the aforesaid debate, this

study considers coordination through communication by focusing merely on inter-organisational coordination.

In a nutshell, this study conceptualises AMC as a combination of five distinct dimensions: inter-organisational coordination, inter-organisational learning, alliance proactiveness, alliance transformation and alliance bonding. Table 3-2 summarises the dimensions of the AMC with a list of sources that have considered these dimensions.

Table 3-2: Brief overview of different dimensions of AMC

No:	Capabilities	Description	Value relevance	Exemplary research
1	Inter-organisational coordination	Identifies and builds consensus about the task and specification of procedures to execute the tasks	It is considered as a success benchmark because development of shared understanding allows to access the new technologies and expands the product-market reach.	Goerzen (2005); Kumar and Nti (1998); Schilke and Goerzen (2010)
2	Inter-organisational learning	Allows the firms to acquire, transfer and utilise knowledge across organisational boundaries	Learning across a firm's portfolio of key exchange partners yields new knowledge and new capabilities to manage technology uncertainty, expand resources and entry in international markets.	Leischnig et al. (2014); Holmqvist (2003); Larsson, Bengtsson, Henriksson, and Sparks (1998)
3	Alliance proactiveness	Enables a firm to scan and seize the potential partnering opportunities	The better assessment of the potential partners helps to identify the changes in customer's demands and thereby first-mover advantage can be obtained.	Kauppila (2015); Sarkar, Echambadi, and Harrison (2001); Zaheer and Zaheer (1997)
4	Alliance transformation	The extent of routines to modify the alliances over the course of collaboration process	It reflects the ongoing transformation of alliance contracts, which improves the organisational flexibility to adapt to changing environment.	Niederkofler (1991); Schilke and Goerzen (2010)
5	Alliance bonding	Develops close personal bonds through extensive and repeated interaction between the concerned entities	High level of relational bonds between parts are key to effective realisation of mutual benefits as bonds improves the trust and knowledge sharing across partnering organisations.	Gulati (1995); Harrison, Price, and Bell (1998); Schreiner et al. (2009);

In the following sections, each of the five AMC's dimensions will be explained in more detail.

### **3.3.1.1 Inter-organisational coordination**

Inter-organisational coordination pertains to the ability to identify, implement and accomplish the collaborative tasks, considering their interdependency, for the benefit of both partners (Moshtari, 2016; Schreiner et al., 2009). Coordination routines help firms to develop joint working procedures, communication means, design interface and knowledge-sharing practices, enhancing the efficiency of collaboration relationships (Gulati et al., 2005; Schilke & Goerzen, 2010). Highlighting the importance of inter-organisational coordination, prior research ascribed that partners are subject to different constraints from the environment, culture, physical distance and authority structure, for instance. In that context, firms may suffer to coordinate activities due to lack of information to link their own activities with those of their partners, and to harmonise the activities to achieve joint benefits (Huang, Luo, Liu, & Yang, 2016). Furthermore, the coordination failures may hinder the complementary actions taken by exchange partners in order to achieve mutual outcomes (Eberly, Holley, Johnson, & Mitchell, 2011); in some instances, the cost of coordination failures may even overreach the benefits of determining actions (Croson, Donohue, Katok, & Sterman, 2014). To achieve mutual goals, therefore, firms are required to have cooperative routines and framework to direct the mutual interactions among allying partners (Schepker, Oh, Martynov, & Poppo, 2013). Thus, having effective inter-organisational coordination routines, firms can govern the alliances efficiently and promote mutual understanding (Chen, Hsiao, & Chu, 2014).

The inter-organisational coordination routines include the practices to direct the firm's sequential activities – timely information, capacity to search for information and adaptation – on new compounds to pursue a common alliance objective (Ring & Van de Ven, 1994; Zollo et al., 2002). Consequently, a greater mutual adaptation between the partners allows the accomplishment of complex tasks (Dekker, 2004). For instance, in the case of aerospace projects, two interfaces – organisational and technological – exist between contractors for the purpose of producing and launching certain space vehicles (Wren, 1967). For organisational interface, partnering firms can specify formal rules and contract responsibilities to handle the technical enquires across respective boundaries. But the technological interface requires mutual coordinator/interface manager to make sure that the hardware is in agreement with the other guidance systems and sub-systems. Supported by these considerations, the fact is that firms with developed inter-organisational coordination routines are able to apprehend of these alternate practises at the outset of inter-organisational linkage. Further, firms can adapt to the growing interdependence, avoid duplicate actions and effectively manage the joint activities with the ability to coordinate activities with partners.

### **3.3.1.2 Inter-organisational learning**

Inter-organisational learning, which refers to 'ability to pursue the process of knowledge acquisition and improved performance' (Walter, Lechner, & Kellermanns, 2007), is the glue that holds alliances together and compensates for the limited experiential knowledge base (Bruneel et al., 2010). Scholars argue that narrow organisational rationality in learning can create a dysfunctional inter-organisational learning dilemma, where the pursuit of an organisation to maximise its arrogation of collective learning undercuts the process of creating these joint learning outcomes (Larsson et al., 1998). This implies that a firm should have learning routines that include systematic information processing in general and diffusion of learning effect across the collaborating partners, in particular (Feller et al., 2013; Kandemir, Yaprak, & Cavusgil, 2006).

Clearly delineating the concept of inter-organisational learning is important. While defining the concept of inter-organisational learning, a variety of scholars relied on Cohen and Levinthal's (1989) theory of absorptive capacity (see for example, Lane & Lubatkin, 1998). Absorptive capacity refers to a firm's ability to identify external knowledge, assimilate it and apply to commercial ends (Cohen & Levinthal, 1990). Lane and Lubatkin (1998) argued that absorptive capacity captures the steps involved in the inter-organisational learning process. On the contrary, some scholars viewed absorptive capacity and inter-organisational learning as two different concepts where former is related to improvement in learning activities and the latter refers to the ability to acquire and utilise external as well as internal knowledge (Chen, Lin, & Chang, 2009; Selnes & Sallis, 2003). However, Sun and Anderson (2010) suggest the interchangeable use of absorptive capacity and organisational learning due to common conceptual affinity. This affinity is evident from the definition of organisational learning. Fiol and Lyles (1985, p. 80) defined organisational learning as "the process of improving actions through better knowledge and understanding". This definition highlights the importance of acquiring and applying new knowledge for improved organisation's actions. This overlap suggests that both concepts, absorptive capacity and inter-organisational learning, are mutually interlinked.

Organisational learning literature has conceptualised the two processes of learning: inter-organisational and intra-organisational learning. Prior research has stressed the need to cross-fertilise these two processes of organisational learning by proposing that both themes are deeply interlaced (Holmqvist, 2003; Liu & Zhang, 2014). In a similar vein, Feller et al. (2013) suggest that the development of alliance management capability requires not only intra-organisational, but also inter-organisational learning, i.e. joint learning. By such intra-organisational learning typically refers to the learning from experience of integrated formal

organisations (Chan, Cooper, & Tzortzopoulos, 2005), while inter-organisational learning refers to the learning by producing sets of inter-organisational rules that are partly separate from the rules of each of its members (Easterby-Smith, Lyles, & Tsang, 2008). Because this study focus on how firms govern partnerships rather than the firm's internal operations, therefore this study excludes intra-organisational learning from the conceptualisation of alliance management capability.

There are two routines for the development of inter-organisational learning ability - socialisation and externalisation, and each routine serves a different function (Feller et al., 2013). Socialisation routines, such as group events, coaching and meetings, may help transfer tacit, R&D process-related knowledge from one partner to another. Externalisation routines, such as partner meetings, are instrumental for explicating individual or group knowledge on the management of R&D alliances for the use of alliance partners through dialogue. Considering the effectiveness of inter-organisational learning, research supports not only the notion to gain resources from partners, but also augment the idea that the successful learning will result in exploration/exploitation (Holmqvist, 2003). Consequently, inter-organisational learning routines need to be at the outset of the relationship to understand the learning capability of partners and how joint learning needs to be managed.

### **3.3.1.3 Alliance proactiveness**

Alliance proactiveness, which refers to 'the high alertness to environmental information (Zaheer & Zaheer, 1997), is absolute routine that allows organisations to accomplish reconfigurations ahead of competitors. It allows firms to obtain potential partnering opportunities, adapt to changing conditions (Quinn, 2000), sense the environment to seize opportunities, reconfigure assets (Teece, 2007) and gain competitive advantage as resources become available (Hite & Hesterly, 2001). In these instances, surveillance of market trends allows the firm to reconfigure and manage the relationship with counterparts. The basic routines of proactiveness capability entail: (1) generation of market intelligence, (2) dissemination of market intelligence and (3) responsiveness to market intelligence (Pavlou & El Sawy, 2011). First, generation of market intelligence relates to identification of customer needs, responsiveness to market trends, identification of market opportunities and detection of rigidities and resource combinations (Day, 1994; Kohli & Jaworski, 1990). Second, dissemination of market intelligence relates to interpreting market intelligence, making sense of events and developments, and exploring new opportunities (Maltz & Kohli, 1996; Slater & Narver, 2000). Finally, Responsiveness to market intelligence relates to instigating plans to exploit the market intelligence to gain competitive advantage (Kara, Spillan, & DeShields, 2005) and pursuing specific market segments with plans to seize the new market

opportunities (Diamantopoulos & Hart, 1993). An important idea is that effective market intelligence focuses not just on specific behaviours, but also helps to operationalise the market placement. This, in turn, is likely to increase the value creating potential of a firm alliance.

Through active proactiveness, firms can be better able to enjoy first-mover advantage in the market for a strategic partner, which ultimately leads towards maintenance of competitive advantage or develop new advantages (Sarkar, Echambadi, & Harrison, 2001). In this case, a proactive firm can be valuable to the other firms in any given alliance because it can provide valuable opportunities and reduce search cost (Leischnig et al., 2014). For example, a number of studies suggest that firms with proactiveness ability are better able to scan the potential collaboration opportunities and recognise partners with complementary resources and strategic compatibilities (i.e. a competency to successfully integrate these capabilities into the firms' own routines from their partners) in an efficient way (Kandemir et al., 2006; Sarkar, Echambadi, & Harrison, 2001). Also, the unique resource configurations or constellations that result from an alliance sensing ability may be difficult to imitate, leading to sustainable differences in the value of the alliance portfolio in which firms are embedded (Sarkar, Aulakh, & Madhok, 2009). Consequently, a firm that actively seeks to develop its proactiveness routines is viewed as a favoured partner.

#### **3.3.1.4 Alliance transformation**

Alliance transformation is reflected in the ability of partners to adapt the transfer process in response to changed conditions (Leischnig et al., 2014). Prior research suggests that alliance instability, whether defined as changes in market conditions or other types of alliance changes (i.e., parent firm factors and alliance attributes), is indicative of failure on the part of the alliance (Reuer & Zollo, 2005). For instance, US tech giant Cisco system has consistently failed to forge partnerships with Motorola and Ericson as they made it direct competition with its strategic partners (Bloomberg, 2009). On the other hand, in late 2009, the partnership between Volkswagen and Suzuki quickly unravelled in a storm of disagreements and breach of contract (Autonews, 2015). On the other hand, in late 2009, the partnership between Volkswagen and Suzuki quickly unravelled in a storm of disagreements and breach of contract. It is unrealistic to establish the perfect fit between partners from the beginning of a relationship. Rather, regular interaction and norms of adaptation are responsible to ensure the success of an alliance (Doz, 1996). The flexibility of a firm is often mentioned as a big advantage to transform the alliances (Reuer, Zollo, & Singh, 2002; Schilke & Goerzen, 2010).

Organisational routines for transformation of alliances often do not exist. It is often difficult, if not impossible, to routinize change beyond recognising shared principles that should be

adhered to in order to deal with it (Teece, 2012). Adaptations (e.g., contract amendments, changes in alliance governance mechanisms) profoundly require actions that one may never replicate. First and foremost, a well-developed transactive memory system – that encodes, stores and retrieves knowledge– can provide information about who is expert in certain domains and in turn responds to changing market conditions (Argote & Ren, 2012). Second, the resources deployed in the alliance must often be transformed in imperfect predictable ways in order to adjust to the alliance (Madhok et al., 2015). Third, executives need to design alliance monitoring approach to detect when governance changes are needed and learn how to manage the transformation process (Reuer & Zollo, 2000). Nonetheless, the building of such routines serves as a basis of routinized behaviour because firms thought to make the reorganisation of alliances desirable (Reuer & Zollo, 2000). Building on this argument, it can be argued that the alliance transformation is one of the key dimensions of AMC to effectively manage the alliances.

### **3.3.1.5 Alliance bonding**

Alliance bonding – as a dimension of AMC- entails the routines to develop strong relational ties in which partners can socially integrate and provide expressive value to each other (Moshtari, 2016). Prior research has documented that alliances suffer due to underdeveloped personal relationships (Inkpen & Tsang, 2005; Kale, Singh, & Perlmutter, 2000; Kang, Morris, & Snell, 2007; Rowley, Behrens, & Krackhardt, 2000). In this context, scholars have pointed the overwhelming importance of close personal ties and relationship in order to establish the norm of trust and reciprocity in economic exchange (Stanko, Bonner, & Calantone, 2007; Yli-Renko, Autio, & Sapienza, 2001). Such relational bonds often create a better possibility to increase the commitment of the parties to maintain a cooperative relationship (Seabright, Levinthal, & Fichman, 1992), facilitate the transfer of complex technological knowledge (Kotabe, Martin, & Domoto, 2003), enable the transfer of resources between partners and resolve the dysfunctionality of the relationship (Walter, 2003). Deep immersion in a relationship may, therefore, leads to adaptation and execution of long-term relationship in a constantly changing environment, thus motivating a firm's initiative to seek new business opportunities (Liu, Luo, & Liu, 2009).

Since close personal bonds produce the iterative process of exchange between the partner firms (Badaracco, 1991), it is important to develop close bonds with partners. Scholars suggest that such bridging ties can emerge through the trustful linkages over a longer period where collective actions are initiated to access the resources (Chidambaram, 1996). Also, it can be developed from the accomplishment of one's socio-psychological needs of preserving self-esteem, self-expression, affiliation and belonging (Hornsey & Jetten, 2004).

Collaborations in which actors fail to bring such benefits can be associated with disruptive conflicts and dissolution of partnership (Kenis & Knoke, 2002).

The key attributes of alliance bonding include the provision of value to the partners by providing timely and reliable responses to their needs, spending time with partners, and appreciating partners' views and ideas (Schreiner et al., 2009). For instance, in software development projects, integrated knowledge is embodied in the design of the software. The strong bonding routines allow the alliance partners to develop a shared conceptualisation of what the software ought to do and how it should do it. As a whole, such behaviour creates a perception of care to meet the needs of partners and a symbol of respect, which is a signal of trustworthiness.

To summarise, building on prior literature, AMC are regarded as encompassing routines namely: inter-organisational coordination, inter-organisational learning, alliance proactiveness, inter-organisational transformation, and alliance bonding (Kandemir et al., 2006; Leischnig et al., 2014; Schreiner et al., 2009). While each of these routines has a profound role to manage the alliances, empirical research has not thoroughly addressed this issue. Therefore, this study has seen these routines as theoretically related and uniformly directed towards the same objective – that is AMC.

### **3.4 AMC and performance**

This section is directed towards the discussion of empirical evidences suggesting that AMC influence relevant performance outcome. As the vast literature shows, AMC is often related to two types of outcomes: (1) alliance performance, and (2) overall firm performance. Alliance performance refers to the attainment of strategic objectives (either independent or collective objectives) in a given relationship. In contrast, firm performance is the overall performance of the company in terms of sales, growth and so on. The following section discusses the implications of AMC for each kind of performance outcome.

#### **3.4.1 AMC and alliance performance**

Given the potential benefits of AMC, strategy literature posits the existence of a relationship between AMC and alliance performance (Kale et al., 2002). In general, untangling the impact of AMC on alliance performance requires knowledge of the logic of value creation and value appropriation/capture (Lavie, 2007; Ritala & Tidström, 2014). Value creation refers to the total sum of value that is derived by a focal firm from its relationship with partners as they collectively pursue shared objectives or extend the range of value chain activities (Lavie, 2007; Ritala & Hurmelinna-Laukkanen, 2009). In succession, value appropriation is defined

as the individual share of the value that a focal firm can appropriate from collaboration (Gulati & Olivia Wang, 2003). Value appropriation suggests that partners competitively pursue the self-interested objectives to increase the appropriated relational rents (Lavie, 2007). The divergence between value creation and value appropriation is corresponding to divergence between common and private goals (Ritala & Tidström, 2014). By simultaneously considering value creation and value appropriation, prior literature offers a more nuanced impact of AMC for two dominant alliance outcomes: (1) alliance success (Zollo et al., 2002) and (2) joint actions (Leischnig et al., 2014). The core argument of value appropriation help best explains how a firm can generate alliance success by deploying AMC (Dyer, Singh, & Kale, 2008). In turn, value creation supports the interlink between AMC and joint actions, where common benefits are shared by all partners in an alliance (Grönroos, 2012). By distinguishing alliance success from joint actions, the following section elucidates the role of AMC for both alliance success and joint actions.

First, alliance success is a firm-level outcome that is related to the firm's performance satisfaction and perceived goal fulfilment (Kale & Singh, 2007). The paradox is that partnering firms follow the value appropriation mechanisms that permit the provision of common benefits to individual partners as well as unilateral extraction of private performance/goal fulfilment (Kivleniece & Quelin, 2012; Lavie, 2006). While documenting the nature of private goals, strategy literature argues that the perceived goals vary based on the industry and relationship (Park & Mezias, 2005). For instance, a software service provider can pursue the following goals in an alliance with a software product seller (Schreiner et al., 2009). Firstly, the vendor needs a better insight about the seller's customer base in order to get insights about business opportunities that partners can realise by working together. Secondly, a service provider would like to increase own sales and profitability due to a relationship with a specific seller (Schreiner et al., 2009).

Considering the role of the AMC for alliance success, Heimeriks and Duysters (2007) recommend that firms need to integrate alliance-related knowledge to create AMC for firm's alliance success. Schreiner et al. (2009) further add to this argument by suggesting that distinct skills as comprised by AMC allow a firm to apply mutual working practices for the effective implementation of alliance-related tasks, providing advantage to both parties. However, the focus of the prior studies was on individual alliance success rather than alliance portfolio performance. Schilke and Goerzen (2010), for that reason, consider alliance portfolio performance and argue that the more the firm possesses alliance-related knowledge and the skills to apply it (i.e., AMC), the more alliances are likely to benefit from it. Scholars also extend the logic of AMC and alliance portfolio performance by suggesting that alliance experience and dedicated alliance function influences the creation of AMC (Heimeriks &

Duysters, 2007; Kale et al., 2002). On the one hand, referring to the literature of a learning curve, it is argued that repeated participation in alliances exposes firms to variations in alliance management practices (Sampson, 2005), and allow firms to assess effective management skills to manage complex activities with uncertain outcomes (Hoang & Rothaermel, 2005). Alliance experience aids firms to develop adequate AMC to effectively manage alliances, which in turn lead to higher alliance performance. On the other hand, dedicated alliance function (including alliance specialist, alliance units) helps to discover the procedures that produce favourable outcomes like, knowledge codification and facilitation of communication over functional areas (Hoffmann, 2005). In addition, dedicated alliance function provides the resources to scan the environment for potential partnering opportunities and facilitates the selection of valuable partners (Gulati, 1999). Thus, dedicated alliance function facilitates the systematic alliance management and determine effective AMC, which result in alliance success (Schilke & Goerzen, 2010).

Yet numerous studies have revealed that firms require AMC to optimise alliance portfolio performance (Heimeriks & Duysters, 2007; Kale et al., 2002). In contrast to previous literature, AMC studies claim that AMC can moderate the relationship between alliance portfolio characteristics and alliance portfolio performance. For instance, by providing a firm with access to various knowledge resources, alliance partner diversity (i.e., partner and geographic diversity) has been found to enhance the alliance portfolio performance (Duysters et al., 2012). In particular, it has been argued that high level of alliance portfolio diversity may make it difficult for firms to interact with a large set of partners (Marino, Strandholm, Steensma, & Weaver, 2002). As a consequence, it is likely that the coordination of scarce resources becomes difficult for the focal firms (Hoang & Rothaermel, 2005). Hence, Duysters et al. (2012) suggest that the effect of alliance portfolio diversity on alliance performance can be dependent on AMC. Such a capability allows the managers to oversee and formulate alliance strategies (Hoffmann, 2005) and to arrange trainings in order to share the lessons learned from different alliances (Zollo et al., 2002). Being equipped with AMC, therefore, enable firms to manage diverse alliance portfolio and consequently lead to better alliance performance.

Second, joint action (that is a value creation mechanism) is an alliance-level outcome where both parties pool the resources to mutually produce an outcome that neither of the parties can simply achieve on its own (Gulati, 1998). Within this premise, scholars contend that in a competitive environment, firms need to dynamically pool resources across organisational boundaries to exchange technological knowledge and/or artefacts and rights (Lichtenthaler & Ernst, 2007), and create competitive solutions (Schreiner et al., 2009). The greater need of joint actions can increase the interdependence between partners (Gulati & Gargiulo, 1999).

In such a situation, the greater the efforts taken by the partners to manage the interdependencies and joint activities, the greater their ability to compete effectively in the marketplace (Schreiner et al., 2009). Thus, the potential of joint actions is contingent upon the ability of firms to effectively manage the alliances. Accordingly, AMC (ability of partners to develop joint working procedures, share information in a timely manner and strength the formation of trusting relationships) influence the degree of joint actions between partners in an alliance (Schreiner et al., 2009).

To summarise, the literature documented the role of the AMC for firm-level alliance success as well as alliance-level joint actions. Table 3-3 provides the exemplary studies using the alliance success, joint actions and AMC.

Table 3-3: Selected studies on alliance performance implications of the AMC

No:	Study	Description	Independent variable	Dependent variable	Mediator	Moderator
1	Schreiner et al. (2009)	AMC is a multidimensional construct (skills like coordination, bonding and communication) that is linked to alliance-level outcomes (i.e., degree of joint actions) and firm-level outcomes (i.e., fulfilment of strategic goals).	AMC	Degree of joint action (alliance-level) Fulfilment of strategic goals (firm-level)	NA	NA
2	Schilke and Goerzen (2010)	AMC positively impacts on alliance portfolio performance and mediates the performance effects of dedicated alliance structures and alliance experience.	Alliance structure (dedicated alliance function) Alliance experience	Alliance portfolio performance (firm-level)	AMC	NA
3	Duysters et al. (2012)	Alliance portfolio diversity is advantageous as well as disadvantageous for alliance portfolio performance. Alliance experience and AMC enables the firm to deal more effectively with the diversity in alliance portfolio.	Alliance portfolio diversity	Alliance portfolio performance (firm-level)	NA	Alliance experience AMC
4	Leischnig et al. (2014)	Inter-organisational technology transfer (ITT) is a key component of firms' innovation processes. In order to understand the inter-organisational technology-transfer process, the author suggests that AMC influence interaction quality, which in turn improves the inter-organisational technology transfer. Organisational quality influences inter-organisational interaction quality.	AMC	Technology transfer success (alliance-level)	Inter-organisational interaction quality	Organisational compatibility

**Note:**

1: NA refers to not available

### 3.4.2 AMC and firm overall performance

The growing interest in capability to manage alliances emboldens the researchers to investigate the potential value of AMC for firm performance. From this perspective, Anand and Khanna (2000, p. 296) note, "*...if the ambiguities involved with managing alliances were perfectly specifiable, it is unlikely that interfirm differences in the ability to create value through alliances would persist.*" Thus, it can be argued that AMC is a source of competitive advantage. Dyer et al. (2001) found that the ability to form and manage alliances better than competitors can act as a source of competitive advantage. In this regard, scholars argue that the effect of AMC on competitive advantage can be contingent on environmental factors. For instance, Schilke (2014) suggests that high level of environmental dynamism can reduce the value-creation potential of AMC. This is due to the fact that the nature of alliances substantially differs from one alliance to the other in a highly dynamic environment. Given the high degree of novelty in alliances during dynamic environment, firms face challenges to match the AMC with the novel settings of alliance because firms with AMC prefer to stick to the established partner selection procedures and engage in social bonding with the existing partners (Heimeriks, 2010). Limited partner selection, therefore, can be disadvantageous in a highly dynamic environment where firms are required to frequently change the partner in order to gain access to more relevant resources (Kandemir et al., 2006). Thus, at an intermediate level of environmental dynamism, a balance exists between AMC and competitive advantage of firms (Schilke, 2014).

The empirical literature on AMC and firm performance has also documented the link between alliance type, AMC and innovation performance (Rothaermel & Deeds, 2006). Building on classical Ricardian perspective, it has been argued that firms enter in most productive alliance first (regardless of partner type) for innovation performance, thus leaving only less productive alliances for subsequent alliance formation (Zahra, Ireland, & Hitt, 2000). This perspective suggested the need for AMC to manage the relationship between alliance type and innovation performance. Accordingly, considering different partner types for alliance performance, Rothaermel and Deeds (2006, p. 438) found that "*different alliance types demand different levels of alliance management capability, with upstream alliances demanding the largest amount, downstream alliances demanding the least amount and horizontal alliances demanding a moderate amount.*" As such upstream alliances with universities and other research institutions are generally characterised by high uncertainty and involve frequent transfer of tacit knowledge (Quintana-García & Benavides-Velasco, 2004), high level of AMC allow closer monitoring of alliance for innovation performance. In contrast, downstream alliances is relationship with the end user and focus on complementarities among the partners

(Baum & Silverman, 2004). Accordingly, ambiguity is reduced in downstream alliances, which demand least level of AMC (Rothaermel & Deeds, 2006).

Recently, scholars inclined to suggest the indirect relationship between AMC and firm performance. In this respect, it has been suggested that AMC influence firm's financial performance and growth through strategic actions (Kauppila, 2015). From this perspective, it has been postulated that the potential value of AMC remains unrealised as long as firms do not undertake joint actions (Schreiner et al., 2009). Therefore, firms need to undertake joint actions to leverage the value of AMC for firm performance. Given that the number of studies are limited about the interlinkage between AMC and firm performance, and also because these ideal relationships are linked through actions, it can be argued that the use of alternative strategic actions would help to examine and explain the complex interrelated relationships between AMC and firm performance of different domains without overly simplifying the phenomena. Table 3-4 provides an overview of the studies linking AMC to firm performance.

Table 3-4: Selected studies on firm performance implications of the AMC

No:	Study	Description	Independent variable	Dependent variable	Mediator	Moderator
1	Rothaermel and Deeds (2006)	The inverted U-shaped relationship between total number of alliance and new product development is moderated by alliance experience and alliance type. In addition, different alliance type demands different level of alliance management capability.	R&D alliances	New product development	NA	Alliance experience Alliance type AMC
2	Schilke (2014)	A nonlinear, inverse U-shaped moderation is proposed, implying that the relationship between AMC, new product development and competitive advantage is strongest under intermediate levels of dynamism but comparatively weaker when dynamism is low or high.	AMC New product development capability	Competitive advantage	NA	Environmental dynamism
3	Kauppila (2015)	AMC is associated with strategic actions – that are co-exploration and co-exploitation- which are related to firm performance.	AMC	Firm performance Financial performance	Strategic action	NA

**Note:**

1: NA refers to not available

### **3.5 Knowledge gaps**

The discussion of the previous empirical studies that investigated the link between AMC, alliance portfolio characteristics, strategic action and firm performance, reveals research gaps in four key areas: (1) conceptualisation of AMC, (2) indirect relationship between AMC and internationalisation performance through strategic action, (3) role of alliance portfolio characteristics, and (4) context of SMEs.

First, there is a lack of agreement among scholars about the notion of AMC where some scholars conceptualised it as routines (Schilke & Goerzen, 2010) and other group of research recognised it as skills (Kandemir et al., 2006). Given this variability, this study views AMC as routines. This is consistent with the RBV, which suggests that routines are resources that generate competitive advantage for firms (Barney, 2001b). AMC literature also lacks the broader conceptualisation of AMC with respect to governance routines and routines to manage an individual alliance on a regular basis (Schreiner et al., 2009). Since there are different stages in alliance life-cycle, firms need a comprehensive set of routines – including governance, coordination and trust-building - to actively manage any given alliance (Kale & Singh, 2009). Considering the limitations of previous literature (Chao, 2011), this study integrates all the alliance management routines in one study and provides a comprehensive empirical assessment of AMC by integrating five different routines: inter-organisational coordination, inter-organisational learning, alliance transformation, alliance proactiveness and alliance bonding (Schilke & Goerzen, 2010; Schreiner et al., 2009).

Second, inter-organisational collaboration has become critical to the success of innovation and internationalisation performance (see systematic review in Chapter 2) (De Mattos et al., 2013; Francioni et al., 2016; Franco & Haase, 2015). Undoubtedly, the empirical evidence suggests that the IOC has an indirect effect on internationalisation through innovation activity (Mesquita & Lazzarini, 2008). Despite the profound role of AMC for the management of IOC, previous studies lacks the understanding of how AMC leads to internationalisation performance, which is proposed as a potential question for future research (Stoian et al., 2017). In doing so, this study considers the link between AMC and internationalisation performance through strategic actions. In fact, Schreiner et al. (2009) signified the need to link broader conceptualisation of AMC to manage any given alliance with relevant strategic actions as well as other outcomes. Innovation activities are conceptualised as strategic actions in this study considering the complexity involved in the creation of innovation (Dekker, 2004; Zhao & Lavin, 2012). The conceptualisation of strategic actions is consistent with the argument that firms need to undertake appropriate strategic actions to utilise the full potential

of their available resources for performance (Bouncken, Plüschke, Pesch, & Kraus, 2016; Schreiner et al., 2009). Thus, IOC based innovation activities (i.e. strategic actions) can help firms to leverage the value of AMC for internationalisation performance.

Third, beyond the focus on the main effects among AMC, strategic actions and internationalisation performance, previous research suggests the need to consider moderators such as the alliance portfolio characteristics that has been suggested to be more difficult to manage (Schilke & Goerzen, 2010). Previous studies attempted to investigate the moderating effect of AMC on the relationship between alliance partner type and innovation performance (Rothaermel & Deeds, 2006). However, to date, there is a lack of empirical research to establish the moderating effect of alliance partner diversity on the relationship between AMC and strategic actions. Therefore, this study perceives the moderating effect of alliance partner diversity on the relationship between AMC and strategic actions. From the RBV perspective, firms collaborate with external partners to complement the internal innovation efforts (Lee et al., 2010). Since resources are likely to vary among different partners, different relationships often lead to redundant information (de Leeuw, Lokshin, & Duysters, 2014). Strategic actions, thus, can be implemented by exploiting AMC according to the level of alliance partner diversity.

Finally, from an empirical standpoint, previous literature has considered AMC in the context of large firms (Leischnig et al., 2014; Schilke & Goerzen, 2010), without recognising firm size as an influencing factor (Veugelers, 2008). As SMEs have scarce internal resources (Parida & Örtqvist, 2015), SMEs need capabilities to mitigate resource scarcity by accessing external resources. This study focuses on AMC as influential capabilities in enabling access to external resources. Specifically, it is argued that small firms with AMC can develop and maintain productive relationships with external partners, which gives them access to resources for co-creation of innovation and enhances the likelihood of internationalisation performance (Gronum et al., 2012a; Haeussler, Patzelt, & Zahra, 2012). Thus, this study extends the AMC literature by considering the notion of AMC in relation to SMEs.

### **3.6 Conclusion**

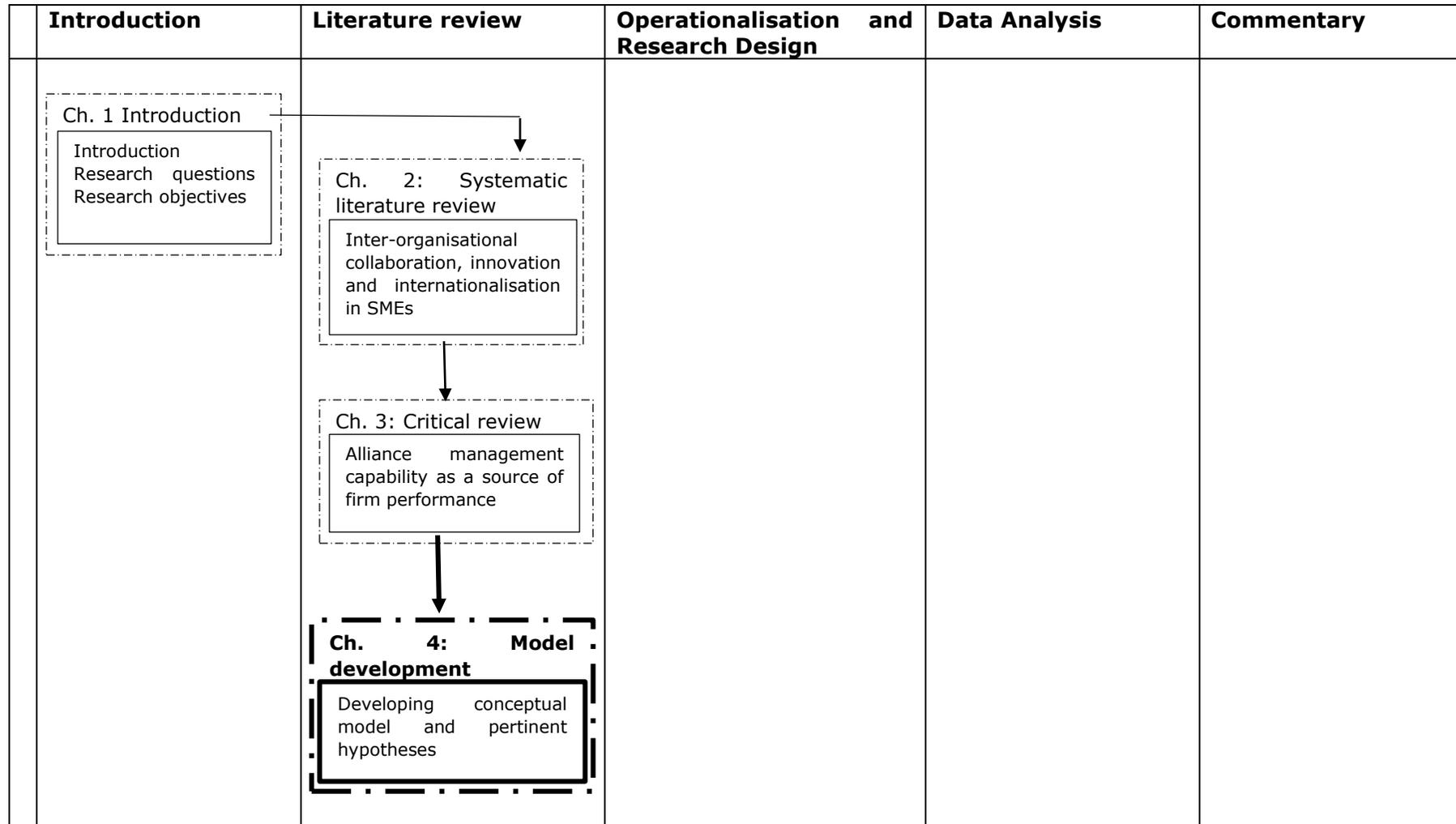
This chapter provides an overview of AMC and the emergence of AMC. This chapter also comprehensively reviewed pertinent literature regarding the conceptualisation of AMC, alternative classifications of AMC and dimensions of AMC (namely, inter-organisational coordination, inter-organisational learning, alliance proactiveness, alliance transformation and alliance boning).

Moreover, this chapter exhaustively reviewed relevant literature on the relationship between AMC and performance. Specifically, the relationship between AMC and alliance performance as well as relationship between AMC and firm performance were explained.

Finally, after gathering the evidences from the systematic review of IOC, innovation and internationalisation, and critical review of AMC literature, this chapter provided an insight about the research gaps in the existing literature. Particularly, the review signified the importance of AMC for strategic actions and internationalisation performance of SMEs, which is the focus of the current study.

The following chapter builds on the theoretical foundations of RBV and on the synthesis of evidence as discussed in Chapter 2 Chapter 3 to introduce the conceptual model and hypotheses to address the research question and objectives. The next chapter, Chapter 4, presents a detailed description of the conceptual model for this study.

This is that part of the earlier Figure 1-1 that is being addressed in the forthcoming chapter.



# Chapter 4. Conceptual Framework

## 4.1 Introduction

This chapter aims to develop the conceptual model to describe the central role of AMC for strategic actions, which ultimately lead to internationalisation performance of SMEs. This chapter is organised in eight sections.

After introducing the chapter, the second part presents the theoretical foundations for economic rents. The third part focuses on the linkage between resources and performance using the RBV. This part also explains the reasons as to why RBV should be used in this study and suggests the role of strategic actions between resource and performance linkage. The fourth part turned the attention towards the discussion of the relationship between AMC and strategic actions. In additions, the hypotheses are developed suggesting the role of AMC for radical co-innovation and incremental co-innovation. The fifth part discusses the relationship between strategic actions and internationalisation performance, and accordingly develops the hypotheses. The sixth part explains the role of moderating factors, where the role of alliance partner diversity and foreign market knowledge is considered. The seventh part of the chapter summarises the hypotheses of this study. Finally, the chapter is concluded.

## 4.2 Theoretical foundations for economic rent

IOC have been widely explored over the past three decades based on different theoretical foundations, see section 2.3.1 in systematic review chapter. These theoretical frameworks contributed meaningfully to the understanding and modelling of the relationship between firm resources and profits, on the one hand (Humphreys, Lai, & Sculli, 2001), and to the selection of appropriate unit of analysis – firm, dyad or network, on the other hand (Fynes, Voss, & de Búrca, 2005).

While some of the rent-yielding theories argue that structure of an organisation acts as a source of competitive advantage (e.g., barriers to entry, relative bargaining power and so on) (Porter., 1980), resource-based view attributed the source of differential firm performance to firm heterogeneity (Barney, 1991). Proponents of RBV have conceptualised firms as heterogeneous bodies entailing the bundles of idiosyncratic resources that secure competitive advantage (Barney, 2001a; Wernerfelt, 1984). In this view, resources are defined as stocks of objects, personal characteristics and conditions that are possessed by the firm (Amit & Schoemaker, 1993). Resources can be converted into final products or services by using a wide range of other

firm assets and bonding mechanisms such as technology, management information systems, incentive systems, trust between management and labour, and more (Amit & Schoemaker, 1993; Barney, 1991). However, researchers doubt that the mere possession of resources is insufficient to sustain competitive advantage in situations involving rapid and unpredictable changes (Eisenhardt & Martin, 2000). In particular, RBV contains the arguments for greater attention to the influence of the market conditions under which different resources may be available (Barney, 2001a). Consequently, a contemporary view is offered by dynamic capabilities view, which suggests that competitive advantage is not necessarily derived from the resources, but how they are configured by managers to address rapidly changing environment (Teece, 2007; Teece et al., 1997). It is treated as offshoot to the RBV that address "the evolutionary nature of firm resources and capabilities in relation to environmental changes and enabling identification of firm- or industry-specific processes that are critical to firm evolution" (Wang & Ahmed, 2007, p. 35). Dynamic capabilities are the antecedents organisational and strategic routines by which managers change the resource base, integrate the resources, and recombine the resources to create new value-generating strategies (Eisenhardt & Schoonhoven, 1996).

As strategy scholars have searched for sources of competitive advantage, relational view emerged as a distinct, but contemporary view to generate rents (Dyer & Singh, 1998). The central premise of relational view is that critical resources span organisational boundaries and rents can be generated through association with the networks (Borgatti & Cross, 2003; Lavie, 2006). Another dominant theoretical foundation concerns transaction cost economics, primarily developed by Coase (1937) and further refined by Williamson (1975). It intends to explain the choice of governance structure for different markets and hierarchies using transaction cost perspective. This view contains three basic dimensions, namely uncertainty, frequency of interaction and asset specificity (Wang, 2002). For instance, the unpredictable changes in the environment cause high market uncertainty, which increase the transaction cost higher and make the market transactions as less efficient (Humphreys et al., 2001). Transaction cost economics offers a narrow view of alliances as hybrid organisations and emphasis contractual rather than relational aspects (Lavie, 2006).

### **4.3 Linking resources and performance: A critical evaluation using RBV**

This section narrates the conceptual framework developed on the theoretical basis of RBV. RBV asserts that firms can gain competitive advantage by deploying valuable resources and capabilities (Peteraf, 1993; Wernerfelt, 1984). Over the years, RBV has been used to empirically test the linkage between resources/capabilities and firm performance (Barney & Arkan, 2001). The examples in strategy literature includes the analysis of the relationship between IOC and innovation performance (Ketchen, Ireland, & Snow, 2007; Zeng et al., 2010), as well as

relationship between IOC and internationalisation performance (Boehe, 2013; Lee et al., 2012). The results are consistent with RBV and confirm the association between resources and performance. In addition, Barney and Arikan (2001) review the results of 166 empirical studies that test the RBV in one form or another. Barney and Arikan (2001) suggest that the effect of resources on performance have consistent results with the RBV.

Newbert (2007), however, argues that nature of Barney and Arikan's (2001) framing and sampling is biased due to unconscious predispositions. Using the systematic methodology as employed by David and Han (2004) for the assessment of transaction cost economics, Newbert (2007) finds that only 53 percent of the studies assessed in his research were empirically supported. Utilising the more sophisticated approach of meta-analysis, Crook et al. (2008) suggest that resources contribute to performance, however, evidence of under-specification in resource-performance link is present. Consequently, several scholars have come to believe that the RBV is insufficient as a theory because possessing resources is necessary but insufficient condition for superior performance (Kraaijenbrink et al., 2010; Priem & Butler, 2001).

Despite this distrust, other scholars alleged that researchers can move beyond the traditional resource-performance linkage and extend the research models towards process-based approaches (Groen, Wakkee, & De Weerd-Nederhof, 2008). Specifically, a multi-phase RBV model, that incorporates the strategic actions as intermediary factor between resources and performance relationship, enables the researcher to determine the manner in which resources can be leveraged for performance (Ketchen, Hult, & Slater, 2007). Strategic action refers to 'a pattern of resource allocation that enables firms to maintain or improve their performance' (Barney, 1996, p. 27). According to RBV, strategic actions are processes to realise the value of the resources (Newbert, 2007). Since resources (or capabilities) are tangible (like financial and physical assets) and intangible (human capital, technology knowhow and patents) assets (Amit & Schoemaker, 1993; Grant, 1991), strategic actions are distinct in that they describe the activities that a firm needs to undertake to leverage its resources.

Similar to other RBV studies, research on AMC has focused on the direct relationship between AMC and performance outcomes, disregarding the role of strategic action (Schilke & Goerzen, 2010; Schreiner et al., 2009). Therefore, the conclusion of previous studies can be considered invalid because performance effect is confounded to resources rather than to effective strategic actions. This is consistent with the view of Ndofor et al. (2011) contending that failure to include leveraging strategic actions when examining the effect of resources on performance can lead to underspecified model and invalid conclusions about resource-performance relationship. Considering these limitations, it is vital to understand the mediating role of strategic action between AMC and internationalisation performance relationship.

SMEs provide a unique context to study the relationship between AMC-strategic actions-internationalisation performances. Research findings suggest that effective management of relationships opens up new avenues for SMEs through which to enter foreign markets and achieve internationalisation performance (Torkkeli, Puumalainen, Saarenketo, & Kuivalainen, 2012). Despite the examination of this relationship, scholars still have doubts about the competitiveness and internationalisation of SMEs (Aragón-Sánchez & Sánchez-Marín, 2005; Kuivalainen, Saarenketo, & Puumalainen, 2012). This situation reveals the need to suggest or find effective strategic actions so that SMEs can leverage AMC for internationalisation performance. This study, therefore, develops the conceptual framework (as depicted in Figure 4-1) to explain how AMC leads to internationalisation performance.

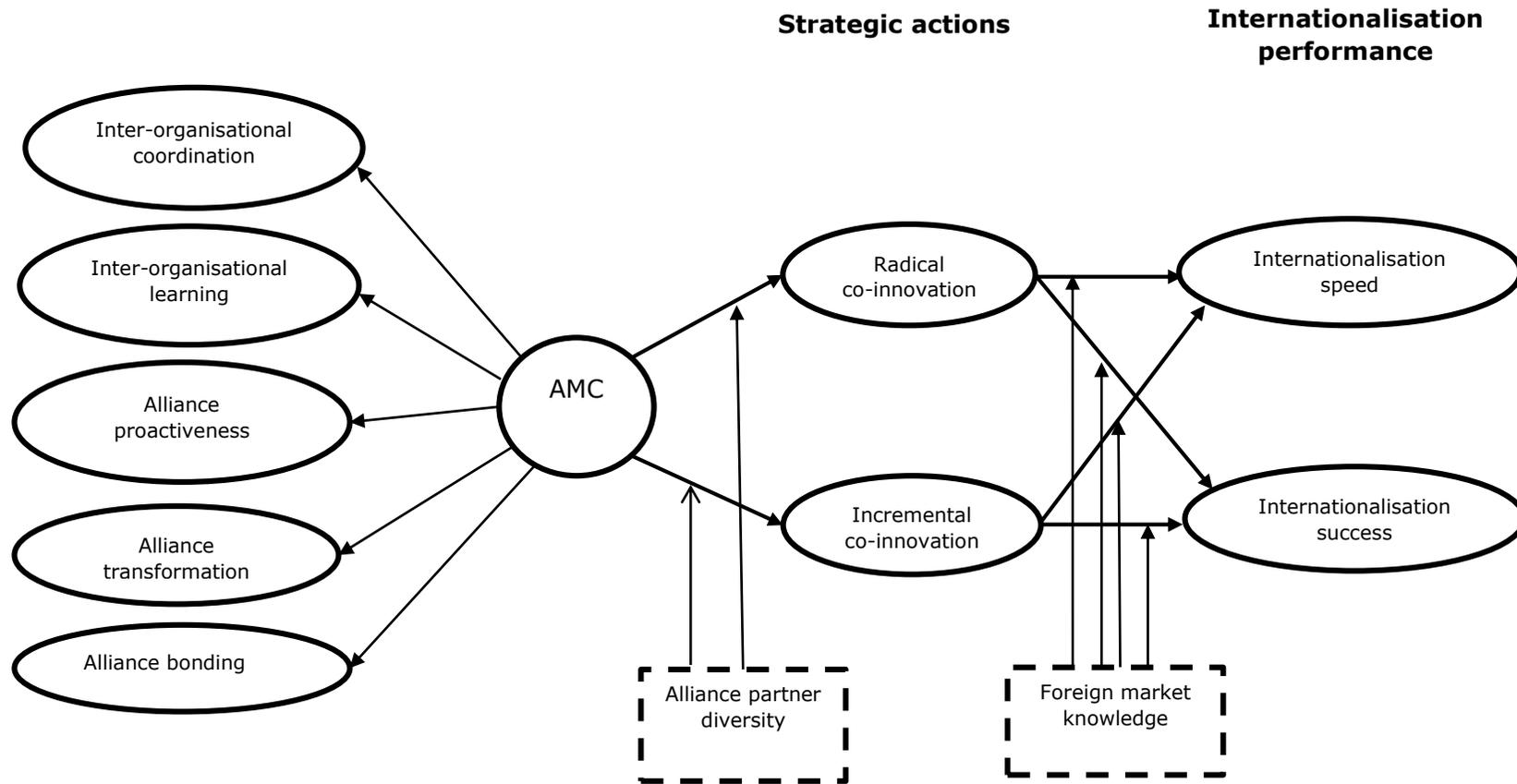


Figure 4-1: The conceptual model of this study

#### **4.4 AMC and strategic actions**

Strategic action is concerned with the process that firms need to undertake to achieve superior performance (Ketchen, Hult, et al., 2007). Typically, resources are heterogeneous and include all assets, capabilities, processes and knowledge controlled by a firm in order to conceive and implement strategies (Barney, 1991; Porter, 1985). In contrast, strategic actions (for example, flexibility, imitability, cooperation and entrepreneurship) are the processes in which companies leverage capabilities to realise long-term performance (Leonidou, Palihawadana, & Theodosiou, 2011; Miller, 1992). Building on RBV, researchers have conceptualised strategic action as subjective responsiveness of an organisations towards the market intelligence and environmental changes (Garg, Walters, & Priem, 2003). As small firms may not be able to cope with the rapid changes, they show a good deal of apparent randomness due to strategically confuse behaviours (Peng, 2003). Nevertheless, out of such chaos two primary strategic actions seem to have emerged. The first one may be regarded a network-based strategic action, emphasising at manager's interpersonal ties and inter-organisational relationship (Powell, 1990). The second one may be regarded as market-based strategic action, concentrating on competitive resources and capabilities emphasised in traditional strategy research (e.g., production, financing, and marketing), which are independent of the firm's networks and relationships (Barney, 1991).

In the context of SMEs facing dynamic environment, different authors have debated over which is the more appropriate strategic action. Some views a network-based strategic action as a winning option in the absence of resource bundles and liability of smallness (Gassmann & Keupp, 2007). Others complain that too much emphasis on collaboration is a hotbed of corruption and that the internal development of products may enable more firms to compete (Bougrain & Haudeville, 2002). While it is possible that different strategic actions may be useful during different phases of the transitions, the RBV logic argues that the unique characteristics of resources give them potential to make the most of appropriate strategic actions (Das & Teng, 2000; Murray, Gao, & Kotabe, 2010). Put differently, the deployment of resources that do not match with the implemented strategic action can lead to flawed inferences (Kazadi, Lievens, & Mahr, 2016). Therefore, this study considers IOC strategy as efficient strategic action to capitalise on AMC. The function of inter-organisational collaboration is quite logical for small firms considering that SMEs have limited resources and the substantial investment in building AMC is practically useful if small firms do not have any inter-organisational relationship to apply this capability (Schilke, 2014).

Whilst one may quibble about the role of IOC, in this regard, an increasing literature advocated that collaboration is a critical strategic action for innovation, as discussed in section 2.3.2.1

(Laursen & Salter, 2006; West & Bogers, 2014). Examination of innovation have been divided into major research streams: innovation activity and innovation performance (Brown & Eisenhardt, 1998). The first stream defines innovation as an activity involving all the steps that are intended to develop or refine the products, services and/or processes to effectively meet the market opportunities (Withers, Drnevich, & Marino, 2011). Within the second research stream, an innovation is defined as a new product and/or process that a firm has developed for the market and signifies the commercialisation of an invention, where invention is an act of insight (Myers & Marquis, 1969). Currently, there is a gap in the literature as few empirical studies assume innovation as an activity (Bercovitz & Feldman, 2007; Voss & Voss, 2013). To address this gap, this study, therefore, conceptualises innovation as a fundamental representation of activity.

The most established classifications of innovation within the strategy literature are the dichotomy of radical, incremental, product, process, administrative, and technological innovation (Camisón-Zornoza, Lapiedra-Alcamí, Segarra-Ciprés, & Boronat-Navarro, 2004). Traditionally, the two most common of these innovation dimensions are radical and incremental, as shown in section 2.3.2.1. Radical innovation is ground-breaking developments that represent a major departure from existing capabilities in the firm and establish the basis for the revolutionary change in the technologies (Ettlie, 1983; Ritala & Hurmelinna-Laukkanen, 2013). Incremental innovations, on the other hand, are the developments of new products and services that are known to the market or minor improvements in the existing products (Parida et al., 2012).

This study focuses on two specific types of strategic actions: radical co-innovation and incremental co-innovation. This focus is justified because the strategic intent of SMEs' – that is whether to develop new innovations or refine existing innovations – is the primary determinant of IOC (Parida et al., 2012; Song & Thieme, 2009). Specifically, SMEs try to seek radical co-innovation and incremental co-innovation because (1) radical and incremental innovation are the two dominant activities required for the success of SMEs (Lee et al., 2010; Rosenbusch, Brinckmann, & Bausch, 2011) and IOC is the important strategy to pursue radical and incremental innovation in SMEs (Brunswicker & Vanhaverbeke, 2015; Maes & Sels, 2014). This study, therefore, determines radical co-innovation and incremental co-innovation as two dominant activities that SMEs perform with their partners (Bouncken & Kraus, 2013). Particularly, *radical co-innovation* is defined as SMEs' strategic action to significantly transform the existing innovation practices by establishing alliances with complementary partners. Correspondingly, *incremental co-innovation* is defined as a strategic action that focuses on refinement and reinforcement of existing competencies and knowledge.

Based on the above-mentioned conceptualisation, the next section theories the relationship between AMC and radical/ incremental co-innovation.

#### **4.4.1 AMC and radical co-innovation**

Substantial radical innovation results are more likely to emerge in SMEs by establishing alliances with complementary partners (Lee et al., 2010). Following this insight, a vast amount of research on the sources of radical innovation has stressed the importance of inter-organisational collaboration and has provided empirical evidence for its crucial role for radical innovation, particularly for firms in dynamic environment (Maes & Sels, 2014; Oerlemans et al., 2013). Given that small firms use co-innovation strategy to develop radical innovations (Gronum et al., 2012a), it is of particular importance to leverage AMC to support the discovery of collective opportunities (McDermott & O'Connor, 2002; Möller & Rajala, 2007). In particular, empirical evidence suggests that the ability to create and manage external relationships is important in order to manage the risks associated with co-exploration process (Kauppila, 2015; Rothaermel & Deeds, 2006), which is an important step toward radical innovation (Lee et al., 2010). Following this line of thought, it appears that AMC provides the small firm with greater access to its surroundings, and thus provides an effective mechanism to radical innovation (Story, O'Malley, & Hart, 2011). To explain how the AMC can influence the radical co-innovation action, the relationship between the five dimensions of AMC and radical co-innovation is discussed next.

First, inter-organisational coordination, which relates to the ability to identify and implement joint working procedures for efficient and appropriate task execution (Schreiner et al., 2009), is a centripetal force on exploration. Since SMEs are subject to resource constraints and environmental hostility (Sullivan-Taylor & Branicki, 2011), they might also suffer from coordination mechanisms due to boundary spanning mechanisms, working conditions, roles, procedures and responsibilities (Huang et al., 2016). In such a case, SMEs are at a risk to impede the complementary actions taken by exchange members in order to achieve ground-breaking developments (Eberly et al., 2011); in some instances, the cost of failed coordination may even exceed the benefits of determined actions (Brunsson, 1982). In addition, compared to incremental co-innovation -with readily codification in refinements to current product and process- radical co-innovation requires coordination capability as a centripetal force to develop the knowledge that is tacit and of uncertain value (Hoang & Rothaermel, 2010; Narula, 2004).

Second, inter-organisational learning allows the partnering firms to connect with each other and share the experiential knowledge (Beeby & Booth, 2000). It refers to the organisational routines to pursue the process of knowledge acquisitions and improved performance (Walter et al., 2007). SMEs with well-developed learning rationality are more likely to adapt to partnering firms (Liao,

Welsch, & Stoica, 2003). Cohen and Levinthal (1990) suggest that structure of knowledge within an organisation, overlapping of such knowledge and contact among individuals, all of these influence the acquisition and exploitation of knowledge. It implies that development of learning capability permits an SME to better appreciate, understand and diffuse the information among collaborative partners. Considering the role of inter-organisational learning for radical co-innovation, scholars argue that the improved understanding of how to transfer and absorb information about novel technology from origin organisation to destination organisation can result in radical innovation (Chang, Chang, Chi, Chen, & Deng, 2012). It has also been asserted that inter-organisational learning routines allow to gain mastery from academic and research institutions. Thus, it improves the likelihood of researching at the technological frontier and develop patents for new-to-the-world products (Miotti & Sachwald, 2003), that in turn fuels radical innovation (Faems, Van Looy, & Debackere, 2005; Maes & Sels, 2014).

Third, alliance proactiveness consists of routines that allow a firm to spot, interpret and pursue valuable opportunities in the environment (Bonner, Kim, & Cavusgil, 2005). It is an absolute skill that allows small organisations to accomplish reconfigurations ahead of competitors. It allows SMEs to obtain potential partnering opportunities, taking pre-emptive actions in response to the perceived opportunity (Quinn, 2000), sense the environment to seize opportunities, reconfigure assets (Teece, 2007) and gain competitive advantage as resources become available (Hite & Hesterly, 2001). With respect to the role of alliance proactiveness for radical co-innovation, it can be argued that alliance scanning allows SMEs to establish a portfolio of ties to a diverse body of potential partners. Particularly, the establishment of weak ties allows to access variable information and ideas that is the principal condition for radical co-innovation (Padula, 2008). Furthermore, the mastering of scanning capabilities by small firms serves as a prerequisite to bring the best candidate into relationship with specialised knowledge and strategic compatibility (Street & Cameron, 2007), which helps the partners to achieve the first-mover advantage and introduce revolutionary products (Varadarajan & Cunningham, 1995).

Fourth, alliance transformation routines counteracts the dilemma of the innovation-promoting, facing technological discontinuities adequately and ultimately enabling firms to foster radical innovations on an ongoing basis (Herrmann, Gassmann, & Eisert, 2007). It is referred to the ability of partners to adapt with the transfer process in reacting to changed conditions (Leischnig et al., 2014). Adaptations (e.g., contract amendments, changes in alliance governance mechanisms) profoundly require actions that one may never replicate. In terms of SMEs, they have behavioural strengths such as flexibility and capacity to quickly adapt routines and strategies (Pascual Ivars & Comeche Martínez, 2015), which is a necessary condition to modify alliances over the course of the alliance process (Reuer et al., 2002). Such transformations serve

as a base to deal with the complexity of co-exploration and develop the radical innovation (Lasagni, 2012; McAdam, Moffett, Hazlett, & Shevlin, 2010).

Finally, alliance bonding helps the establishment of close personal ties, which are necessary to develop the norm of trust and reciprocity in economic exchange (Stanko et al., 2007; Yli-Renko et al., 2001). Scholars have pointed the overwhelming importance of bonding such that it often creates a good possibility to increase the commitment of the parties to maintain a cooperative relationship (Seabright et al., 1992); facilitate the transfer of complex technological knowledge (Kotabe et al., 2003); enable the transfer of resources between partners; and resolve the dysfunctionality of relationship (Walter, 2003). Deep immersion in a relationship may, therefore, leads to adaptation and execution of long-term relationship in a constantly changing environment, thus motivating a firm's initiatives to seek new business opportunities (Liu et al., 2009). In fact, in the context of SMEs, cooperation behaviour is a much stronger signal of radical innovation, since these collaborations involve trustworthiness and mutual reinforcement (Lee et al., 2010). For example, the small technology firms can transfer tacit knowledge, know-how and compete head-on with established rivals as they build on the bonding skills (Gilsing & Nooteboom, 2005).

Taking together, the alliance management routines, including, coordination, learning, transformation, proactiveness and bonding, facilitate the transmission of knowledge and information among the partners, which provide the basis for radical co-innovation. This leads to the following hypothesis:

**Hypothesis H1:** *AMC is positively related to radical co-innovation in SMEs.*

#### **4.4.2 AMC and incremental co-innovation**

A firm's AMC is developed over time and accumulated through its past experience. It reflects the possession of routines that support various alliance-related tasks, such as partner identification and knowledge exchange, and facilitate an effective execution of inter-organisational relationship (Schilke, 2014). Based on dynamic capability perspective, AMC requires a firm to have two temporal orientations: the present and the future (Brown & Eisenhardt, 1998). In *the present*, exploitation dominates through sustained incremental innovation. On the contrary, *the future* requires learning-by-doing, creation of new product designs and ability to drive new designs, architectural innovations and product substitutes (Ancona, Goodman, Lawrence, & Tushman, 2001). Möller and Törrönen (2003) posit that more incremental innovation is particularly important in the global climate of competition because '*suppliers cannot keep up with the pace of developing next generation solutions within a technology field*' (p. 112). A single firm may alone produce incremental technological solutions, although this is rare due to the difficulty and

cost involved in mastering the multiple technologies (Rubera, Chandrasekaran, & Ordanini, 2016). The incremental innovation commonly takes place through joint action between different firms. The effective implementation requires mutual adaptation routines, such as AMC that can affect the success of joint actions.

Following the previous discussion, radical and incremental innovation requires different structures, strategies, procedures and capabilities (He & Wong, 2004). Incremental innovation requires firmly organised culture, highly structured processes, roles and systems, and a strong emphasis on hierarchy as compared to radical innovation (Ancona et al., 2001). As such, incremental innovation is variance-decreasing activity on disciplined problem-solving (Azadegan, Dooley, Carter, & Carter, 2008), small firms need to possess stronger AMC to search local, neighbourhood information and knowledge stores to achieve immediate advantage (Levinthal & March, 1993). Empirical evidence provides some indirect support for these arguments. Zhou and Wu (2010), for example, find that a firm's technology capability tends to increase the potential for exploitation. At the same time, Kauppila (2015) determine that a firm with strong AMC tends to engage in co-exploitation to gain access to complementary assets in order to commercialise its products. Within the context of SMEs, AMC help small firms to initiate the knowledge exchange to handle their existing knowledge imperatives that may eventually leads to create incremental innovations (Arikan, xe, & T, 2009). In fact, possession of various alliance management routines (i.e., inter-organisational coordination, inter-organisational learning, alliance proactiveness, alliance transformation and alliance bonding) facilitates the effective sharing of knowledge among the partners for incremental co-innovation. The next section exhibits the linkage between all the different alliance management routines and incremental co-innovation.

First, inter-organisational coordination is critical part of planning and controlling the external relationship. In increasingly complex and uncertain environment, a consensus view of the future technology requires the incremental co-innovation (Lichtenthaler, 2010), which demands the inter-organisational coordination capability to manage the integration mechanisms. Inter-organisational coordination aids the small firm to leverage existing technologies and improves the synchronisation of joint exploitative activities. In addition, Hoang and Rothaermel (2010) posit that investment in coordination capabilities simultaneously enables the identification of specific roles and execution of behaviours with minimal redundancy that are critical to transfer the prevailing knowledge for incremental innovation. Although coordination cost is significantly low in incremental co-innovation due to less need of communication at a later stage of development, higher inter-organisational coordination improves the efficiency in knowledge integration and provides the higher learning benefits as well as avoids the high cost of extensive mutual incremental innovation.

Second, inter-organisational learning aids the small firms to establish an existing technology as an industry standard (Lichtenthaler, 2010). Particularly, it allows to access the knowledge assets of partners to leverage complementarities across different and unique competencies along the value chain (Bresser, Heuskel, & Nixon, 2000), while allowing the partner to maintain the comparative knowledge advantage (Grant & Baden-Fuller, 2004). Considering the significance of inter-organisational learning specifically for incremental co-innovation, it has been argued that exploitation requires the diversity of knowledge with the ability to integrate different type of knowledge and utilise the knowledge to its full capacity (Grant & Baden-Fuller, 2004). Thus, inter-organisational learning with the ability to transform, systematise, coordinate and socialise the knowledge allows the increased incremental co-innovation for SMEs (Gebauer, Worch, & Truffer, 2012).

Third, alliance proactiveness helps the small firms to achieve the competitive positional advantage despite the surrounding environmental uncertainty in the market (Kandemir et al., 2006; Schilke & Goerzen, 2010). Considering the relevance of alliance proactiveness for incremental co-innovation, it can be argued that alliance scanning brings the best partners in the relationship to achieve the co-exploitation and thereby incremental co-innovation. Furthermore, proactive scanning of partnering opportunities can allow the identification of partners with complementary knowledge, resources and strategic compatibility (i.e., a skills to integrate the capabilities of partners in firm's own routines), which is a prerequisite for incremental co-innovation (Kandemir et al., 2006).

Fourth, alliance transformation is linked with the flexibility of partners to adapt the transfer process in reacting to changed conditions (Reuer & Zollo, 2000). Although incremental co-innovation may pursue perfect and unified interactions, such outcomes seldom appear from the beginning. New knowledge and know-how continue to develop as incremental innovations occur, alliance transformation capability is the foundation to change the alliance governance mechanisms and conditions for greater alliance continuity and also for incremental developments. To the extent that higher alliance transformation capability is available, one would expect that improved incremental co-innovation is likely to occur in SMEs due to extensive experimentation with new combinations, creation of variation and continuous improvements.

Finally, alliance bonding relates with the extensive and repeated contact between the collaborating parties (Granovetter, 1985). As radical and incremental innovation is different in nature, both activities require different bonding routines. For instance, as far as incremental co-innovation in small businesses is concerned, the emphasis is on exploitation and efficiency (Elfring & Hulsink, 2003). In this instance, strong bonding capability is a good deal to get best out of alliance relationship. Rowley et al. (2000) argue that incremental co-innovation focus on

refinement of existing ideas and so strong relational bonds with frequent contact is likely to provide specific information with deeper knowledge in a particular area. Perhaps, the strong alliance bonding capability helps the small partners to remain proactively responsive to the concerns, staying reliable in responses and remaining in frequent contact that ultimately leads to immediate gains in incremental co-innovation (Schreiner et al., 2009).

This study augments the previous literature by suggesting the positive association between AMC and incremental co-innovation in SMEs. The central observation is that accumulation of AMC enable a firm to better understand the value of alliance relationship and provide insights to co-exploit identical resources with the partner (Cohen & Levinthal, 1990). The profit gains from investment in AMC can outweigh its cost because it enables a small firm to configure the partnering opportunities, create strong relational bonds and coordinate the activities in external linkages that are indispensable to successfully exploit existing resources for incremental innovation. In addition, as the small firm accumulates AMC, it becomes more competent in assimilating knowledge from a diverse range of partners within similar technological fields due to the positive feedback between experience and learning (Zhou & Wu, 2010). This assumption is in keeping with the RBV that capability to integrate valuable resources (and capabilities) makes the firm to exploit external knowledge and ultimately supports incremental innovation (Lane, Koka, & Pathak, 2006). Accordingly, this study postulate that:

**Hypothesis H2:** *AMC is positively related to incremental co-innovation in SMEs.*

#### **4.5 Strategic actions and internationalisation performance**

The advocates of internationalisation argue that potential benefits of expansion into international markets are appealing (Zhou, Wei-ping, & Xueming, 2007). Firms that do not internationalise may lose competitiveness because the over-dependence in one market can increase the income uncertainty; given that dependence on market stability generates vulnerability to sales fluctuations (Figueira-de-Lemos & Hadjikhani, 2014). Even though internationalisation has been seen as an indeterminate undertaking in the face of an unknown environment (Figueira-de-Lemos, Johanson, & Vahlne, 2011), it is argued that in globalisation economy, it may be more difficult to internationalise (George, Wiklund, & Zahra, 2005). Primarily, SMEs may not have the full range of resources and capabilities to realise the benefits of internationalisation. By definition, SMEs internally face the resource constraints and liability of smallness, while externally, they face challenges arising from their vulnerability to environment (Madrid-Guijarro, Garcia, & Van Auken, 2009). Such inherent deficiencies in resources and capabilities impose restraints on the internationalisation of SMEs (Lu & Beamish, 2001). These constraints inflate the liabilities of foreignness and newness, and make internationalisation a daunting challenge.

Literature on internationalisation apprehended that firms should have sufficient knowledge about the foreign markets in order to be aware about opportunities and problems in the foreign market (Eriksson, Johanson, Majkgard, & Sharma, 1997). Considering the possibility to obtain foreign market knowledge and enter into new markets, studies show that there are two divergent strategic actions – entrepreneurial proclivity and networked innovation, which can facilitate the internationalisation of firms (Boehe, 2013; Ricci & Trionfetti, 2012; Wu et al., 2007). In this vein, one group of scholars argue that entrepreneurial proclivity – the tendency of a firm to engage in entrepreneurial processes, characterised by the organisational culture for innovativeness, risk taking and proactiveness – facilitates the extension of firm’s activities across national borders (Ken Matsuno, John T. Mentzer, & Özsomer, 2002). The entrepreneurial knowledge and vision facilitates the firms to exploit windows of opportunities unseen by competitors (Zhou, 2007); and thus allows the internationalisation success. On the contrary, the other group of researchers understands innovation-oriented network models including collaborative R&D (Blomqvist, Hara, Koivuniemi, & Äijö, 2004; Chesbrough) as alternative mode of internationalisation performance.

Following the RBV logic, scholars are in agreement that firms’ decision to choose the appropriate strategy is consistent with the resources and capabilities available to them (J. A. Wolff & T. L. Pett, 2000), because firms are heterogeneous with respect to their resources and capabilities (Barney, 1991). In line with this view, Baird, Lyles, and Orris (1994) argue that small firms may tie to strategic options that fits with their unique resources in order to response to global competition and acquire internationalisation performance. Previous research on SMES has well described innovation and strategic alliances as important enablers of internationalisations of the small firms (Chetty & Stangl, 2010; Ganotakis & Love, 2011). However, the success of SMEs depends on the collaborative innovation, which allows them to translate their successful innovations into internationalisation performance. Although collaborative innovation has not been explicitly studied in the context of internationalisation, earlier research on its roles in firm performance is extensive. For instance, a number of studies claimed that inter-firm nature of innovation is unique and creates differentiation, which untimely allows the firms to improve revenue growth and financial performance (Chesbrough & Crowther, 2006; Faems, De Visser, Andries, & Van Looy, 2010). Accordingly, the present study hypotheses the relationship between strategic action (i.e., radical and incremental co-innovation) and internationalisation performance.

The international business literature reveals different indicators of the internationalisation performance such as strategic (entry into international markets, achievement of objectives, sales growth) and economic/operational (profit, sales) (Armario et al., 2008; Cavusgil & Zou, 1994). Considering this dichotomy, this study has considered internationalisation speed as strategic

aspect and internationalisation success as operational aspect. The distinction between internationalisation speed and success is drawn to determine the impact of radical and incremental co-innovation.

First, the speed of internationalisation serves as a time-based measure to captures the speed with which a venture enters a specified target country (Jones & Coviello, 2005). Although phenomena of early internationalisation is documented for large enterprises due to their potential to create and transfer the knowledge (Dunford, Palmer, & Benveniste, 2010). According to Sapienza, Autio, George, and Zahra (2006), early internationalisation may, at times, diminish the survival potential of small resource constrained firms. However, there are significant potential benefits associated with early internationalisation. Firstly, firms willing to take the risks associated with internationalisation are exposed to new learning and growth opportunities (Zahra & Hayton, 2008). In addition, early internationalisation provides benefits stemming from "learning advantages of newness" in the form of faster adaptation and the development of flexible organisational routines. The resulting outcomes are regarded as the ability on the part of small firms in order to better identify and exploit future international opportunities (Weerawardena, Mort, Liesch, & Knight, 2007).

The concept of internationalisation speed is often confounded with the born global ventures (Bell, McNaughton, Young, & Crick, 2003) and speed of a firm's subsequent international growth (Sapienza et al., 2006). The former view holds that firms do not internationalise incrementally but enter international markets soon after their inception (Chetty & Campbell-Hunt, 2004). The born-global firms perceive the world as one market and thus do not confine themselves to a single country (Knight & Cavusgil, 2004). In the latter view, speed is defined as the growth of the proportion of company sales derived from foreign countries over a specific period of time (Wagner, 2004), increase in the proportion of company assets held abroad (Johanson & Vahlne, 2009) or increase, over time, in the number and variety of the countries where a company is active (Asmussen, 2009; Jones & Coviello, 2005). Consistent with the view of Acedo and Jones (2007), this study regards internationalisation speed as a time-based measure that considers the amount of time elapsed between the year of founding and international operations.

Second, internationalisation success is a fundamental measure to indicate the profitability and by the same token the survival of firms (Freixanet, 2012). Freixanet (2012) argue that internationalisation success can be seen in the context of economic results, export diversification and competitiveness. Along the same line, Leonidou, Katsikeas, and Samiee (2002) suggest that it is appropriate to assess internationalisation success using financial and non-financial goals as measure of performance. Next, this study hypothesises that radical and incremental co-innovation is

positively related to two internationalisation performance outcomes: internationalisation speed and internationalisation success.

#### **4.5.1 Radical co-innovation and internationalisation speed**

The first firm to enter a new market for a specific product or service is commonly believed to accrue long-term competitive advantage (Kerin, Varadarajan, & Peterson, 1992). These advantages are directly derived from the firm's early competitive move to international markets and gaining market position (Capone, Malerba, & Orsenigo, 2013). Faced with the decision about the entry in international markets, the optimal timing may not be subject to managerial choice but depends upon the strengths or weaknesses of the firm's existing resource base (Lieberman & Montgomery, 1988). Internationalisation speed is likely to be "*a desirable strategy for the firms whose relative skills are in new product development (radical innovation)*" (Lieberman & Montgomery, 1998, p. 1113). It is generally presumed that lack of capital, limited resources and small size reduces the ability of small firms to gain first-mover advantage (Pitelis, 2009; Steffens, Davidsson, & Fitzsimmons, 2009). The presumption of SMEs as a disadvantaged group of firms in pursuing internationalisation speed aligns with the RBV, which highlights the inherent differential resources as a source of competitive advantage (Barney, 1991; Peteraf, 1993). This presumption, however challenged by empirical research suggesting that SMEs adopt a global market focus and enter in foreign markets from inception (Gassmann & Keupp, 2007; Zhou, Wu, & Luo, 2007).

The profound role of collaborative innovation is often recognised in order to explain the internationalisation speed of resource-constrained SMEs (Filatotchev, Liu, Buck, & Wright, 2009; Freeman et al., 2006). Gulati (2007) suggested that collaborative resources have expanded the realm of RBV that incorporate resources that are raised from external integration. IOC, therefore, compensates for lack of SME's resources (Coviello, 2006). External collaboration relationships allow the small firms to develop radical innovation. Previous scholars generally agree that radical innovations are fundamental changes that represent revolutionary changes in technology (Dewar & Dutton, 1986; Verganti & Öberg, 2013). Based on organisational learning perspective, radical innovations require the broad and general knowledge for radical developments (March, 1991). As SMEs lack individual resources and capabilities with which to address innovation challenges, collaboration networks bring together knowledge, technologies and resources that are distributed across organisational boundaries (Rothaermel & Alexandre, 2009). Consequently, firms that scores high on IOC can access external knowledge and utilise knowledge for radical innovation.

The radical co-innovation promotes the knowledge creation that speed up the internationalisation of SMEs (Coviello & Cox, 2006; Zahra et al., 2000). Focusing on organisational learning, March (1991) has provided the empirical support affirming that radical co-innovation may lead to more variations, flexibility and developments, which in turn increase the potential of resource-constrained firms to rapidly expand to international markets and adapt to unpredictable changes (Li, Qian, & Qian, 2015). In this vein, Chetty and Campbell-Hunt (2004) find that small firms with new innovations can be forced to internationalise quickly and benefit from the first-mover advantage. In order to provide further support for this contention, Chetty and Stangl (2010) contend that small firms with diverse inter-organisational linkages for radical innovation are more likely to have rapid internationalisation. Particularly, the central premise of these arguments is that radical innovation is associated with high degree of learning from actors with diverse backgrounds, which creates barriers for the potential competitors to accelerate the operation in international markets (Dunning, 1998). In inter-organisational networks, partners focus on revolutionary innovations from the start that are developed in response to global needs, and thus need to move rapidly to international markets (Elena Vasilchenko & Morrish, 2011). Some of the literature on international business highlights that small firms are better at creating radical co-innovations due to protection of innovators property rights and therefore they do not have to spend resources to overcome barriers against international expansion (Acs, Morck, Shaver, & Yeung, 1997). Radical co-innovation, thus, enables a small firm to experiment different ideas and develop new products, which then contributes to tackling of new markets and rapid entry into international markets (Chiva et al., 2014). On the basis of the aforementioned discussion, the following hypothesis is proposed.

**Hypothesis H3:** *Radical co-innovation is positively related to internationalisation speed in SMEs.*

#### **4.5.2 Radical co-innovation and internationalisation success**

Radical co-innovation relates to the development of ground-breaking products/technologies by sharing complementary resources, knowledge and competencies with partners (Bossink, 2002). Many SMEs can benefit from this strategy because they are faced with shorter product life cycle, rapid technological changes and shortage of capital (Parida et al., 2012). According to van de Vrande et al. (2009), SMEs can overcome these challenges from collaboration with external partners as it can fuel their radical innovation activities. Arguably in international business context, collaborative innovation may be critically important for the internationalisation success. For instance, numerous researchers have shown that there is a positive relationship between innovation and internationalisation (D'Angelo et al., 2013) and that innovative firms are able to enjoy the advantage of multi-nationality (Cassiman & Golovko, 2011; Higón & Driffield, 2011).

Indeed, researchers suggest that there may be a challenge for internationalising firms to develop an internationally suitable product offering for international opportunity seeking (Prashantham, 2008). Recent studies have shown that co-innovation serves as a means to gain more knowledge about the demands of customers and provides access to wider international markets (Löfgren, 2014; Westerlund & Rajala, 2010).

It can be argued that radical co-innovation influences the internationalisation success of small firms. First, according to RBV, firms are regarded as a set of resources, that these resources are heterogeneously distributed across firms (Barney, 1991). Based on these assumptions, it has been theorised that valuable and rare resources provides the basis for competitive advantage, both in domestic markets (Camisón & Villar-López, 2014) and international markets (López Rodríguez & García Rodríguez, 2005). The technology profile can be considered as relevant resource to achieve internationalisation success (Silva, Styles, & Lages, 2017). To the best of researcher knowledge, no internationalisation studies have analysed the impact of radical co-innovation on internationalisation success. Nevertheless, the unique characteristics of partners' resources for radical innovation can give the potential to small firms to positively affect internationalisation success. Particularly, the impact of radical co-innovations on internationalisation success is expected because radical innovation dominates the early stage of product life cycle and may result in higher quality innovation (Cassiman et al., 2010). Second, in a competitive international environment, a small firm needs to develop new products and change its resource structure to adapt to competitive environment (Karim & Mitchell, 2000), because existing organisational practices may reduce the flexibility to adapt to new changes (Levitt & March, 1988). Since radical innovations are inherently risky, firms can seek external partnering opportunities to successfully introduce radical innovation (Lettl, Herstatt, & Gemuenden, 2006), which acts as a source of internationalisation success. In particular, when competitive forces are in place, small firms tend to continually develop radical co-innovation to maintain internationalisation success (Chiva et al., 2014; Oesterle, 1997). Finally, entrepreneurial SMEs are more likely to identify the demand for radical innovations in the domestic market (Avlonitis & Salavou, 2007; Salavou & Lioukas, 2003). Although radical innovation is driven by domestic demand, SMEs tend to serve international niche markers due to foreign demand and attain superior level of internationalisation success (Knight & Cavusgil, 2004). Consistent with the previous arguments, this study posits that:

**Hypothesis H4:** *Radical co-innovation is positively related to internationalisation success in SMEs.*

### **4.5.3 Incremental co-innovation and internationalisation speed**

The production of knowledge constitute a resource of firm that underpins the sustainable competitive advantage (Barney, 1991). The literature on open innovation provides strong evidence of the recombining diverse knowledge for effective incremental innovation (Rubera et al., 2016). By engaging in IOC, SMEs can increase the incremental innovation because collaborative partners provide diverse information and resources, and reflect upon how to improve products they are familiar with (Brunswick & Vanhaverbeke, 2015; Parida et al., 2012). In fact, incremental co-innovation can be regarded as a unique strategic action required to achieve competitive advantage. With respect to the performance implications of incremental co-innovation, this study focuses on internationalisation speed. In keeping with RBV, internationalisation speed constitutes a key type of competitive advantage (Loane & Bell, 2006). Below, the researcher discusses the unique way in which incremental co-innovation influences internationalisation speed.

First, the RBV asserts that valuable and rare resources determine the choice of strategic opportunities (Barney, 1991). Although the changes in incremental innovation are not like radical innovation, incremental co-innovations designed by the agents of one country are different from those designed (Puga & Trefler, 2010). In line with this view, incremental co-innovation is valuable and rare for foreign customers, which in turn enhances internationalisation speed. Further, consistent with RBV, co-creation of incremental innovation results in timely and relevant information about foreign markets, which can lead to internationalisation speed. Second, in international context, Nassimbeni (2001) argues that ability to break into a foreign market and successfully compete against local offers is closely linked to upgrade in innovations of SMEs. Strengthening collaboration for incremental innovation can help firms track emerging trends in the foreign markets and changing foreign customer preferences (Lisboa, Skarmas, & Lages, 2011). In addition, through incremental co-innovation, SMEs can redirect pre-existing products and services to fulfil specific needs of psychologically close countries or optimise the choice of foreign markets (Yanto, Chris, & Ian, 2009), which ultimately leads to internationalisation speed.

**Hypothesis H5:** *Incremental co-innovation is positively related to internationalisation speed in SMEs.*

### **4.5.4 Incremental co-innovation and internationalisation success**

Incremental innovation generates the value by accumulative effect, by technical rigidities and by creating versatility in established designs (Abernathy & Clark, 1985). However, small firms might not be able to incorporate a particular type of incremental innovations due to several reasons: (1) lack of resources and capabilities to introduce an incremental change; (2) protection

of ideas by competitors; and (3) long time to observe the acceptance of change in market and introduce by themselves (Nelson & Winter, 1982). By the time SMEs become familiar that change is acknowledged by the customers, it is often too late to introduce the products because the opportunity has passed or competitors have created the barriers (Banbury & Mitchell, 1995). In such a case, collaboration strategy is of interest to introduce successful incremental innovations that saves time and cost while commercialising the innovations (Chiang & Hung, 2010).

As suggested earlier, at home SMEs often operate at uneconomically small scale (Contractor, 2007) hence success in international markets requires the significant strategic actions. The literature suggests that notwithstanding the dynamics of market and comparative disadvantages (Bhaskaran, 2006), SMEs in highly competitive international environment can be profitable if the small firms adopt networked innovation strategy. Particularly, the incremental co-innovation strategy offers novel landscapes to build a strong revenue base due to active experimentation, refinement of activities and customer-specific objectives (Vickery, Jayaram, Droge, & Calantone, 2003). Although there have been fewer empirical studies, it has been suggested that external sources of innovation are particularly important for the internationalisation success of small firms with limited experience (Fletcher & Harris, 2012; Freeman et al., 2006). Indeed, the link between the use of external sources of incremental innovation and internationalisation cannot be easily separated.

From the organisational learning perspective, incremental co-innovation allows SMEs to influence internationalisation success by allowing SMEs to learn what the market needs and how to fulfil these needs (Weerawardena et al., 2007). Moreover, Love and Ganotakis (2013) and Andriopoulos and Lewis (2010) explain that incremental co-innovation improves the value of output by leveraging existing knowledge to develop product extensions, which is critically important for international market share and revenue generation in foreign markets. For instance, large businesses that frequently rush the flawed products to markets usually suffer severely. Following this logic, SMEs' collaboration with external partners seeks to decrease the production cost because the partners with efficient manufacturing capabilities increases the efficiency of resource allocation (Lorenzoni & Lipparini, 1999). Moreover, subcontractors helps to refine an occasional flawed products and overcome problems caused by its introduction (Banbury & Mitchell, 1995), which in turns increase the value of goods for customers. Thus, the adoption of competitor's innovation and effective commercialisation of products helps to realise the increased market share in international markets. This study, though, predicts that introducing increment co-innovation can help small businesses to achieve greater market share in foreign markets by leveraging greater returns on their knowledge as compared to competitors. Based on these arguments, the following hypothesis is proposed.

**Hypothesis H6:** *Incremental co-innovation is positively related to internationalisation success in SMEs.*

## **4.6 The role of moderating factors**

The earlier literature suggests that relationship between AMC, strategic action and internationalisation performance is contingent upon certain structural and organisational factors. This study, therefore, considers the moderating role of alliance partner diversity and foreign market knowledge. The following section discusses the role of each moderator in a greater detail.

### **4.6.1 Moderating role of alliance partner diversity for AMC and strategic actions linkage**

It is apparent that integration and dissemination of AMC is difficult organisational activity, particularly for small resource constrained firms, as it requires substantial investment in, for instance, the creation of a dedicated alliance function with the responsibility to capture prior experience and create guidelines to help managers handle specific aspects of the alliance life cycle (Eriksson, 2014; Kale & Singh, 2007). While supporting the institutionalisation of AMC, research suggests that such investments are substantial to leverage the strategic action (Newbert, 2007). However, the impact of AMC on strategic action varies significantly in the degree to which different partner are involved (Zeng et al., 2010). The theoretical discussion on the impact of AMC on strategic action thus needs to incorporate alliance partner diversity as an intervening factor in the relationship. This idea coincides with the recent suggestion by Oerlemans et al. (2013) that innovation outcomes are embedded within diversity of alliance partners, which requires managerial abilities to efficiently claim such innovation outcomes.

Research examining partner diversity has defined it as one type of functional factor with variety of that enables a firm to obtain new knowledge and technology from the alliance partners (Oerlemans et al., 2013). Beers and Zand (2014) identify the five different types of partner: (1) research institutions, (2) universities, (3) suppliers, (4) competitors and (5) customers and lead users. Especially, universities and research institutions are attractive option for SMEs due to access to fundamental knowledge and the possibility of high-quality research (Oerlemans et al., 2013), which is a viable source to tap into the basic product development process (J. A. C. Baum et al., 2000). In contrast, suppliers and customers gives access to the manufacturing, regulatory and marketing knowledge that is required to move from a commercially feasible technology to a marketable product (Nieto & Santamaría, 2007). In case of competitors, small firms can share R&D costs, benefit from resource pooling and get assistance in quick market penetration (Miotti & Sachwald, 2003).

These research findings would seem to suggest that different alliance partners are endowed with different level of expertise and abilities and will, therefore, contribute differently to innovation (Mesquita & Lazzarini, 2008). This study, therefore, argues that relationship between AMC and strategic action varies across levels of partner diversity. At low level of partner diversity, the relationship between AMC and strategic action is affected only marginally, because firms are connected to the same kind of partners possessing similar resources and efforts to manage relationship can be limited (Kang et al., 2007; Sampson, 2007). A high level of partner diversity, on the other hand, allows small firms to obtain new ideas and knowledge held by a diverse set of partners. Due to the importance of combining diverse knowledge, AMC help SMEs to absorb increasingly diverse knowledge (Parida, Patel, Wincent, & Kohtamäki, 2016). This becomes especially impactful once AMC exceed a certain (moderate) level at which organisational inertia problems for strategic action would emerge without partner diversity. In that case, high partner diversity is expected to increase the impact of AMC on strategic action due to enhancement in the breadth of perspective, cognitive resources and overall problem solving capacity (Goerzen & Beamish, 2005). The diversity in network partners may provide a diverse sample of information from which to learn and develop capabilities, which in turn result in efficient implementation of strategies (Gulati, Nohria, & Zaheer, 2000). Also, actors from diverse functional groups provide complementary knowledge and tacit skills that are necessary to develop radical products by employing capabilities to manage the relationships (Beers & Zand, 2014). In other words, high partner diversity allows firms to benefit more from high level of AMC by utilising the capabilities at optimal level resulting in better coordination mechanism and gaining access to currently most relevant resources, and ultimately, in higher innovation activity.

Based on the characteristics of radical and incremental innovation, it is reasonable to argue that moderation effect of partner diversity will differ between the two types of innovation activities. Given that incremental innovation is the improvement in existing resources (Ritala & Hurmelinna-Laukkanen, 2013), utilising low portfolio diversity, adjusted with the prevailing organisational routines, should be sufficient to make the most out of AMC (Parida et al., 2016). On the other hand, radical innovation is complex activity and requires state-of-the-art knowledge to develop commercially viable products (Dewar & Dutton, 1986; McDermott & O'Connor, 2002). Also, in order to make sufficient use of alliance management routines, firms need to use alliances beyond a functional level and outweighs the capabilities' cost by its gains (Heimeriks, 2010). Therefore, the high level of partner diversity allows small firms to make better use of AMC to manage the alliances and enabling them to develop radical co-innovations. Based on this reasoning, this study suggests that positive effect of AMC in creating radical co-innovation is comparatively high when level of alliance partner diversity is high. The above line of reasoning leads to hypothesis 7 and hypothesis 8.

**Hypothesis H7:** *Partner diversity positively moderates the relationship between AMC and radical co-innovation in SMEs such that high level of partner diversity will increase the AMC that maximise radical co-innovation.*

**Hypothesis H8:** *Partner diversity positively moderates the relationship between AMC and incremental co-innovation in SMEs such that low level of partner diversity will increase the AMC that maximise incremental co-innovation.*

#### **4.6.2 Moderating role of foreign market knowledge for strategic actions and internationalisation performance linkage**

The dominant view in internationalisation of SMEs points to the importance of innovation (Cassiman et al., 2010; Kyläheiko, Jantunen, Puumalainen, Saarenketo, & Tuppurä, 2011). Consistent with this, scholars consider innovation as a social process (Nahapiet & Ghoshal, 1998), so also are external networks. From this perspective, unsurprisingly, collaborative innovation is a suitable and operational strategy for the internationalisation of SMEs (Prashantham & McNaughton, 2006). Inter-organisational relationships are conduit of new knowledge and information that lead to enhanced innovation and thereby internationalisation (Chetty & Stangl, 2010). However, countries differ not only on their level of institutional development but importantly, also on the business practices and types of supporting-institutions for innovation (Busenitz, Gómez, & Spencer, 2000). For instance, UK has well-developed capital markets that can provide funds for innovation (Sweeting, 1991), while India has weak regulatory system but well-developed educational infrastructure (Hoskisson, Wright, Filatotchev, & Peng, 2013). This kind of institutional and regulatory differences requires the small firms to possess sufficient foreign market knowledge. The availability of foreign market knowledge for small firms allows them to recognise the importance of cultivating and integrating the ground-breaking innovation for different international markets. This is consistent with the internationalisation process perspective, which argues that internationalisation is a gradual process firms where firm starts with the development of routines and administrative structures to manage domestic market operations, thereby adjusting to foreign environment (Eriksson et al., 1997). This study, therefore, hypothesises that strategic action affects internationalisation performance differently due to foreign market knowledge.

First, given that knowledge is the important resource in internationalisation of firms (Johanson & Vahlne, 2003), the possession of foreign market knowledge is likely to facilitate the pace of the firm's initial internationalisation. Specifically, it is argued that possession of foreign market knowledge gives rise to strategic initiatives (e.g., understanding of what is appropriate and

fundamentally important for foreign customers) that is conducive to how early and rapidly a small firm seeks to obtain sales outside its own domestic market (Zhou, 2007). Second, foreign market knowledge allows the SMEs to trade upon the liability of smallness by effectively employing the limited resources with the partners and overcome the liability of foreignness by spotting the business opportunities in foreign markets (Knight & Liesch, 2002; Tsai & Eisingerich, 2010). Thus, it can be posit that foreign market knowledge increases the ability of SMEs to coordinate the international activities as well as improves the willingness of small businesses to make resource commitment to these activities (Hadjikhani, 1997).

**Hypothesis H9:** *Foreign market knowledge positively moderates the relationship between strategic actions and internationalisation performance in SMEs such that high level of foreign market knowledge will increase the strategic actions that maximise internationalisation performance.*

**H9a:** *The greater the foreign market knowledge, the stronger the impact of radical co-innovation on internationalisation speed in SMEs.*

**H9b:** *The greater the foreign market knowledge, the stronger the impact of radical co-innovation on internationalisation success in SMEs.*

**H9c:** *The greater the foreign market knowledge, the stronger the impact of incremental co-innovation on internationalisation speed in SMEs.*

**H9d:** *The greater the foreign market knowledge, the stronger the impact of incremental co-innovation on internationalisation success in SMEs.*

#### **4.7 Summary of the hypothesised relationships**

This study investigates the role of AMC for internationalisation performance of SMEs through strategic actions. The review of IOC-INN-INT relationship and AMC has showed that there is lack of explanation as to how AMC leads to internationalisation performance of SMEs. Based on the RBV, it is argued that SMEs need to undertake strategic action in order to leverage the value of resources for performance (Newbert, 2007). Accordingly, this study conceptualised innovation activities as important strategic actions through which SMEs can realise the potential value of AMC (as resources) for internationalisation (performance). Further on this, research hypotheses are developed to justify the interrelationship between the constructs of model, as exhibited in Figure 4-1. The research hypotheses, theoretical perspectives and main arguments are summarised in Table 4-1.

Table 4-1 - Summary of theoretical arguments underpinning the expected relationships

Research Issue	Hypothesis	Theoretical perspective	Main argument	References
AMC and strategic actions	<b>Hypothesis H1:</b> AMC is positively related to radical co-innovation in SMEs.	Resource-based view	The ability to integrate valuable resources (and capabilities) allows to effectively combine the partner's resources for radical innovation.	Kraaijenbrink et al. (2010); Newbert (2007)
	<b>Hypothesis H2:</b> AMC is positively related to incremental co-innovation in SMEs.	Resource-based view	The ability to integrate valuable resources (and capabilities) allows to effectively combine the partner's resources for incremental innovation.	Kraaijenbrink et al. (2010); Newbert (2007)
Strategic actions and internationalisation performance	<b>Hypothesis H3:</b> Radical co-innovation is positively related to internationalisation speed in SMEs.	Resource-based view	The external linkages enhance joint innovation due to the variety of resources to be shared, thereby enabling the firms to successfully achieve internationalisation speed.	Boso, Story, Cadogan, Micevski, and Kadić-Maglajlić (2013); Libaers and Meyer (2011)
		Organisational learning	The firm learns from the partners to overcome the liability of foreignness and newness in international markets.	Levitt and March (1988)
	<b>Hypothesis H4:</b> Radical co-innovation is positively related to internationalisation success in SMEs.	Resource-based view	IOC enhances radical innovation due to the variety of resources, which enables the firms to successfully achieve internationalisation success.	Boso, Story, Cadogan, Micevski, and Kadić-Maglajlić (2013); Libaers and Meyer (2011)
	<b>Hypothesis H5:</b> Incremental co-innovation is positively related to internationalisation speed in SMEs.	Resource-based view	The external linkages enhance joint creation of incremental innovation due to the variety of available resources, which	Boso, Story, Cadogan, Micevski, and Kadić-Maglajlić

Research Issue	Hypothesis	Theoretical perspective	Main argument	References
			ultimately increases the internationalisation speed.	(2013); Libaers and Meyer (2011)
	<b>Hypothesis H6:</b> Incremental co-innovation is positively related to internationalisation success in SMEs.	Organisational learning	The firm learns from the partners to overcome the liability of foreignness and newness in international markets	Levitt and March (1988)
Partner diversity as a moderator between AMC and strategic actions	<b>Hypothesis H7:</b> Partner diversity positively moderates the relationship between AMC and radical co-innovation in SMEs such that high level of partner diversity will increase the AMC that maximise radical co-innovation.	Resource-based view	Partners provide different resources and capabilities that improve and complement AMC for radical innovation.	Becker and Dietz (2004); Nieto and Santamaría (2007)
	<b>Hypothesis H8:</b> Partner diversity positively moderates the relationship between AMC and incremental co-innovation in SMEs such that low level of partner diversity will increase the AMC that maximise incremental co-innovation.	Resource-based view	Partners provide different resources and capabilities that improve and complement AMC for incremental innovation.	Becker and Dietz (2004); Nieto and Santamaría (2007)
Foreign market knowledge as a moderator between strategic actions and internationalisation performance	<b>Hypothesis H9:</b> Foreign market knowledge positively moderates the relationship between strategic actions and internationalisation performance in SMEs such that high level of foreign market knowledge will increase the strategic	Internationalisation process theory	Knowledge-intensity of firm's resource is an enabling factor to influence the growth of small businesses in international markets	Coviello and Munro (1997); Eriksson et al. (1997)

<b>Research Issue</b>	<b>Hypothesis</b>	<b>Theoretical perspective</b>	<b>Main argument</b>	<b>References</b>
	actions that maximise internationalisation performance.			

## **4.8 Conclusion**

This chapter focused on the development of conceptual framework of this study. In doing so, section 4.2 provided an overview of the theoretical development in the literature. Following this, section 4.3 explained the relationship between resources, strategic actions and performance using the RBV, which formed the basis for the development of conceptual model. Accordingly, section 4.4 discussed the relationship between AMC and strategic actions and developed the hypotheses. Later, section 4.5 discussed the relationship between strategic actions and internationalisation performance and suggested the hypotheses. Following this, the role of moderating factors (i.e., role of alliance partner diversity for the relationship between AMC and strategic actions, and role of foreign market knowledge for the relationship between strategic actions and internationalisation performance) was outlined to develop the hypotheses. Finally, section 4.7 provided a summary of the research hypotheses along the details of theoretical perspectives and main arguments.

Building on the research issues, the next chapter, Chapter 5 discusses the context of study.

This is that part of the earlier figure 1-1 that is being addressed in the forthcoming chapter.

Introduction	Literature review	Operationalisation and Research Design	Data Analysis	Commentary
<p>Ch. 1 Introduction</p> <p>Introduction Research questions Research objectives</p>	<p>Ch. 2: Systematic literature review</p> <p>Inter-organisational collaboration, innovation and internationalisation in SMEs</p> <p>Ch. 3: Critical review</p> <p>Alliance management capabilities as source of firm performance</p> <p>Ch. 4: Model development</p> <p>Developing conceptual model and pertinent hypotheses</p> <p><b>Ch. 5: Study context</b></p> <p>SMEs in the UK manufacturing sector</p>			

# Chapter 5. Study Context

## 5.1 Introduction

This chapter laid the foundation of study context. This study is positioned within the theoretical context of IOC, innovation, internationalisation and AMC literature and empirical context of UK manufacturing SMEs, as depicted in Figure 5-1. The theoretical context of IOC, innovation and internationalisation of SMEs is discussed in Chapter 2 and theoretical context of AMC is discussed in Chapter 3. The current chapter discusses the empirical context of SMEs in the UK manufacturing industry.

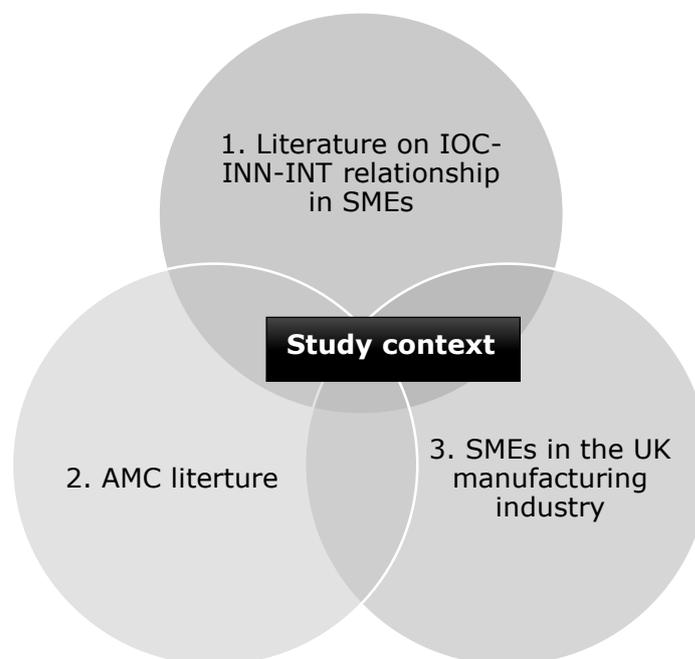


Figure 5-1: Context of study

This chapter is structured in five sections. After introducing the chapter, the second part defines the concept of SMEs. The third part discusses the importance of SMEs in the UK economy. Following on this, the fourth part justifies the choice of manufacturing SMEs in the UK economy. Finally, the chapter is summarised.

## 5.2 Definitions of SMEs

It is important to agree on the common SMEs definition to improve the consistency and effectiveness of research and, also to limit the competition (Kommission, 2005). In 1996, a recommendation establishing the common definition of SMEs was adopted by EU commission (European Commission, 2005). However, to date, there is no uniform definition of SMEs available as it varies from country to country. The definition of SMEs is mainly based on three attributes: number of employees, turnover and balance sheet total. The following section provides an overview of definitions available in different countries and justifies the choice of definition for this study.

### 5.2.1 UK

There is no standard for defining SMEs in the UK. While the Department of Trade and Industry defines SMEs based on the number of employees, British Bankers Association defines SMEs based on the turnover. In the UK, sections 382 and 465 of the Companies Act 2006 define a SME for the purpose of accounting requirements, as in Table 5-1.

Table 5-1: Definition of SMEs with UK standard

Category	No: of employees	Turnover	Balance sheet total
Small	< 50	< £6.5 million	< £3.26 million
Medium	< 250	< £25.9 million	< £12.9 million

Source: UCL (2017)

### 5.2.2 European Commission

The European Commission has defined SMEs in a similar manner to the UK except that they include a category 'micro'. A micro enterprise has less than 10 employees. Table 5-2 provides the number of employees, turnover and balance sheet total for all the three categories: micro, small and medium.

Table 5-2: Definition of SMEs with European Commission standard

Category	No: of employees	Turnover	Balance sheet total
Medium-sized	< 250	≤ € 50 million	≤ € 43 million
Small	< 50	≤ € 10 million	≤ € 10 million
Micro	< 10	≤ € 2 million	≤ € 2 million

Source: European Commission (2003)

There is no agreed definition of SMEs among scholars. In the context of UK SMEs, a diverse body of academic literature used the number of employees as the selection criteria following the EU definition (Lee, 2014; McAdam et al., 2010). Therefore, the current study adopted EU definition for the purpose of research.

### **5.3 Importance of SMEs in the UK economy**

SMEs are seen as an important focus for the attention of policymakers, both for developed and developing markets (Hulbert, Gilmore, & Carson, 2013; Memili, Fang, Chrisman, & De Massis, 2015). Most economic structures are largely composed of SMEs, and despite the presence of SMEs, most employment is concentrated in this sector (Hoffmann & Schlosser, 2001). They are significant to the innovation activities (Szirmai, Naudé, & Goedhuys, 2011), entrepreneurship and exporting (Julien & Ramangalahy, 2003) as well as, to exploit opportunities from globalisation. For instance, the SMEs' imports in UK amount to £182,266 million in 2014 with a growth rate of 4% compared to 2013; exports amounted to £111,388 million in 2014 with a minor decline of 3% (HMRC, 2015). These figures suggest that SMEs have potential to nurture and drive innovation in this marketplace and beyond, resulting in exporting.

In the UK, as elsewhere in the world, the economy is dominated by the activities of SMEs. According to Rhodes (2016), there were 5.5 million businesses in the UK, with 99% of businesses were SMEs. These businesses accounted for majority of the employment and turnover in the UK. Figure 5-2 provides an overview of the share of firms (including small, medium and large-sized firms) in the UK private sector. It is evident from the Figure 5-2 that small firms dominate the UK private sector in terms of employment, turnover and businesses.

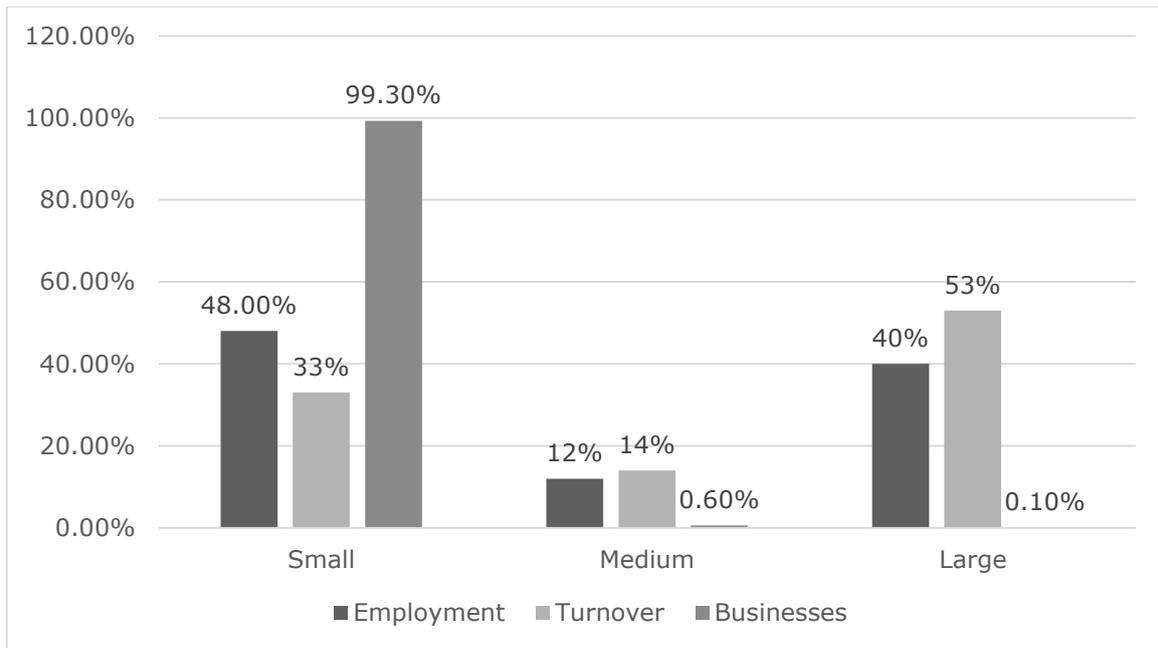
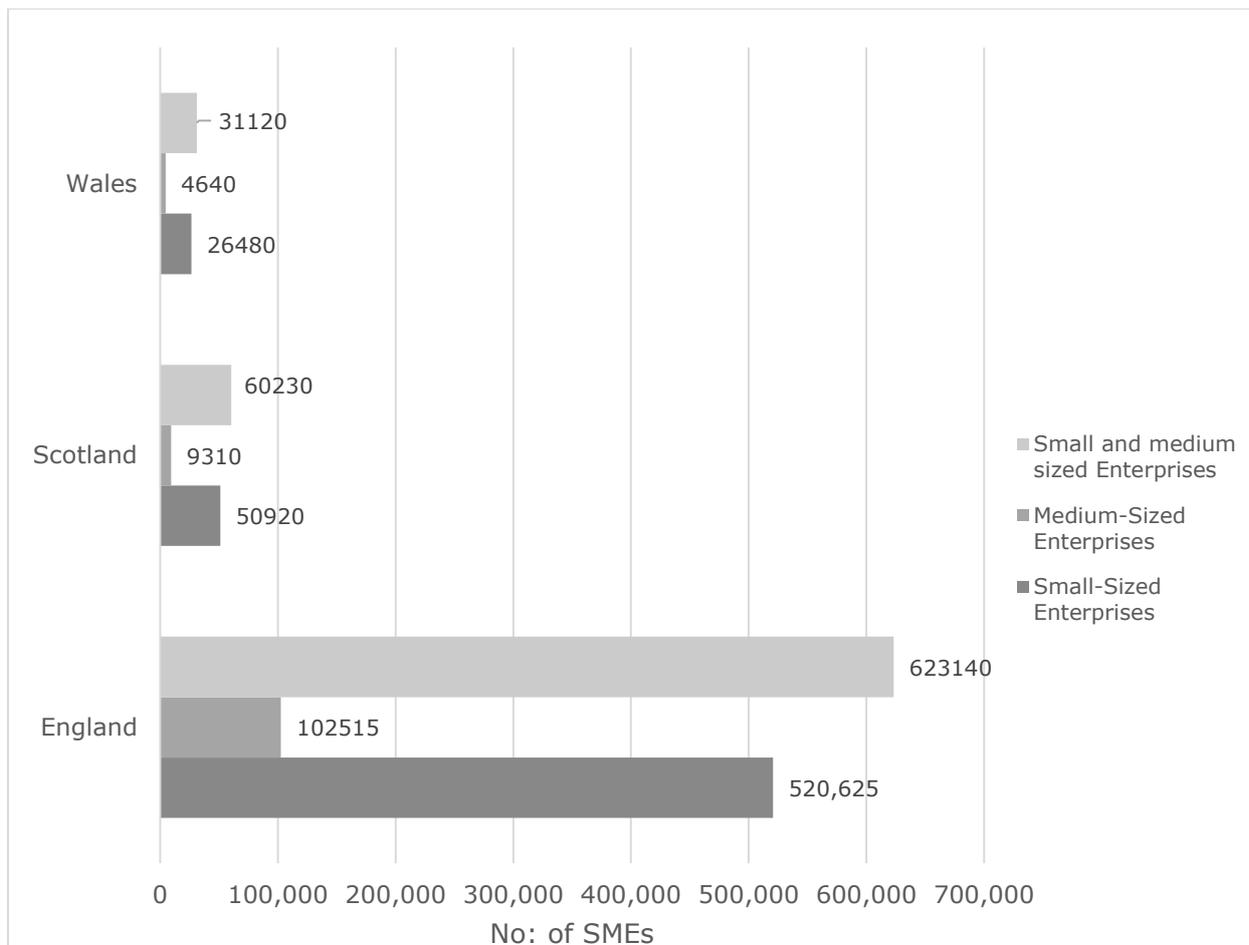


Figure 5-2: Share of Enterprises in the UK private sector, 2016

**Note:**

1: Adapted from: Business population estimates, 2016, p1

The number of SMEs differs in the different areas of the country. In the UK, including the areas of England, Wales, and Scotland, there were 714,490 SMEs in 2016. Among these SMEs, there were 598,025 small-sized enterprises and 116,465 medium-sized enterprises. Within UK local authority districts, England is the major area with larger number of SMEs 623,140, followed by Scotland 60,230 and Wales 31,120. Therefore, it is worth to consider the areas of England, Wales and Scotland to study the SMEs. Figure 5-3 exhibits the number of SMEs in different regions of the UK in 2016.



**Note:**

Figure 5-3: Number of SMEs in different Great Britain regions, 2016

Source: Shaw (2017)

Given the large number of SMES in different UK regions, the UK government also recognises that economic success is inevitable associated with the vitality of SMEs' sector. Underscoring the importance of SMEs, Department for Business, Innovation & Skills (2017) states that there is an increase of 97,000 SMEs since 2015, where total employment in SMEs was 15.7 million that accounts for 60% of all private sector employment in the UK. In addition, the growing importance of SMEs in the UK is justified on a number of grounds. First, in 2016, the combined annual turnover of SMEs was £1.8 million, 47% of all private sector turnover in the UK. Second, with respect to growth, innovation is vital to the success of economy as it keeps fresh markets, which may otherwise go stagnant. Around 37% of SMEs engage in innovation activity, suggesting that small firms are key enablers of growth and innovation (Department for Business Innovation & Skills, 2013). Finally, the creative destruction is widely accepted principle in innovation literature, whereby new innovative entrepreneurs challenge incumbent businesses (Robinson, O'Leary, & Rincon, 2006;

Tripsas, 1997). SMEs spur competition in the UK; the least productive firms exit and the most productive firms grow, result in an increase in productivity (Department for Business Innovation & Skills, 2013).

The aforesaid discussion of facts delineates the strong position of SMEs in the UK economy. While the economic climate is favourable one for SMEs, the country actually needs SMEs to sustain a healthy economy. However, the research by RSA insurer group suggests that the majority (55%) of SMEs do not survive over five years (RSA, 2014). Beyond survival, SMEs also face considerable challenges in achieving growth with *"two thirds (63 per cent) of small business owners admitting that it is difficult to grow their firm and three fifths (61 per cent) of owners lacking confidence in their ability to achieve three-year continued growth"* (Smallbusiness, 2015). The prevalence of high number of SMEs in the UK have created a dynamic and a highly competitive environment, reflecting the need for new approaches towards innovation and internationalisation (Ben Brik, Rettab, & Mellahi, 2011). SMEs are characterised by flexibility and entrepreneurial dynamism (Reid et al., 2001; Zhu, Wittmann, & Peng, 2011), which helps them to involve in external collaboration (Zeng et al., 2010). Inter-organisational collaboration facilitates the access to resources in order to innovate and internationalise (Stoian et al., 2017).

Since UK SMEs involve in collaboration, they need capabilities to manage the relationship and stay together (BSI, 2013). In spite of the increasing interest in AMC, previous studies have been intended for large firms, where the notion of AMC first started. Discussion about the concept of AMC for SMEs have been excluded due to following reason. It is easy to study AMC in larger firms, as SMEs have small size and lack of resources (Gassmann, Enkel, & Chesbrough, 2010). However, it is necessary to differentiate between SMEs and larger firms about AMC, since it is recognised that they involve in collaboration for innovation activity and internationalisation more than larger firms (Boso, Story, Cadogan, Micevski, & Kadić-Maglajlić, 2013). SMEs in the UK are no exception to large firms in other countries and markets that should be encouraged to use AMC to support alliance success and organisational performance. Therefore, this study focuses on AMC in SMEs, firstly seeking to place the concept of AMC in the context of SMEs, and secondly encouraging strategic actions and internationalisation performance by suggesting AMC as a key resource.

#### **5.4 Manufacturing SMEs in the UK economy**

The manufacturing sector cuts across a wide range of industries from food, drinks, and textiles to aerospace, electronics and pharmaceuticals. Despite the decline since 1970, when manufacturing contributed 25% of UK GDP, the UK is the ninth largest

manufacturing nation in the world (The manufacturer, 2017). According to EEF (2017), UK manufacturing employs 2.7 million people and represents 68% of business research and development. As per the most recent known data in 2013, SMEs accounts for 57% of all UK manufacturing.

Aerospace is one of the most manufacturing sectors in the UK economy, largest in Europe and second largest in the world. The 2,375 companies in the aerospace (as of 2013) comprise 0.1% of the UK's registered SMEs. With respect to UK automotive sector, it produced over 1.4 million and 2.5 million engines in 2011, exporting in excess of 80% of its production. As of 2013, the 70,200 companies within Automotive account for 3.3% of the SMEs within the UK. Construction is one of the largest sector in the UK economy that contribute almost £90 billion in the UK economy in value added. 14% of the UK's registered SMEs are in the Construction sector. The 73,505 SME businesses in the Food sector account for 3.4% of the registered SMEs in the UK. The 92,965 companies within Healthcare account for 4.3% of the registered SMEs within the UK. Healthcare saw a 7.8% increase in the number of registered SMEs between 2011 and 2013. As of 2013, the 165,170 registered SMEs in ICT account for 7.7% of the UK total.

Against this background, this study aims to explain how UK SMEs can flourish following different strategic options. Understanding the AMC, innovation and internationalisation of manufacturing SMEs is important for strategy research for several reasons. First, collaborative innovation is one of key strategies to rapidly internationalise (Chetty & Stangl, 2010), making it an appropriate subject for examining whether SMEs will adopt AMC in accordance with the needs for collaboration. Second, manufacturing SMEs are important to geographical area of the UK (House of Lords, 2013). Third, manufacturing industry has significant economic impacts. The UK's manufacturer's product sale was £357.8 billion in 2015 (ONS, 2015), which is estimated to grow and develop at faster pace by 2020 (Lawrence, 2016). However, the success depends on building products that stand out differently in the local as well as in international markets. To embrace the manufacturing revolution, SMEs need to explore the collaborative business models for better development of innovation (Masons, 2017). Although the importance of collaboration, innovation and internationalisation for UK manufacturing SMEs is clear, there is lack of data on the impact of AMC for the success of collaboration.

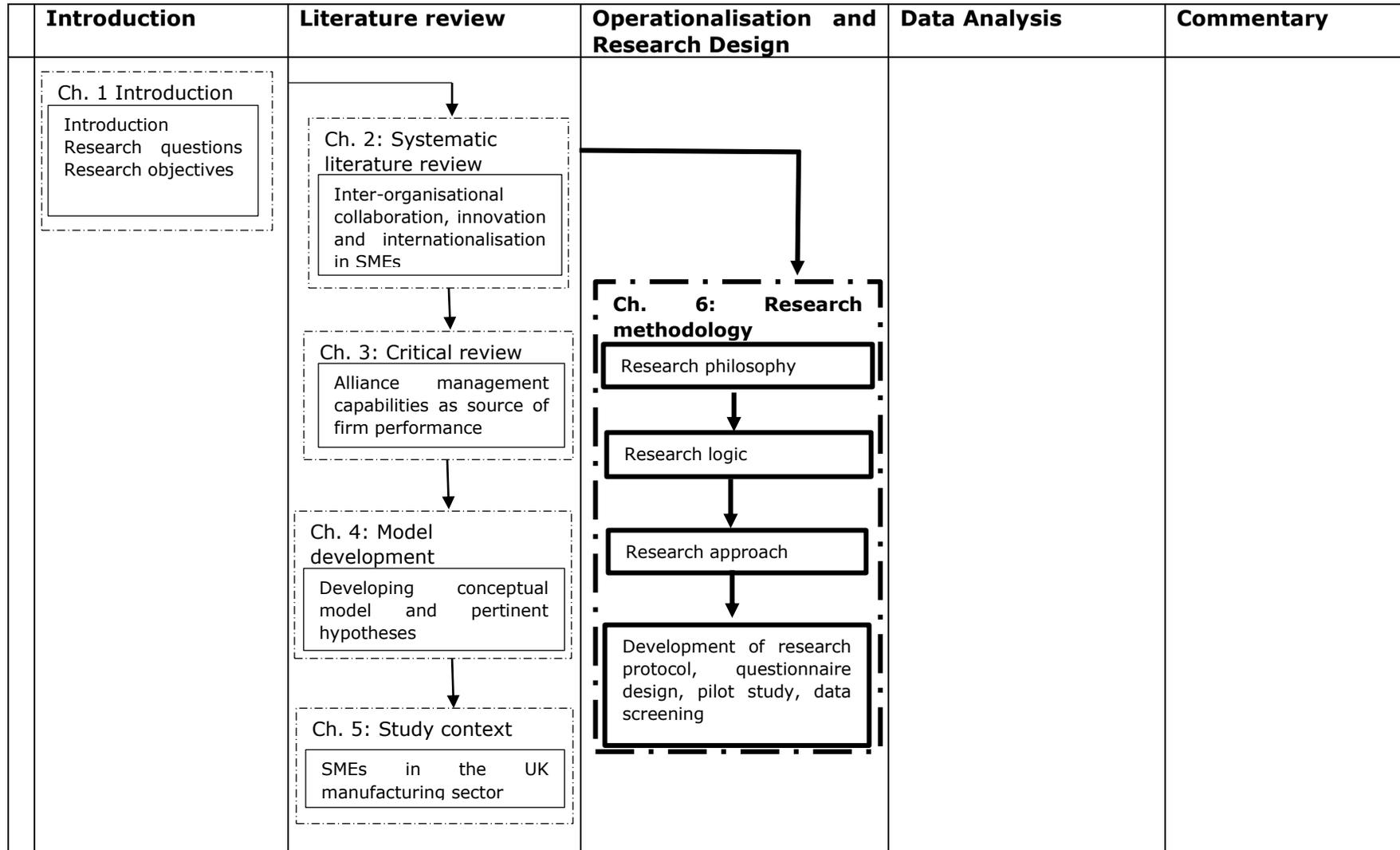
## **5.5 Conclusion**

Given the significant contributions made by SMEs to economic growth in the UK (McAdam, McAdam, Dunn, & McCall, 2014), understanding, understanding their performance determinants is an important question in strategy and international business research

(Arranz, Arroyabe, & Fdez. de Arroyabe, 2016; Love & Roper, 2015; Parida et al., 2016). This study considers the role of AMC to promote strategic actions, which ultimately result in internationalisation performance of SMEs. This chapter justified the choice of study's context. To do this, the concept of SMEs was defined and choice of SMEs' definition for this study was rationalised. In addition, the importance of SMEs in the UK economy was discussed. Further to this, the significance of manufacturing SMEs in the UK economy was debated. Finally, the chapter is concluded.

The next chapter, Chapter 6 outlines and justifies the issues of research methodology.

This is that part of the earlier figure 1-1 that is being addressed in the forthcoming chapter.



# **Chapter 6. Research Methodology**

## **6.1 Introduction**

In the previous chapter, the context of study is discussed with the explanation of importance of SMEs in the UK manufacturing sector. This chapter discusses the research methodology that has been followed to conduct the empirical part of the study. It is important to outline the detailed research plan to explain how the research questions are answered. Consequently, this chapter is divided into six sections.

The discussion in this chapter starts with an explanation of philosophical standpoint of this research and then move to a description of research logic. Next, the chapter focuses on the research approach and justified the choice of quantitative approach. Following this, the research process is explained. This consists of four steps: development of research protocols (like survey design, the targeted sample, key informants, and response rate), questionnaire design (including scale properties and measurement of constructs), pilot study and preliminary data screening. Finally, a brief description of the research ethics is presented.

## **6.2 Philosophical assumption of the study**

In the wake of the work of Thomas Kuhn in the 1960s, the concept of research paradigm has been used to refer to a set of beliefs that guide the actions to carry out a project (Kuhn, 1962). The understanding of research paradigm is important because it can help the researchers to recognise which research design may work or not work in certain investigations (Entman, 1993). Since the formation of research paradigm is based on certain philosophical assumptions (i.e., ontology and epistemology) to perceive objects and conceive reality (Kuhn, 2012), it is recommended that all the research designs may not fit with all paradigm's philosophical assumptions (Calder, Phillips, & Tybout, 1981). For instance, ontology is related to the assumptions researcher have about the nature of reality (Creswell, 2013). In order to understand the question about 'what really exists', the attention has been brought towards two main aspects (Guba & Lincoln, 1994). One aspect holds that reality exists because of the experience, while another aspect argues that reality exists independent of those who live it (Hatch & Cunliffe, 2006). Thus, it can be inferred that dichotomy of ontological assumptions provides the basis for the choice of different research designs. Closely linked to the question of what is reality, there is the question of how do we measure reality. This is the premise of epistemology that how

reality can be measured and what establishes the suitable knowledge in the area of study (Shah & Corley, 2006). Research designs, therefore, are defined within the principles of epistemology because epistemology describes what is possible to know, how it can be known, how reality is described and reflection on methods to generate reliable information/knowledge (Eriksson & Kovalainen, 2015; Ghauri & Grønhaug, 2006; Hatch & Cunliffe, 2006).

With these basic ontological and epistemological distinction in place, a comparison of different research paradigms can guide the choice of appropriate research design. Table 6-1 depicts the comparison between four key paradigms (positivism, realism/critical realism, interpretivism/constructionism and pragmatism) across the four dimensions - ontology, epistemology, methodology and logic.

In interpretivism/constructivism, it is important to understand *the difference between human behaviours being the social actors* (Lincoln & Guba, 2002). Ontologically, it appreciates that reality is socially constructed in human minds (Martens, 2005). Therefore, the researcher is required to understand the knowledge in a particular context and discover the differences in the interpretation of human experiences. From the epistemological perspective, it follows subjectivism where the researchers have to enter the social world and understand their world from their perspective (Creswell, 2013). In contrast, researchers from the realism school of thought advocate the idea that 'truth is actually *what the senses show*' (Devitt, 1997) and the objects exist independent of the human mind (Crotty, 1998). Particularly, critical realism is of the view that there are meanings for every social phenomenon, but it is not possible to quantify the meanings (Easton, 2010; Wilson & McCormack, 2006). By adopting this philosophy in social science, researchers conceive the world as structured, differentiated and changing (Bhaskar, 2010). Pragmatism, another philosophical paradigm, focuses on the what and how of the research problem (Easterby-Smith, Thorpe, & Jackson, 2012). The followers of pragmatism reject the notion that social actors can obtain the truth about the real world merely by the use of scientific methods (Martens, 2005). Within pragmatic paradigm, the research problem is placed as central, and data collection and analysis methods are chosen as those most likely provide insights into the research problem (Quinlan, 2011). Methodologically, mixed method is seen as an appropriate research design for pragmatism paradigm (Tashakkori & Teddlie, 2003).

Based on the above comparison, it is established that neither of the discussed paradigms fits with the nature of this study. For instance, critical realism believes that reality exists independent of human minds, but interpretation is based on social conditioning (Creswell

& Plano Clark, 2011). Contradicting the objectives of this research, it ought to be critical in evaluating the social phenomena in order to generate credible understanding (Evely, Fazey, Pinard, & Lambin, 2008). However, one needs not to be critical in measuring the internationalisation performance. In other words, being objective is a sufficient condition to examine the performance because it is easy to identify what we do not see through the practical and theoretical processes of the social science (Bhaskar, 2010). Likewise, interpretivism/constructivism is not an appropriate stance for this research because it believes that reality is socially constructed (Creswell & Plano Clark, 2007). Also, it argues that reality can only be reached inductively (Quinlan, 2011), whereas the current study has started deductively (Section 6.3. research logic has discussed in detail). Along the same line, pragmatism does not fit with the objectives of current study because it assumes that truths are provisional tools used to solve particular problems thrown up by life (Kelemen & Rumens, 2008). However, the truth needs to be grounded in some foundation of certain knowledge that can be tested (Morgan, 2007; Shalin, 1986).

By observing the Table 6-1, positivism is an admissible paradigm to work with an observable social reality. This study, therefore, adopts the positivism paradigm. The positivist ontology believes that the world is external and there is a single objective reality regardless of researcher's perception (Hudson & Ozanne, 1988). It allows the researcher to take a controlled and structured approach by identifying a clear research topic and adopting a suitable research methodology. Epistemologically, the researcher emphasis on regularities and causal relationship between its constituent elements (Singh, 2007). Therefore, the main focus is on the generalisation and abstraction as well as on the hypotheses and stated theories. Positivism as a paradigm encourages the use of quantitative method and the deductive reasoning.

Table 6-1: Comparison of the research paradigms

Comparison dimensions	Research paradigms			
	Positivism	Realism/ Critical Realism	Interpretivism/ constructionism	Pragmatism
<b>Ontology</b> The nature of reality	External, objective and independent of social actors	Objective, Exists independent of human thoughts and beliefs (realist) but interpretation is based on social conditioning (Critical realist)	Subjective, multiple, Socially constructed	External, multiple, view chosen to enable the answering of research question
<b>Epistemology</b> The role of researcher regarding what makes the acceptable knowledge	Only observable phenomena can provide credible data and facts. Focus on causality and law like generalisability	Observable phenomena provide credible data and facts. insufficient data indicates inaccuracies in sensation	Subjective, Focus upon the details of situation.	Observable phenomena and subjective meanings can provide acceptable knowledge
<b>Methodology</b> What is the process of data collection?	Highly structured, large samples, measurement, primarily quantitative but can also be qualitative	Chosen method must fit the subject matter; qualitative or quantitative	Small sample, in-depth investigation	Mixed or multiple method design, Quantitative and qualitative
<b>Logic</b>	Deductive	Deductive but inductive is also acceptable	Inductive	Abduction

**Note:**

1: Source: Adapted from: Cohen, Manion, and Morrison (1994); Guba and Lincoln (1994); Easterby-Smith et al. (2012)

The choice of positivism paradigm can be justified as follows. Firstly, strategic management literature accepts the view that 'organisation' and 'environment' is real, material and separate from each other, just as in biology (Smircich & Stubbart, 1985; Stacey, 2007). Accordingly, organisations are perceived as a biological organism that adapt to their ambient environments (Hassard, 1995). This suggests that the roots of strategy and international business lie in positivism. Second, positivism prefers to use existing theory to develop hypotheses that will be tested and confirmed or refuted, leading to further developments of theory (Haig, 2014). This is in accordance with the scope of this study where a conceptual framework is developed based on existing theory and hypotheses are developed. Finally, it facilitates the replication of study due to use of a highly structured methodology (Gill & Johnson, 2002). This is in line with the research design of this study as the data is collected through a structured questionnaire.

As mentioned previously, the understanding of research paradigm affects the different aspects of research like research logic, research design, validity and generalisability of results (Holden & Lynch, 2004; Hughes & Sharrock, 1997). Considering the differences between different philosophical paradigms and justifying the choice of positivism paradigm, the next section discusses its implication for different research aspects namely, research logic and research approach.

### **6.3 Research logic**

Since research paradigms are views or beliefs that a group of people may have to understand the theory (Courgeau & Franck, 2007), the extent to which existing theory can be made explicit in the design of research depends on the research logic (Adams, Khan, & Raeside, 2014). In the subject of social sciences, there are two primary research logics: deductive – testing theory, and inductive – building theory. Within deductive approach, the law presents the basis for the justification, permit the prediction of the phenomenon, projection the incidence of phenomenon and allow its occurrence (Collis & Hussey, 2014). The researcher follows five sequential stages to progress the deductive research such as, (1) deducing a hypothesis, (2) expressing the hypothesis in operation term, (3) testing the operational hypothesis, (4) examining the specific outcomes, and (5) modifying the theory if necessary (Robson, 2011). On the contrary, the inductive approach starts with the research questions and detailed observations, which can later generate ideas about the issue and abstract generalisation (Creswell, 2013). It is likely to be useful where the researcher is concerned with the context in which such event is taking place (Liang, Jia, Taatgen, Zhong, & Li, 2014). In order to pursue the principle of business like scientific rigour, the researcher needs to employ the deductive approach (Sekaran & Bougie, 2010).

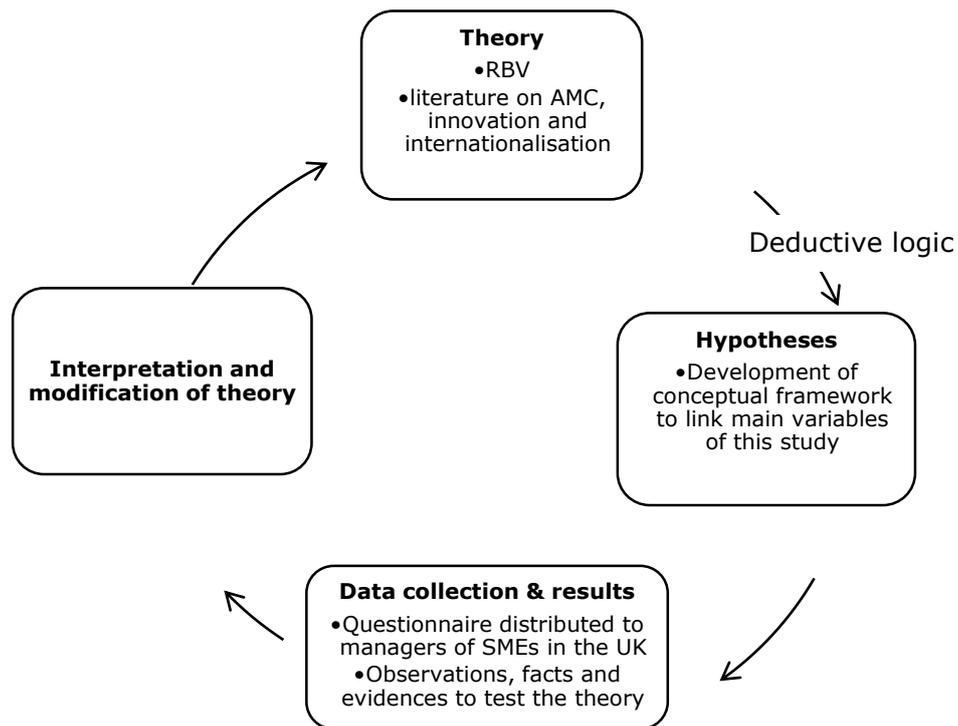


Figure 6-1: Deductive logic as applied in this study

**Note:**

1: Source: Adapted from: Black (1999)

Given the above discussion, this study adopts the deductive logic as shown in Figure 6-1. The choice of deductive logic is justified based on the following two reasons. First, Barney and Hoskisson (1990) argue that inductive reasoning suffers from lack of theoretical grounding and empirical evidences on strategy and performance link. This has led the researchers to cast doubts about the appropriateness and robustness of inductive approach for configurations-performance relationships (Ketchen, Thomas, & Snow, 1993). This evokes the need for theory-based models that permit the prediction of performance differences in strategy literature (Pugliese et al., 2009). This has provided the basis for this study to choose the deductive approach. Second, deductive reasoning is an efficient approach to overcome the subjectivity inherent in the inductive interpretations (Ketokivi & Mantere, 2010). According to Rips (1994), deductive reasoning has more stable internal properties. It sounds plausible to assume that subject utterances' in deductive reasoning are the products of mental processes that represent the information contained in the problem, transform the information in a sequence of steps and employ the transformed facts to decide on an answer to the research question (Oaksford & Chater, 2001; Rips, 1994). By adopting the deductive approach, this study relies on the existing strategic management (specifically AMC and IOC literature), international business and SMEs literature to identify the knowledge gaps. A link between AMC, strategic actions and

internationalisation performance was missing in the extant strategy and international business literature. This study, therefore, developed a conceptual framework based on the literature and RBV as a theory. The quantitative data using survey was collected to test the conceptual model. Finally, the model is tested using the quantitative analysis techniques. Thus, the adoption of deductive logic can allow the researcher to predict important outcomes.

## 6.4 Research approach

Research approach refers to a systematic and orderly approach to collect and analyse data in order to understand the research problem in hand (Jankowicz, 2005). From this point of view, there are two dominant research approaches in the social sciences research, namely: quantitative and qualitative (Creswell, 2013). Predominantly, quantitative is used for any data collection technique or data analysis procedure that generates or uses numerical data (Black, 1999; Cooper & Schindler, 2011). It employs several techniques to collect the data like survey and experiment. In contrast, qualitative research includes an “array of interpretive techniques which seek to describe, decode, translate, and otherwise come to terms with the meaning, not the frequency of certain more or less naturally occurring phenomena in the social world” (Cooper & Schindler, 2006, p. 196). Pillow (2003) contends that qualitative researchers use the reflexivity to bring understanding through the ideas of researchers. There are several techniques to collect qualitative data like case study, action research, grounded theory and ethnography. Insofar, it is suitable to link the choice of research method to the different research philosophies. Therefore, quantitative approach fits more to the positivism and, qualitative approach corresponds to interpretivism.

Table 6-2: Comparison of research approaches

No:	Characteristics	Research approach	
		Quantitative	Qualitative
1	Method	Survey, structured interview	Focus group, interviews and documents review
2	Approach	Deductive	Inductive
3	Ontology	Objectivism	Subjectivism
4	Data	Numeric	Text-based
5	Information	Less in-depth but large cases	More in-depth but few cases
6	Measurement	Statistics	No statistics
7	Evaluation of information	Reliability	Genuineness
8	Generalisability	More	Less

**Note:**

1: Source - Adapted from: Bryman (2012); Cooper and Schindler (2011)

Drawing on the above discussion and comparison in Table 6-2, quantitative research approach is the suitable choice for the current study to link theoretical concepts with empirical research for testing theory (Bryman, 2012). There are several reasons that underpin the choice of quantitative approach. First, paradoxically, organisational theorists have praised the virtue of strategic management, which is consistent with market needs and firm's demands (Harris & Ogbonna, 2001). Interestingly, the IOC is linked to increased organisational performance (de Leeuw et al., 2014). Although these valuable contributions have served as a useful starting point, sometimes important information regarding the link between AMC, strategic actions and organisational performance is missing. The endeavour to test existing theories in order to determine the AMC as a fertile ground for internationalisation performance (as an indicator of organisational performance) is likely to greatly enrich the strategic research (Wright, Filatotchev, Hoskisson, & Peng, 2005; Zahra et al., 2000). Thus, by following quantitative research approach, the strategy research can be enriched through the use of conceptual schemes to define the relationship in a logical manner, testing these empirically and devising self-checking mechanisms to ensure the replicability of study (Black, 1999; Snow & Thomas, 1994). Second, Bryman (1984) suggests that quantitative methodology is a common research design to conduct the social science research, which applies the techniques of natural scientists. As the current study pursues to include the real-world data, the empirical research to verify a theory has strong foundations to make truthful assumptions underlying mathematical and simulation modelling in social sciences (Flynn, Sakakibara, Schroeder, Bates, & Flynn, 1990). Accordingly, this study has generated hypotheses in advance to be tested using collected data, which can help to extend existent theory. Finally, the findings of qualitative research have limited scope and difficult to be generalised to other settings (Perlow, 1997). Considering the scope of the current study, quantitative research can facilitate the researcher to generalise the findings beyond the confines of a particular context in which the research is conducted (Blumberg, Cooper, & Schindler, 2014). The quantitative research followed in this research is similar to previous strategy and international business studies (see for example, Harris & Li, 2009; Inemek & Matthyssens, 2013; Shearmur, Doloreux, & Laperrière, 2015).

Over the years, however, quantitative research along with its ontological and epistemological foundations has been the centre of criticism. To provide the flavour of the criticism of quantitative research, four censures are discussed briefly. Firstly, quantitative researchers '*fail to distinguish people and social institutions from the real world of nature*' (Bryman & Bell, 2011, p. 167). In so doing, the central tenant is that the principles of the scientific method can be applied to all phenomena that are the focus of investigation.

However, this should not be seen as an issue because, unlike qualitative research, it usually avoids the unsystematic views about what is important and significant. It allows the researcher to explicitly state the problem based on the existing literature on that topic and key theoretical ideas. Secondly, with respect to ecological validity, the reliance on the instrument and procedures can hinder the connection between researcher and everyday life. Cicourel (1982) argues that how do we know if survey respondents have the requisite knowledge to answer the questions. This issue is addressed in questionnaire by asking the knowledgeability questions to the respondents. This is further discussed in section 6.5.3.1 and section 7.2.1. Thirdly, there is an artificial and a counterfeit logic of accuracy and exactitude in the measurement process. In this vein, it is argued that the connection between the measures developed by social scientists and the revealed information is assumed rather than real (Bryman, 2012). The researcher has dealt with this issue by asking the questions with fixed-choice answers (Adcock, 2001; Cicourel, 1964). Finally, the analysis of relationship between variables can create a static view as it is independent of human lives (Blumer, 1956). This criticism incorporates that the meaning of events is ignored and also there is a lack of knowledge about the connection of such findings to everyday context. This issue is addressed in the section of Face validity.

## **6.5 Research process**

After grounding the theoretical foundation of the research methods, this section discusses the research process followed in this study. Research process acts as a plan to guide the investigator in the process of designing, collecting and analysing data (Frankfort-Nachmias & Nachmias, 2007). It also provides the basis to use the scientifically gathered information to draw the causal inferences among study variables (Kothari, 2004). Polit and Beck (2004) suggest that research process can have three phases, as explained in Figure 6-2.

This research has been conducted in three phases: (1) the conceptual phase, (2) the design, planning and empirical phase and (3) the analytical phase. Phase 1 incorporated the formulation of the research problem, review of the literature and development of the conceptual framework. Phase 2 relates to research design and plan of quantitative research, where the issues of population, sampling plan, method to measure the research variables and pilot study have been discussed. The final stage concerned with generation of empirical findings and generation of theoretical implications. However, this chapter is dedicated to the discussion of phase 2, as phase 1 has been discussed in the previous chapters. Phase 3 will be discussed in Chapter 7 and Chapter 8.

Phase 2, the design, planning and empirical phase, involves four key steps, namely, development of protocol, questionnaire design, the pilot study and preliminary screening. In particular, this phase determines the validity of quantitative research (Polit & Beck, 2004). It is important to recognise the numerous variables, which may influence the results and thereby posing the threats to the validity of conclusions (Pedhazur & Schmelkin, 1991). Thus, careful consideration is required in phase 2 to anticipate and determine the validity concerns.

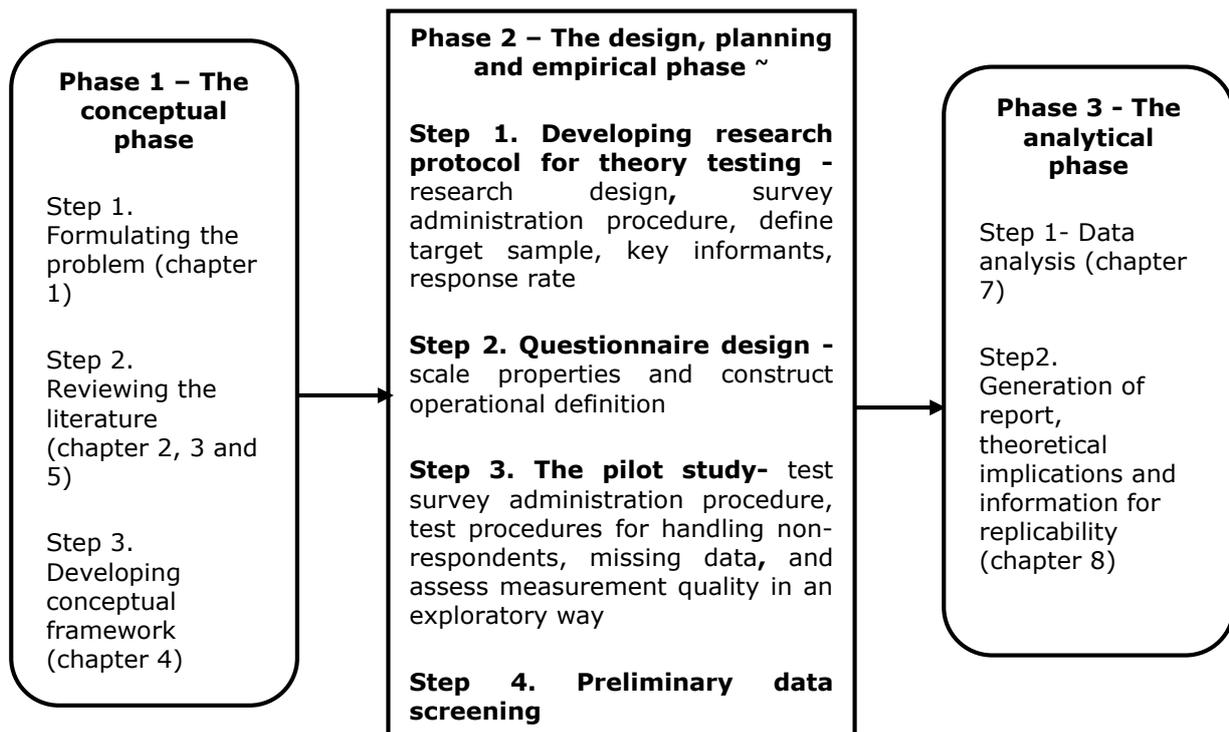


Figure 6-2: Research process for this study

**Note:**

1: ~ Focus of this chapter

### 6.5.1 Step 1. Developing research protocols for theory testing

As a step 1, the development of research protocol has been implemented in five different stages, which are slightly overlapping. These stages include: research design, survey administration method, target sample, key informants and the survey response rate. The output from each stage has informed the subsequent stage that was vital to increase the research consistency and validity.

### 6.5.1.1 Research design

Based on the objectives, the research can result in either descriptive, exploratory or explanatory. The exploratory research is a valuable means of finding out “what is happening; to seek new insights; to ask questions and to assess phenomena in a new light” (Robson, 2002, p. 59). It is of particular relevance to understand the problem and clarify the nature of the problem. In contrast, explanatory research emphasizes on studying the problem to explain the relationship between variables (Blumberg, Cooper, & Schindler, 2014). Finally, the objective of descriptive research is to depict the current profile of events or situations (Kane, 1983). It can be an extension of a piece of exploratory research or more often a piece of explanatory research (Tsang, 1997). However, it requires a clear picture of the phenomena on which data needs to be collected.

The current study aims to establish a causal relationship between AMC, strategic action and internationalisation, and thereby explanatory research is the appropriate choice to answer the research questions. Accordingly, the scholars have identified different research designs with particular relevance for explanatory, exploratory and descriptive research (Yin, 2003). Research design aims to provide the overall direction for the research including, the process to conduct the research in a coherent and logical manner (Remenyi, 1998). There are five different types of research designs named as: experiment, cross sectional or social survey, longitudinal, and comparative design. The comparison of all the four designs is provided in Table 6-3.

Table 6-3: An overview of research designs in quantitative research

No:	Research design	Description	Characteristics
1	Experiment	It owes much to the natural sciences and helps to study causal links.	<ul style="list-style-type: none"> <li>• Manipulation of independent variable</li> <li>• Classic experiment design – before and after analysis</li> <li>• The laboratory/Quasi experiments</li> </ul>
2	Cross sectional	It involves the gathering of substantial amount of data from a large population	<ul style="list-style-type: none"> <li>• More than once cases and data is collected data single point in time</li> <li>• Quantitative data</li> <li>• Issue of reliability, replicability and validity</li> </ul>
3	Longitudinal	To map the changes in business and management research	<ul style="list-style-type: none"> <li>• An extension of social survey research</li> <li>• More able to allow causal inferences to be made</li> </ul>
4	Comparative	Embodies a logic of comparison	<ul style="list-style-type: none"> <li>• May be realised in the context of quantitative or qualitative research</li> </ul>

No:	Research design	Description	Characteristics
			<ul style="list-style-type: none"> <li>At least two cases and data are collected from each usually within cross-sectional design format</li> </ul>

**Note:**

1: Source - Adapted from: Black (1999); Bryman and Bell (2011)

*a. Choice of cross sectional design*

After drawing a comparison between research designs, it can be argued that neither experiment, nor comparative strategy fits with the objectives of this research. For instance, experimental design uses manipulation and control test to understand the causal processes, which is rare in the field of business and management due to the problem of achieving the requisite level of control when dealing with the behaviours of organisation (Scandura & Williams, 2000). Therefore, the experiment is a touchstone because it engenders confidence in the robustness and trustworthiness of causal findings (Kirk, 2013). On the contrary, in comparative design, the point of fact is that the social phenomena can be better understood if compared in relation to two or more contrasting cases or situations (Adams et al., 2014; Anckar, 2008). This contradicts the nature of current research where the focus is to test the relationship between variables within one specific context.

By looking at Table 6-3, it can be inferred that the remaining research design can be seen as cross-sectional or longitudinal approaches. These strategies allow the researchers to address several points of consideration such as, reliability, replicability, validity, response/nonresponse bias, qualification of informants, construction of items and validity of the constructs (Rindfleisch, Malter, Ganesan, & Moorman, 2008). Cross-sectional design examines more than one case at a particular point in time to observe the patterns of association (Buchanan & Bryman, 2011). On the other hand, longitudinal research has the capacity to study changes and developments (Adams & Schvaneveldt, 1985). It involves the reliance on “phenomena at vertical and horizontal levels of analysis and the interconnections between those levels through time” (Pettigrew, 1990, p. 269). Stating differently, longitudinal research is the extension of cross-sectional design with the better ability to deal with the issues of common method variance and causal inferences (Sethi, Smith, & Park., 2001).

Although longitudinal design offers some advantages in terms of reducing the threat of common method variance and causal inferences, it can be low on the precision of measurement and control of behavioural variables (Scandura & Williams, 2000). Thus,

cross-sectional design, by necessity, is an adequate choice for this research. The choice can be justified on the following four grounds. First, yet strategic capabilities and inter-organisational relationships are complex organisational phenomena (Furrer, Thomas, & Goussevskaia, 2008; Prahalad & Hamel, 1994), it is unlikely that all the organisational members possess information about these phenomenon. By using cross-sectional design, researchers can target the highly educated informants with the most current information (Guthrie, 2001). In addition, a cross-sectional design is reasonable choice to expect the low level of response bias due to the characteristics of respondents (Benson & Hocevar, 1985). Second, Chakravarthy and Doz (1992, p. 7) suggest that cross-sectional studies are appropriate if "*the organisation studied is assumed to be in a steady state of adaptation with its environment.*" This study, therefore, uses cross-sectional design because it is assumed that possession of AMC allowed the SMEs to involve in collaborative innovation, which ultimately encouraged internationalisation performance. Furthermore, it is surmised that longitudinal data cannot adequately support assertions related to theories concerning alliance management and performance implications (Chiang & Hung, 2010). Third, cross-sectional design based studies dominate by far the empirical research in the field of strategic management (Terjesen, Hessels, & Li, 2016). Despite the potential inferences in cross-sectional design, Bowen and Wiersema (1999) argue that empirical research in strategic management is benefiting from the cross-sectional design by adopting analytical methods. Consistent with the strategic management journal publications (Bauer & Matzler, 2014; Chadwick, Super, & Kwon, 2015; Cheung, Myers, & Mentzer, 2011), this study adopted cross-sectional research design. Finally, a doctoral study is often limited to the period of three to four years with limited budgets. In this case, the time and budget constraints make it less desirable to choose the longitudinal design, which is inherently more time consuming than gathering cross-sectional data (Chandler & Lyon, 2001).

The chosen cross-sectional research design for this study is in accordance with the previous research studies (Alexiev, Volberda, & Van den Bosch, 2016; Oerlemans et al., 2013; Sluyts et al., 2011; Thornton, Henneberg, & Naudé, 2015).

#### *b. Survey administration method*

Having described the cross-sectional design as the most plausible choice to meet the objectives of current research, this section explains the choice of most feasible data collection method. Table 6-4 presents different types of questionnaire with the unique attributes such as, interviewer completed (telephone questionnaire and face-to-face interviews), and self-completed questionnaires (including internet, postal and delivery and collection questionnaire) (Hair, 2011). Interviewer completed questionnaires are often

used to collect information from a relatively small number of individuals in a qualitative study (Sturges & Hanrahan, 2004), whereas self-completed questionnaires are used to collect quantitative data from a large number of individuals in a convenient manner (Bowling, 2005). Given the needs of the current study, a large number of SMEs' managers are sought to be contacted in order to collect a large amount of information. Therefore, interview completed questionnaires, both telephone questionnaires and face-to-face interviews were not considered appropriate (Sturges & Hanrahan, 2004). Due to inherent limitations of time and cost in interview completed questionnaires (Quinlan & Zikmund, 2015), the previous empirical studies also found that collected data may not adequately uncover diverse dimensions of strategy and international business particularly underlying the nonattribute-based components (Park & Srinivasan, 1994). Thus, self-completed questionnaire is more meaningful than choosing the interview completed questionnaire (Raistrick, Dunbar, & Davidson, 1983).

Table 6-4: Summary of main attributes of questionnaires

	<b>Internet- and Intranet Mediated Questionnaires</b>	<b>Postal Questionnaire</b>	<b>Delivery and Collection Questionnaires</b>	<b>Telephone Questionnaires</b>	<b>Structured Interviews</b>
<b>Cost</b>	Cheapest	Moderate	High	Moderate	Costly
<b>Response rate</b>	Moderate, about 30%	Low to moderate, 30% reasonable		High, 50-70%	
<b>Sampling need</b>	Email address	Address	Address	Telephone number	Address
<b>Burden on respondent</b>	Moderate	High	Moderate	Moderate	Low
<b>Likelihood of contamination</b>	Low	May be contaminated by consultation with others		Occasionally distorted	Occasionally contaminated by consultation
<b>Length of questionnaire</b>	Fewer screens are better	6-8 pages		Up to half an hour	Variable depending on location
<b>Sensitive questionnaire</b>	Good	Best	Good	Moderate	Poor
<b>Lengthy answer choices</b>	Poor			Moderate	Best
<b>Open-ended responses</b>	Poor			Moderate	Best
<b>Complexity of questionnaire</b>	Close questions but not too complex, complicated sequencing is fine, must be interest to respondents	Close questions but not too complex, simple sequencing only, must be interest to respondents		Open and close ended questions including complication questions and complicated sequence	
<b>Role of interviewer</b>	None		Enhancing respondent participation	Enhancing respondent participation, guiding the respondent through questionnaire	
<b>Data input</b>	Usually automated	Closed questions can be designed so responses can be entered using optical mark readers after questionnaire has been returned		Entered at time of collection using computer-aided telephone interviewing	Can be entered at time of collection using computer-aided personal interviewing

**Note:**

1: Source - Adapted from: Dillman, Smyth, and Christian (2014); Baruch and Holtom (2008)

Within self-completed mode of administration, there are three different approaches: delivery and collection questionnaire, postal questionnaire and internet/intranet mediated questionnaire. Though each approach has potential influences on responses, the distribution mode and perception questions can result in differences in the types of responses obtained (Bowling, 2005). First, delivery and collection questionnaire approach embodies some of the characteristics of structured interviews, which require the face-to-face contact with respondents (Oppenheim, 2000). Despite the fact that this method establishes the interest of respondents and clarifies' respondents queries (Boynton, 2004), this is not a preferred choice in the management studies due to dispersed population, wrong address information, the importance of personal contact and high travel cost (Brown, 1987; Ibeh, Brock, & Zhou, 2004). Delivery and collection questionnaire approach also focuses on specific geographic location; therefore, the delivery and collection approach is appropriate to identify the subjects living in designated political precincts or within a given radius of a specific retail outlet or services (Lovelock, Stiff, Cullwick, & Kaufman, 1976). As the focus of this study is to investigate the performance of companies rather than investigation of consumer attitudes or behavioural pattern, thus self-completed questionnaire is not applicable.

The remaining choices can be seen as postal questionnaire or internet/intranet mediated questionnaire. Postal questionnaire allows the researchers to collect the large amount of information (including sensitive) from geographically dispersed population (Dillman et al., 2014). Despite the prominence of mail survey, it has been criticised due to: (1) lack of control over the order in which questions are answered or passing of questionnaires to others (Oppenheim, 2000); (2) higher cost of postage processing and printing in comparison to the web (Groves et al., 2011); and (3) long time to obtain responses with more chances of getting incomplete questionnaires (Dillman et al., 2014). Accordingly, this study selects the internet mediated questionnaire approach (that is web survey). Web surveys have become increasingly central to strategy and international business research (Griffith & Dimitrova, 2014; Mitrega & Pfajfar, 2015; Sauermann & Roach, 2013). The previous research shows that respondents prefer web survey over mail survey because web survey requires less effort in terms of completing and posting the questionnaire (Schaefer & Dillman, 1998). In addition, the web survey is an effective data collection method to target the right participant (Ilieva, Baron, & Healey, 2002). However, some scholars have criticised the web survey due to the issue of low response rate (Fan & Yan, 2010), yet the empirical research suggests that web survey has a higher response rate in contrast to mail survey (Kiernan, Kiernan, Oyler, & Gilles, 2005; Millar & Dillman, 2011).

Considering the powerful potential of web survey, this study considers the web survey as an appropriate approach for data collection.

The survey invitation was distributed by email using Qualtrics survey system (Qualtrics, 2015). Each potential respondent received the unique survey link, allowing the researcher to track responses behaviour over time. This method is effective to accelerate the response process and increase data quality and is inexpensive to administer on a large scale (Dillman et al., 2014). According to Walston, Lissitz, and Rudner (2006), respondents show more interest in the academic surveys than those sponsored by commercial ones. Considering this fact, it was clearly mentioned in the beginning of the questionnaire that *"this questionnaire is part of doctoral research at University of Huddersfield."* In addition, the survey was equipped with a number of features. For example, location verification and IP address that avoided the participants to take the survey more than one time. Moreover, the speed tracker was used to monitor the time that each participant was spending to take the survey. This feature allows to identify the invalid responses. In addition, a number of attention checks were used to ensure that participants are paying attention to the questions. Taking together, these features facilitate the effective administration of the survey and ensure the validity of responses (Sauermann & Roach, 2013).

### **6.5.1.2 Sampling strategy**

It is unlikely to collect data from the entire population due to time and budget constraints (Barlett, Kotrlik, & Higgins, 2001). Therefore, it is vital to set clear boundaries to select the right subset of the population (sample) for the study. Since the strategy and management research is often interested in specific features of population, this study also established a protocol to identify the relevant companies with specific features. The protocol involves the accomplishment of five features as the criteria for sample selection: (1) Manufacturing industry, (2) small and medium enterprises (3) exporting SMEs (4) innovative SMEs, and (5) collaboration with partners. The accurate identification of the study's population was a challenging task. As indicated earlier, they are not merely manufacturing companies, but also SMEs who are innovative, exporter and involved in collaboration. The greatest difficulty with the identification of the population was that they are not covered by official UK statistics, or the financial databases (Stewart & McAuley, 2000). This study, therefore, followed the approach similar to that of used by Ganotakis and Love's (2011) to identify the suitable population from which a sample could be drawn.

As a first step, the FAME (Financial Analysis Made Easy) database was used to identify the manufacturing companies, which is available from the University of Huddersfield library.

Fame is a financial database that contains information about more than 270,000 companies in the UK and Ireland (Stewart & McAuley, 2000). In order to identify the manufacturing firms, the OECD categorisation of manufacturing industries based on technology guided the selection process (OECD, 2003). The OECD has categorised the industries as high, medium-high, medium-low and low technology (see Table 6-5) “based on the R&D intensity relative to value added and gross production statistics” (OECD, 2003). Industries categorised into higher categories have a higher average intensity for both, R&D expenditures and R&D output than industries in lower categories (de Jong & Marsili, 2006; OECD, 2011). This categorisation also helped to capture the innovativeness of firms of all sizes.

Table 6-5: Classification of manufacturing industries into categories based on R&D intensities

<b>High-technology industries</b>	<b>Medium-high-technology industries</b>
<ul style="list-style-type: none"> <li>• Aircraft and spacecraft</li> <li>• Pharmaceuticals</li> <li>• Office, accounting and computing machinery</li> <li>• Radio, TV and communications equipment</li> <li>• Medical, precision and optical instruments</li> </ul>	<ul style="list-style-type: none"> <li>• Electrical machinery and apparatus, n.e.c.</li> <li>• Motor vehicles, trailers and semi-trailers</li> <li>• Chemicals excluding pharmaceuticals</li> <li>• Railroad equipment and transport equipment,</li> <li>• Machinery and equipment</li> </ul>
<b>Medium-low-technology industries</b>	<b>Low-technology industries</b>
<ul style="list-style-type: none"> <li>• Building and repairing of ships and boats</li> <li>• Rubber and plastics products</li> <li>• Coke, refined petroleum products and nuclear fuel</li> <li>• Other non-metallic mineral products</li> <li>• Basic metals and fabricated metal products</li> </ul>	<ul style="list-style-type: none"> <li>• Manufacturing, n.e.c.; Recycling</li> <li>• Wood, pulp, paper, paper products, printing and publishing</li> <li>• Food products, beverages and tobacco</li> <li>• Textiles, textile products, leather and footwear</li> </ul>

Applying the nature of the industry criterion in FAME database, a list of manufacturing companies, across high, medium-high, medium-low and low technology industries, were obtained (Cholasuke, Bhardwa, & Antony, 2004; Parida et al., 2017). In an endeavour to enhance sample consistency, 3000 companies were randomly selected from the list consisting of small-sized, medium-sized and large-sized firms. This is a common sampling practice postulated to use wherein the availability of information is difficult and costly (Goitom & Clemens, 2006; Love & Ganotakis, 2013). The choice of 3000 companies is in line with the expected response rate of 10% to 15% in the field of strategic management (Armbruster, Bikfalvi, Kinkel, & Lay, 2008; Baker & Sinkula, 2009; Lawson, Petersen, Cousins, & Handfield, 2009).

Next, the survey link was sent to 3000 companies using the Qualtrics survey platform. The introductory cover letter was designed to provide an introduction about the study and potential value to the respondents. The copy of the introductory cover letter is attached in Appendix 3. To increase the response rate, the researcher sought to contact the best person. This task was accomplished by following two strategies: (1) name, email and contact details of top-management and middle management were obtained from the FAME Database, and (2) knowledgeability questions were included in the beginning of the questionnaire to determine the extent of manager's knowledge about key issues of interest. It helped to contact the persons who are in a better position to answer the questions of this study.

As mentioned earlier, there are three additional criteria in the sampling frame to satisfy the needs of current study: SMEs, exporting and collaboration relationship. With respect to SMEs, literature has recognised a firm as small or medium enterprise based on the number of employees and turnover (Jenkins, 2009; Love & Irani, 2004). However, it is difficult to identify clear evidences of turnover, which can bias the sample selection. Therefore, number of employees as an indicator of SMEs is widely accepted criterion in research (Brink, 2017). According to UK Department of Trade and Industry (2014), SMEs is any business with less than 250 employees. As explained in Chapter 5 this study followed the definition of EU that is commonly used in SMEs' literature. Following this definition, the category 'small' includes all the firms with 10-49 employees. The category 'medium' includes a range of 50-250 employees. The firms with more than 250 employees were excluded because they are large firms. In addition, the SMEs were supposed to be internationalised (active)<sup>1</sup>. It suggests that SMEs must be operating outside the UK to be considered as study's sample (Crick, 2002). Finally, the SMEs' collaboration with other firms was an important determinant to constitute the sampling frame. In each of the above three criteria, the original questionnaire used in this study had asked firms to indicate the firm size, exporting status and involvement in collaboration. For instance, as an open-ended question, the respondents were asked to mention the number of full-time employees. The response was considered valid if a respondent answered '10' to '250' employees. In addition, internationalisation as a study variable, respondents were asked to answer if their firm is operating (or exporting) in international markets on the scale of

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<sup>1</sup> FAME database tend to over-represent larger firms, especially in terms of data needed for this study (Harris & Cher Li, 2012). Also, there is an issue to suggest the firm as exporters who are foreign-owned but operating in the UK (Crick, 2007). In order to avoid this bias, this study did not rely on FAME database to identify the exporting firms.

yes/no. The survey was terminated if a respondent chose the option 'no'. Finally, respondents were asked about involvement in collaboration with other firms. Two possible answers were provided: yes, or no. The survey was terminated if a respondent selected 'no' option.

To ensure the most complete information, filtering questions at Qualtrics platform were used to exclude those firms that might have large size, and the ones who have lack of innovation activity, exporting and collaboration. When accounting for the size filter, fewer than half (1200 out of 3000) companies are manufacturing SMEs. Next, the internationalisation status of SMEs was identified using exporting filter, which revealed a mere 742 SMEs in manufacturing industry. Finally, to account for collaboration criteria, the study identified 688 SMEs with exporting and collaboration status. This unique process can be appreciated further when taking a close look at the sampling procedure depicted in Figure 6-3.

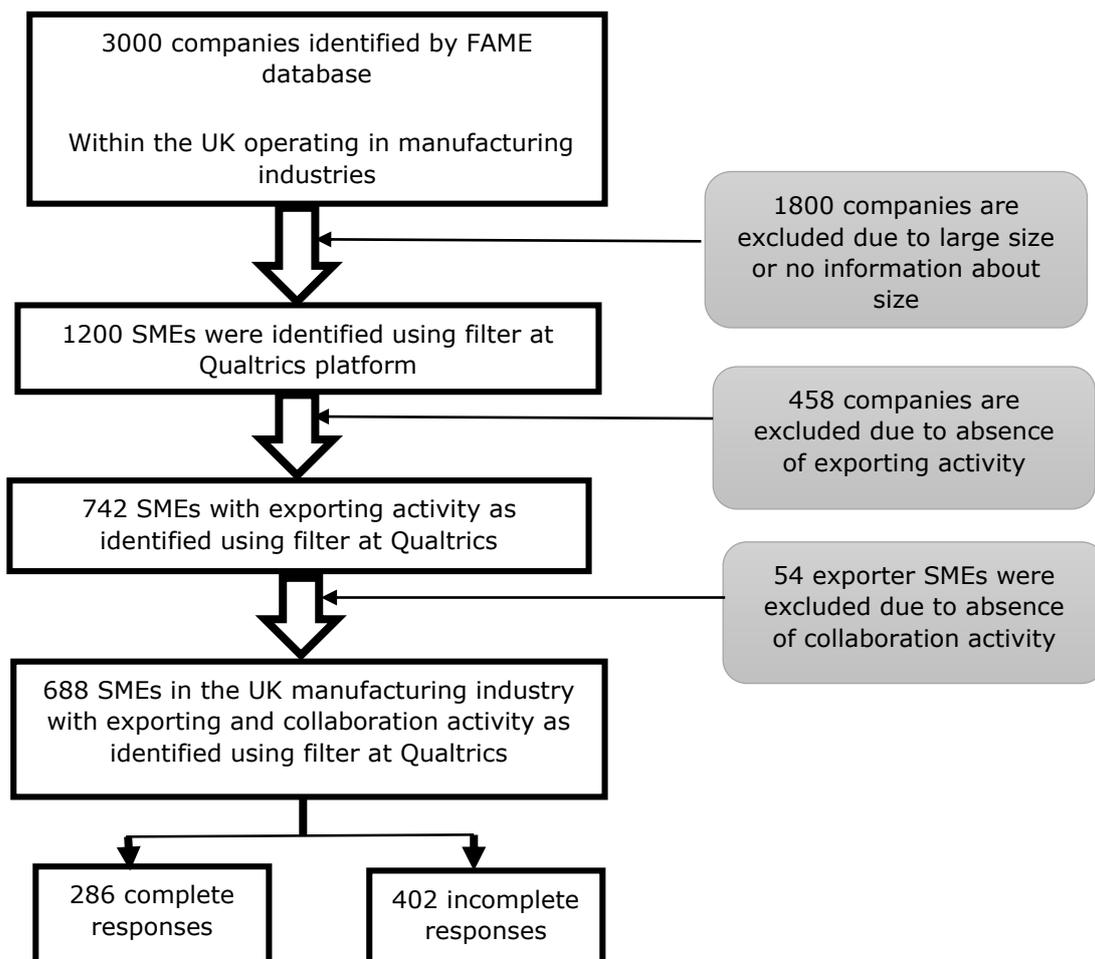


Figure 6-3: Sampling procedure used in this study

### **6.5.1.3 Key informants**

The research on AMC and IOC is based on the report of key informants due to lack of archival data (Currall & Inkpen, 2002; Payan & Svensson, 2007). The selection of key informants, who are competent to report on the study variables, can reduce the response bias and the perceptual agreement (Hughes & Preski, 1997). Since the focus of the current study is on collaboration, innovation and internationalisation, key informants are required to have good insights about all of these aspects. Therefore, considering the requirements of the study, chief executive officer (CEO), senior and middle level product managers, and senior and middle level export managers were deemed appropriate to complete the questionnaire. Moreover, in order to verify each respondent's knowledge, a number of steps were taken in the developing and administering the survey. These steps are discussed in section 6.5.2.

### **6.5.1.4 Response rate**

The data collection process was started in January 2017. Initially, in January 2017, the online survey link was sent to 3000 firms along with the introductory cover letter. The first stage elicited 141 responses. To improve the response rate, non-respondents were encouraged to respond. This yielded another 59 responses. In the third stage and again to improve the response rate, another reminder was sent to complete the questionnaire using the survey link. This yielded another 86 questionnaire giving a total of 286 usable responses. The sampling procedure to increase the response rate is exhibited in Figure 6-4. Based on the total survey population of 3000, the response rate was 10%. Though response rate is modest, it produced suitably large sample to mitigate the issues of low power and generalisability (Newman, 2009). This response rate is within the range of general response rate (i.e., 5% to 15%) in strategy and international business research (Hutter, Nketia, & Füller, 2017; Kriauciunas, Parmigiani, & Rivera-Santos, 2011; Thywissen, Pidun, & zu Knyphausen-Aufseß, 2017). This is considered as acceptable response rate to address the complex questions, such as IOC in technology industries to fully understand the relationship with other variables (Ganotakis & Love, 2011; Kriauciunas et al., 2011).

*It is worthwhile to mention that after adjusting for missing data and outliers (see section 6.5.4.1 and 6.5.4.2), the effective response rate reached to 9.3%.*

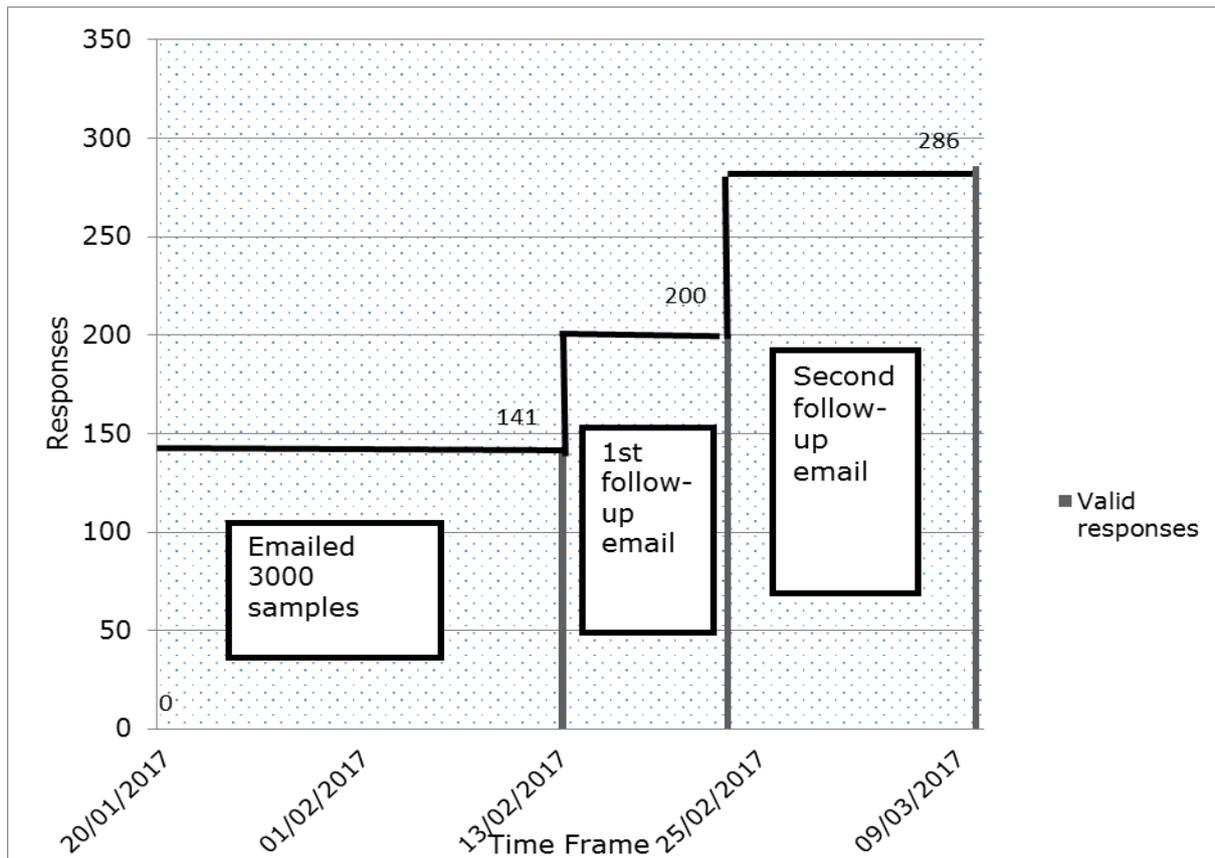


Figure 6-4: Data collection procedure to increase response rate

### 6.5.2 Step 2. Questionnaire design

After the accomplishment of step 1 (developing research protocols for theory testing), there was a need to clearly design the questionnaire to increase the validity of the questionnaire as a data collection instrument, items in the questionnaire and collected data (Krosnick, 1999). A questionnaire contains a set of questions in a predetermined order to be answered which relates to a specific topic (Brace, 2008). It is defined as a way to produce information for describing, comparing, and predicting attitudes, opinions, values and behaviours based on what the respondents say or see and what is contained in records about them and their activities (Fink, 1995). Considering the quality of the survey, it has been argued that “*once you do know what the question actually is, you’ll know what the answer means*” (Dolnicar, 2013, p. 551). In this research, the psychometric procedures were followed to design the questionnaire as explained in Table 6-6 (Churchill, 1979; Devilly & Borkovec, 2000; Gerbing & Anderson, 1988).

Table 6-6: Questionnaire development procedure

Step No.	Step details	How a step was accomplished
1	Specify type of information sought	The information that is sought in the questionnaire was the reflective of conceptual framework and hypotheses of current study. In this regard, the information regarding AMC, strategic action, partner diversity, foreign market knowledge and internationalisation were sought to be collected.
2	Determine type of questionnaire and method of administration	As mentioned in section 6.5.1.1, the web survey was used to collect the data. The Qualtrics system was used to launch and administer the survey.
3	Determine content of individual questions using the existing literature	The questionnaire items were adapted from the existing strategy and international business literature (see section 6.5.2.2) (e.g., Musteen et al., 2010; Schilke & Goerzen, 2010).
4	Determine form of response to each question	The response were measured using Likert scale, interval scale and dichotomous (see section 6.5.2.1). Varying the scale format is obvious solution to maintain the respondents' motivation to provide accurate answers and to control for the issue of common method bias (MacKenzie & Podsakoff, 2012).
5	Determine wording of each question	In order to develop the interest of respondents, vague concepts were avoided and clear and concise language was used (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003).
6	Determine sequence of questions	Items in each construct were randomly ordered to counterbalance the order of questions and decrease priming effects caused by item embeddedness. This was further validated by pilot study (see section 6.5.3).
7	Determine layout of questionnaire	Qualtrics provided a flexible platform to design the questionnaire using different formats. Brief description of research objectives along with the definition of key constructs of study was provided in the beginning of questionnaires.
8	Re-examine steps 1-7 and revise if necessary	Piloting the questionnaire with experts, MBA students and executives helped to determine the adequacy of instructions, order of questions, clarity of contents and elimination of ambiguous items.

The structure of the questionnaire design was divided into two sections. Firstly, the demographic information was investigated by asking about the job position of participants, job experience, industrial sector, collaboration, foreign market operations, number of exporting countries and R&D intensity. Secondly, the major section of the questionnaire was developed that contains the questions about inter-organisational coordination, inter-organisational learning, alliance proactiveness, alliance transformation, radical co-innovation, incremental co-innovation, internationalisation success internationalisation speed, partner diversity and foreign market knowledge. Appendix 4 provides the questionnaire used in this study.

### **6.5.2.1 Scale properties**

In order to provide an operational definition of a concept, it is necessary to have indicators/items that will stand for the concept (Bryman, 2012). It is important to consider whether one item will be enough that tap the concept. According to Boyd, Takacs Haynes, Hitt, Bergh, and Ketchen (2011), one item may apprehend only a part of construct and may not reflect the true state of affairs. Following the lead of Churchill (1979) and Shortell and Zajac (1990), multiple items are used to avoid response bias and to improve the validity of results. Moreover, Hair, Black, Babin, and Anderson (2010) suggested to use a minimum of three items to achieve better fit statistics. Accordingly, a minimum of three items are used per construct, except for internationalisation speed. The majority of studies employed a single-item measure such as the proportion of foreign sales to total sales or proportion of year of exporting to year of foundation (Musteen et al., 2010; Nielsen & Nielsen, 2013). Thus, this study adapted this without adding any extra item.

Furthermore, the items can be measured using scales that can provide the foundation for more accurate estimates of the level of relationship between concepts (Sullivan, 1994). Use of scale with standardised responses facilitates uniform interpretations and enhances comparability (Venkatraman & Grant, 1986). However, a scale needs to have some anchoring points to give meaning to the scores and must be valid in a sense that it measures the attributes it sets out to measure (Oppenheim, 2000). Among a number of scaling methods that exist in the literature (for example, semantic differential, dichotomous scale, continuous scale, rank order scale, graphic positioning, Likert scale) (Oppenheim, 2000; Teas & Wong, 1992), the Likert scale and dichotomous scale are adopted based on theoretical congruence with the requirement of data analysis (Lubke & Muthén, 2004).

### *a. Likert scale*

The Likert scale, one that is anchored by strongly disagree and strongly agree, were used to measure the dimensions of AMC, radical co-innovation, incremental co-innovation, foreign market knowledge and internationalisation success. Likert scale is often considered to have several benefits that can reduce poor responses. One of the benefits of Likert scale is that it can accommodate neutral or undecided feelings and responses can be easily quantifiable (Dillman et al., 2014). In addition, a large number of rating categories offer better psychometric properties and produce more reliable (Gliem & Gliem, 2003). However, Lozano, García-Cueto, and Muñiz (2008) argue that the large number of rating categories can confuse respondents, which can bias the results. Several authors, therefore, recommend to use five or seven point Likert scale (Dillman et al., 2014). While some studies used 5-point Likert scale (Bierly & Daly, 2007), 7-point Likert scale is widely used in the literature (Alexiev et al., 2016; Zhou, 2007). Thus, 7-point Likert scales are used in the study to measure items.

### *b. Dichotomous scale*

A dichotomous scale has two possible responses, such as yes/no, true/false or agree/disagree. This is a popular measure to identify the success or failure of a project or diversity of technology capability (Meyskens & Carsrud, 2013). This is widely used in the strategic management literature (Bruyaka & Durand, 2012; Sampson, 2007). This measurement scale was used to identify the alliance partner diversity.

## **6.5.2.2 Measurement of study's variables**

This section discusses the selection of measurement of study's variables. The conceptual model of this study was developed to conceptualise the AMC, on the one hand, and to link AMC to strategic action and ultimately to internationalisation performance, on the other hand. In addition, the moderating role of partner diversity and foreign market knowledge was examined. To test the hypotheses statistically, appropriate scales are selected from the literature to measure the model constructs, as shown in Table 6-7.

Table 6-7: Preliminary items of the constructs

Construct	Definition	Measure	Source
<p>Inter-organisational coordination</p> <p>1 (strongly disagree) ... 4 (neither disagree nor agree) ... 7 (strongly agree)</p>	<p>Inter-organisational coordination in this research was defined as the extent of routines to coordinate activities and resources with the alliance partners (Shi, White, McNally, Tamer Cavusgil, &amp; Zou, 2005)</p>	<p>Please indicate the extent to which you agree with the following statement:</p> <ol style="list-style-type: none"> <li>1. Our activities with our partners are well-coordinated.</li> <li>2. We ensure that our work is synchronised with the work of our partners.</li> <li>3. There is a great deal of interaction with our partners on most decisions.</li> </ol>	<p>Items were adapted from Schilke and Goerzen (2010)</p>
<p>Inter-organisational learning</p> <p>1 (strongly disagree) ... 4 (neither disagree nor agree) ... 7 (strongly agree)</p>	<p>Inter-organisational learning is the extent of routines designed to facilitate knowledge transfer among partners.</p>	<p>Please indicate the extent to which you agree with the following statement:</p> <ol style="list-style-type: none"> <li>1. We have skills to learn successfully from our partners.</li> <li>2. We have the managerial competencies to absorb new knowledge from our partners.</li> <li>3. We have effective routines to analyse the information obtained from our partners.</li> <li>4. We can successfully integrate our existing knowledge with new information acquired from our partners.</li> </ol>	<p>Items were adapted from Schilke and Goerzen (2010)</p>
<p>Alliance proactiveness</p> <p>1 (strongly disagree) ... 4 (neither disagree nor agree) ... 7 (strongly agree)</p>	<p>Alliance proactiveness refers to the extent of routines to identify potentially valuable partnering opportunities.</p>	<p>Please indicate the extent to which you agree with the following statement:</p> <ol style="list-style-type: none"> <li>1. We strive to prevent our competition by entering into alliance opportunities.</li> <li>2. We often take the initiative in approaching firms with alliance proposals.</li> <li>3. Compared to our competitors, we are proactive and responsive in finding and "going after" partnerships.</li> </ol>	<p>Items were adapted from Schilke and Goerzen (2010)</p>

Construct	Definition	Measure	Source
		<p>4. We actively monitor our environment to identify alliance opportunities.</p>	
<p>Alliance transformation</p> <p>1 (strongly disagree) ... 4 (neither disagree nor agree) ... 7 (strongly agree)</p>	<p>Alliance transformation is related to the extent of routines to modify alliance over the course of alliance process (Niederkofler, 1991).</p>	<p>Please indicate the extent to which you agree with the following statement:</p> <ol style="list-style-type: none"> <li>1. We are willing to put aside contractual terms to improve the outcome of our alliances.</li> <li>2. When an unexpected situation arises, we would rather modify an alliance contract than insist on the original terms.</li> <li>3. Flexibility, in response to a request for change, is characteristic of our alliance management process.</li> </ol>	<p>Items were adapted from Schilke and Goerzen (2010)</p>
<p>Alliance bonding</p> <p>1 (strongly disagree) ... 4 (neither disagree nor agree) ... 7 (strongly agree)</p>	<p>Alliance bonding refers to the extent of routines to show supportive behaviour towards the partners.</p>	<p>Please indicate the extent to which you agree with the following statement:</p> <ol style="list-style-type: none"> <li>1. Even in difficult situations, we signal readiness for discussion toward our partners.</li> <li>2. We stand by our partners' side even in difficult situations.</li> <li>3. We care about the concerns of our partners even if we do not expect any advantages to arise for us in the short term.</li> <li>4. When discussing points of disagreement, we always try to see our partner point of view.</li> <li>5. During conversations, we feel intuitively what our partner actually wants.</li> </ol>	<p>Items were adapted from Schreiner et al. (2009)</p>

<b>Construct</b>	<b>Definition</b>	<b>Measure</b>	<b>Source</b>
Radical co-innovation 1 (strongly disagree) ... 4 (neither disagree nor agree) ... 7 (strongly agree)	Radical co-innovation is defined as the cooperative relationship with a focus to create new innovations.	Innovation activity with your alliance partner(s): to what extent do you agree with the following statements about radical/incremental innovation:  <ol style="list-style-type: none"> <li>1. The important driver of our alliance is to use new, breakthrough technologies.</li> <li>2. The intent of our alliance is to create radical new ideas or ways of doing things.</li> <li>3. Our alliance helps us to come up with creative ideas that challenge conventional ideas.</li> </ol>	Items were developed based on Bierly and Daly (2007) and information from Parmigiani and Rivera-Santos (2011)
Incremental co-innovation 1 (strongly disagree) ... 4 (neither disagree nor agree) ... 7 (strongly agree)	Incremental co-innovation is a strategically important cooperative relationship to refine existing innovations.	Innovation activity with your alliance partner(s): to what extent do you agree with the following statements about radical/incremental innovation:  <ol style="list-style-type: none"> <li>1. The aim of our alliance is to improve efficiency.</li> <li>2. We can rationalize our business operations with alliance.</li> <li>3. Our alliance facilitates the improved quality of existing innovations.</li> </ol>	Items were developed based on Bierly and Daly (2007) and information from Parmigiani and Rivera-Santos (2011)
Internationalisation speed  Open-ended	The speed with which a firm enter into international markets.	<ol style="list-style-type: none"> <li>1. The year of firm's foundation</li> <li>2. The year your firm entered its first international market</li> </ol>	Items were adapted from Reuber and Fischer (1997)

Construct	Definition	Measure	Source
<p>Internationalisation Success</p> <p>1 (far below average) ... 4 (average) ... 7 (far above average)</p>	<p>It refers to the attainment of goals/realisation of objects in the foreign markets.</p>	<p>Please evaluate the performance of your firm in international markets:</p> <ol style="list-style-type: none"> <li>1. Market share relative to its stated objectives</li> <li>2. Sales relative to its stated objectives</li> <li>3. Profit margin relative to its stated objectives</li> <li>4. Return on investment relative to its stated objectives</li> </ol>	<p>Items were adapted from Zhong, Peng, and Liu (2013)</p>
<p>Alliance partner diversity</p> <p>1 (yes) ... 2 (no)</p>	<p>It incorporates the distribution of difference in the partners with which the firm allies.</p>	<p>Our firm Collaborated with... (please circle all that apply):</p> <ol style="list-style-type: none"> <li>1. Other businesses within your enterprise group</li> <li>2. Clients or customers</li> <li>3. Competitors or other businesses in your industry</li> <li>4. Consultants or commercial labs</li> <li>5. R&amp;D institutes</li> <li>6. Universities or higher education institutions</li> <li>7. Suppliers of equipment, materials, services or software</li> <li>8. Other (please specify)</li> </ol>	<p>Items were adapted from UK innovation survey and study of Oerlemans et al. (2013)</p>
<p>Foreign market knowledge</p> <p>1 (much worse than main competitors) ... 4 (neutral) ... 7 (much better than main competitors)</p>	<p>Foreign market knowledge means information about markets and operations in those markets, which is somehow stored in the minds of individuals.</p>	<p>Please evaluate your knowledge about foreign markets relative to main competitors:</p> <ol style="list-style-type: none"> <li>1. Our manager's knowledge about foreign competitors</li> <li>2. Our manager's knowledge about the needs of foreign clients/customers</li> </ol>	<p>Items were adapted from Eriksson and Chetty (2003); Zhou (2007)</p>

Construct	Definition	Measure	Source
		3. Our mangers' international business experience 4. Our mangers' ability in determining foreign business opportunities	

The following section presents the items used in the strategy and international business literature and provides the preliminary pool of items adapted in the current study.

### *a. AMC*

AMC refer to the organisational routines that provide an effective resource base to manage inter-organisational relationships. Following the lead of Schilke and Goerzen (2010) and Schreiner et al. (2009), AMC is conceptualised as a multi-dimensional construct. In doing so, the current study has taken a step further where AMC is represented by five construct: inter-organisational coordination, inter-organisational learning, alliance proactiveness, alliance transformation and alliance bonding (see Table 6-7 for measurements). As mentioned in section 3.3.1, inter-organisational communication is excluded deliberately as AMC dimension because previous research suggests that coordination is a degree to which there are adequate networks among partners to communicate (Kapucu, 2006). Thus, it can be concluded that communication is a part of coordination. The following section presents the measures for each dimension.

*Inter-organisational coordination* was measured using three items. This scale was adapted from Schilke and Goerzen (2010), who developed it from Mohr and Nevin (1990) and Pavlou and El Sawy (2006).

*Inter-organisational learning* was measured using four items adapted from Schilke and Goerzen (2010), which are based on the concept of absorptive capacity (Matusik & Heeley, 2005).

The four items provided the basis to measure *alliance proactiveness*, which are adapted from the study of Schilke and Goerzen (2010).

*Alliance transformation* was measured using three items from Schilke and Goerzen (2010), who developed based on the concept of flexibility in the buyer-supplier relationship (Johnson, 1999).

Alliance bonding was measured using five items adapted from (Schreiner et al., 2009).

### *b. Strategic actions*

In line with RBV, strategic actions refer to processes that enable a firm to realise value of the resources, namely AMC (Newbert, 2007). As explained in chapter 4, it is defined as radical co-innovation and incremental co-innovation. Kanter, North, Richardson, Ingols, and Zolner (1991) and Bogers and West (2012) suggested that radical and incremental

innovation activities should be coupled and perceived as co-produce. For that reason, *radical co-innovation* is defined as the cooperative relationship with a focus to create innovations. In contrast, *incremental co-innovation* is a strategically important cooperative relationship to refine existing innovations. Three items for each construct (i.e., radical co-innovation and incremental co-innovation) were developed on the basis of those of Bierly and Daly (2007) and Parmigiani and Rivera-Santos (2011), who considered the concept of co-exploration and co-exploitation. According to Benner and Tushman (2003), incremental innovations are exploitative and develop upon existing knowledge, whereas radical innovations are exploratory, since they require new knowledge or departures from existing skills. Thus, it can be concluded that co-exploration and co-exploitation measures provide the basis to develop the indicators of radical co-innovation and incremental co-innovation. Table 6-7 presents the preliminary items used to measure radical co-innovation and incremental co-innovation.

### *c. Internationalisation performance*

The internationalisation performance is conceptualised as internationalisation speed and internationalisation success (Musteen et al., 2010). Internationalisation speed is measured as the amount of elapsed time (in years) between the year the company was established and the year it entered its first international market (Reuber & Fischer, 1997). This measure has been widely used in the international business literature by other scholars (see for example, Jones, 1999; Musteen et al., 2010; Zahra, Matherne, & Carleton, 2003).

The literature suggests that internationalisation success can be measured using the objective measures like financial ratios (export sales divided by total sales) (Papadopoulos & Martín Martín, 2010) and subjective measures (Khalid & Bhatti, 2015). However, this study relied on subjective measures due to four reasons. First, performance is an evaluation based measure (McGee & Peterson, 2000); therefore, subjective measures are better able to demonstrate the managerial assessment of performance compared to objective measures (Venkatraman & Grant, 1986). Second, it is difficult to obtain objective data about the performance of SMEs as they are not required to publicly report the international activities (Escribá-Esteve, Sánchez-Peinado, & Sánchez-Peinado, 2009). Third, using the objective data, it is difficult to distinguish between domestic and international operations of a firm in reported data (Katsikeas, Leonidou, & Morgan, 2000). Finally, the cut-off point between successful and unsuccessful firms is arbitrarily set by researchers using the average of sample of exporting firms (Styles, 1998). Taking together, it can be argued that subjective data provide the basis to effectively determine the internationalisation performance of small firms. However, some scholars have critiqued

the subjective measures being biased by whomever is providing the opinion or estimate (Gregory, 1996). Despite the criticism, management literature widely relied on subjective measures of performance (Muchiri, Pintelon, Gelders, & Martin, 2011). Moreover, Rauch, Wiklund, Lumpkin, and Frese (2009) found that the use of subjective indicators produce the relationship of similar magnitude as in the case of objective performance data, which suggest that common method bias associated with self-reporting of performance does not cause a severe threat.

Following the lead of literature to use subjective measures, four items are adapted from Zhong et al. (2013) to measure internationalisation success. This is the commonly used measure in the existing literature (see for example, Deligianni, Dimitratos, Petrou, & Aharoni, 2016; Musteen et al., 2010). Table 6-7 presents the preliminary items used to measure internationalisation speed and internationalisation success.

#### *d. Partner diversity as a moderator*

In the conceptual model, alliance partner diversity is considered as a moderator between AMC and strategic actions. Alliance partner diversity is a multidimensional construct that comprises the attributes of partners (Jiang, Tao, & Santoro, 2010). To construct this variable, the UK innovation survey, that asked if the focal firm had any alliance for innovation activities in the previous three years, is used as a foundation. The alliances are distinguished by means of eight categories: other businesses within your enterprise group, clients or customers, competitors or other businesses in your industry, consultants or commercial labs, R&D institutes, universities or higher education institutions, suppliers of equipment, materials, services or software and an open category other (Oerlemans et al., 2013). As this study focused on diversity of alliance partner diversity and not portfolio size, the alliance partner diversity is created by the following equation (i.e. dividing the number of different types of partners maintained by the firm by the maximum possible amount of different partners (in this case eight) and squaring the result of this division (de Leeuw et al., 2014)):

$$D = \frac{\text{Number of different types of partners maintained by the firm}^2}{\text{The maximum possible amount of different partners}}$$

Where, D represents degree of diversity, and <sup>2</sup> is the square of distribution.

The results of this calculation represented the diversity score with a value between 0 (least diverse) and 1 (highest diverse). The highly diverse portfolio suggested the diverse set of external partners possessing diverse knowledge sources. This measure was chosen due to

similarity with Blau's index of heterogeneity, which has been used frequently in the alliance literature to measure alliance partner diversity (Duysters & Lokshin, 2011).

#### *e. Foreign market knowledge as a moderator*

In the study's conceptual model, foreign market knowledge was introduced as a moderator between strategic actions and internationalisation performance. Accordingly, foreign market knowledge was defined as the degree of foreign market knowledge possessed by managers as compared to competitors (Zhou, Barnes, & Lu, 2010). Consistent with the conceptualisation of Eriksson et al. (1997), four items were adapted from the previous literature, as shown in Table 6-7 (Hadley & Wilson, 2003; Stoian et al., 2017).

#### *f. Control variables*

Beyond the study's main variables, it is important to incorporate other variables – labelled as control variables - that are highly correlated with the estimators of interest (Lavenberg & Welch, 1981). Since the control variables can strongly influence the results, they are held constant in the analysis in order to test the relative relationship between main variables (Freedman, Pisani, & Purves, 2007; Henriques & Sadorsky, 1999). Consistent with Schilke (2014), this study considered the firm size and industry effects. In addition, the effect of R&D intensity is controlled for the strategic actions.

*Firm size.* Since the firm size varies among study's sample (i.e. small and medium sized firms), it can influence the firm performance (Anderson & Reeb, 2003). Schilke (2014) asserts that firm size influences the competitive advantage and dynamic capabilities, with large-sized firms be able to commit supplementary resources to develop their change practises. Consequently, firm size is considered as the control variable in the conceptual model. It was measured using an open-ended category where respondents were asked to specify the number of full-time employees. Later, the question was transformed into multiple choice: 1= '10-25', 2= '26-50', 3= '51-200' and 4= '201-250'.

*Industry effect.* Industry, as a predictor firm-level variable, is generally recognised in the literature (Dess, Ireland, & Hitt, 1990; Spanos, Zaralis, & Lioukas, 2004). This study focused on the manufacturing industry in four different technology sectors. Therefore, it is important to control the effect of industry distribution on the study's results. The industry was measured by providing the choice of 19 categories to respondents as an indicator of manufacturing industry. This was transformed into multiple-choice: 1= 'high-technology industry', 2= 'medium- technology industry', and 4= 'low-technology industry'.

*R&D intensity.* The relationship between AMC and strategic action can be influenced by R&D intensity of a firm. For instance, studies examining the influence of inter-organisational collaboration on innovation (Faems et al., 2005; Rogers, 2004) provided evidence that internal R&D activities positively influence innovation strategies. In this vein, it has been argued that the IOC is indicative of the subsequent purposeful increase in knowledge transfer between collaborative firms (Belderbos, Carree, & Lokshin, 2004). Therefore, it requires the internal R&D activities/investment to transform the fruits of collaboration with external partners (van Beers, Berghäll, & Poot, 2008). Empirical evidences, thus, suggest that the need of IOC increase with the R&D intensity of a firm (Fritsch & Lukas, 2001). Therefore, this study controlled for R&D intensity. Following the previous studies (see for example, van Beers et al., 2008; Van Dijk, Den Hertog, Menkveld, & Thurik, 1997), R&D intensity was measured using the following formula<sup>2</sup>:

$$\text{R\&D intensity} = \frac{\text{Number of full-time employees engaged in R\&D activities}}{\text{Total number of full-time employees}}$$

### **6.5.3 Step 3. Pilot study**

Pilot testing is considered essential prior to using a questionnaire to collect data. Pilot testing entails a small sample size to determine how the questionnaire can be improved to minimise response errors (Bolton, 1993). Pilot study helps to refine the questionnaire in a way that respondents will have no problem in replying the questions and there will be no issue in recording the data (De Vaus, 2013). In addition, it allows the assessment of questions' validity and reliability of the data (Hunt, Sparkman, & Wilcox, 1982). In the previous literature, there are different approaches to pre-test the questionnaire including qualitative pre-testing (interviews with managers or experts in the field) and quantitative pre-testing (completion of questionnaires and quantitative analysis), see Table 6-8. While some studies only relied only on qualitative testing (Mors, 2010), others used the combination of both qualitative and quantitative approaches (Coleman, de Chernatony, & Christodoulides, 2011).

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<sup>2</sup> In the questionnaire, the respondents were asked two separate questions: (1) Total number of full-time employees, and (2) Number of full-time R&D employees. Later for the analysis purpose, R&D intensity was calculated using this formula.

Table 6-8: Review of pilot studies conducted in previous studies

No:	Exemplary study	Description	No: of pilot-testing steps	Method of pilot testing	No: of respondents	Impact of pilot-testing method
1	Robert Baum and Wally (2003)	The study examines the effect of strategic decision speed upon subsequent firm performance.	1 step	1. Structured interviews with the CEOs	13	Interviewees provided the guidance to develop test measures for a questionnaire.
2	Zhou and Wu (2010)	The role of technological capability in product innovation was studied.	2 steps	1. In-depth interviews with senior managers	5	Results verified the relevance and completeness of the questionnaire items, where few items were revised to enhance the clarity.
				2. Quantitative pilot study with senior managers	20	Respondents completed the questionnaire as well as provided the feedback about design and wording of questionnaire.
3	Yam, Lo, Tang, and Lau (2011)	An empirical study to investigate the relationship between the sources of innovation, innovation capabilities and performance.	3 steps	1. Consultation with researchers in the field of study	1	The researchers and executives helped to improve the survey and ensure the content validity.
				2. Meeting with industry executives	4	
				3. Quantitative pre-test with managers	30	Respondents completed the questionnaire as well as commented on clarity and appropriateness of questionnaire's items. Reliability of scales was tested using statistical analysis.

No:	Exemplary study	Description	No: of pilot-testing steps	Method of pilot testing	No: of respondents	Impact of pilot-testing method
4	Coleman et al. (2011)  (All piloting procedures reduced items from 119 to 50)	The development of valid B2B service brand identity scales.	3 steps	1. Expert panel review including three academics and three consultants in industry	6	The panel suggested the new items and determine the extent to which each item represent the domain (content validity).
				2. Pre-test with MBA students	NA	Results revealed the appropriate understanding of questionnaire (face validity). Also, irrelevant items were reduced.
				3. Pilot survey with individuals from final sample	50	It helped to obtain an initial estimate of response rate and test-run the survey process.
5	Bin (2013)	This study embraces both the direct and the interactive influences of the cost-benefit factors (the perceived effort in innovation and the perceived benefit from innovation), the individual characteristics (personal innovativeness and experience) and the social interactions (the perceived social influence) in shaping user innovation at the individual level.	2 steps	1. Interviews with expert users	8	Based on exploratory investigations, a draft questionnaire was developed.
				2. Pilot survey	5	Completed the survey and provided the feedback on design and comprehensibility of the questionnaire.
6	Jugend, da Silva, Salgado, and Miguel (2016)	An attempt was made to establish the relationship between product portfolio management practices and product portfolio performance.	1 step	1. Pilot test with expert in academia and	2	The scale format was retained.

No:	Exemplary study	Description	No: of pilot-testing steps	Method of pilot testing	No: of respondents	Impact of pilot-testing method
				an executive at a company.		
7	Wu, Liu, and Zhang (2017)	This study provides a theoretical account of bricolage effects on two critical new-product advantages: new-product development speed and creativity.	2 steps	1. Interviews with top managers.	NA	It helped to check the scale appropriateness to the Chinese context and accordingly modify the questionnaire.
				2. Pilot test with CEOs	30	The feedback helped to verify and refine the questionnaire in the field.

**Note:**

1: NA refers to not available.

Building on the previous literature, a comprehensive pre-test was conducted, as exhibited in Figure 6-5. Three different approaches were implemented in pre-test the questionnaire. The first stage involved the expert judgement in the field of strategy particularly alliance practices. The second stage was based on the qualitative pre-test with MBA students. The third stage involved quantitative test with executives of SMEs to get feedback on design and determine the comprehensibility of the contents. The following section explains each step in detail and provides the impact of each pre-testing procedure on the questionnaire development.

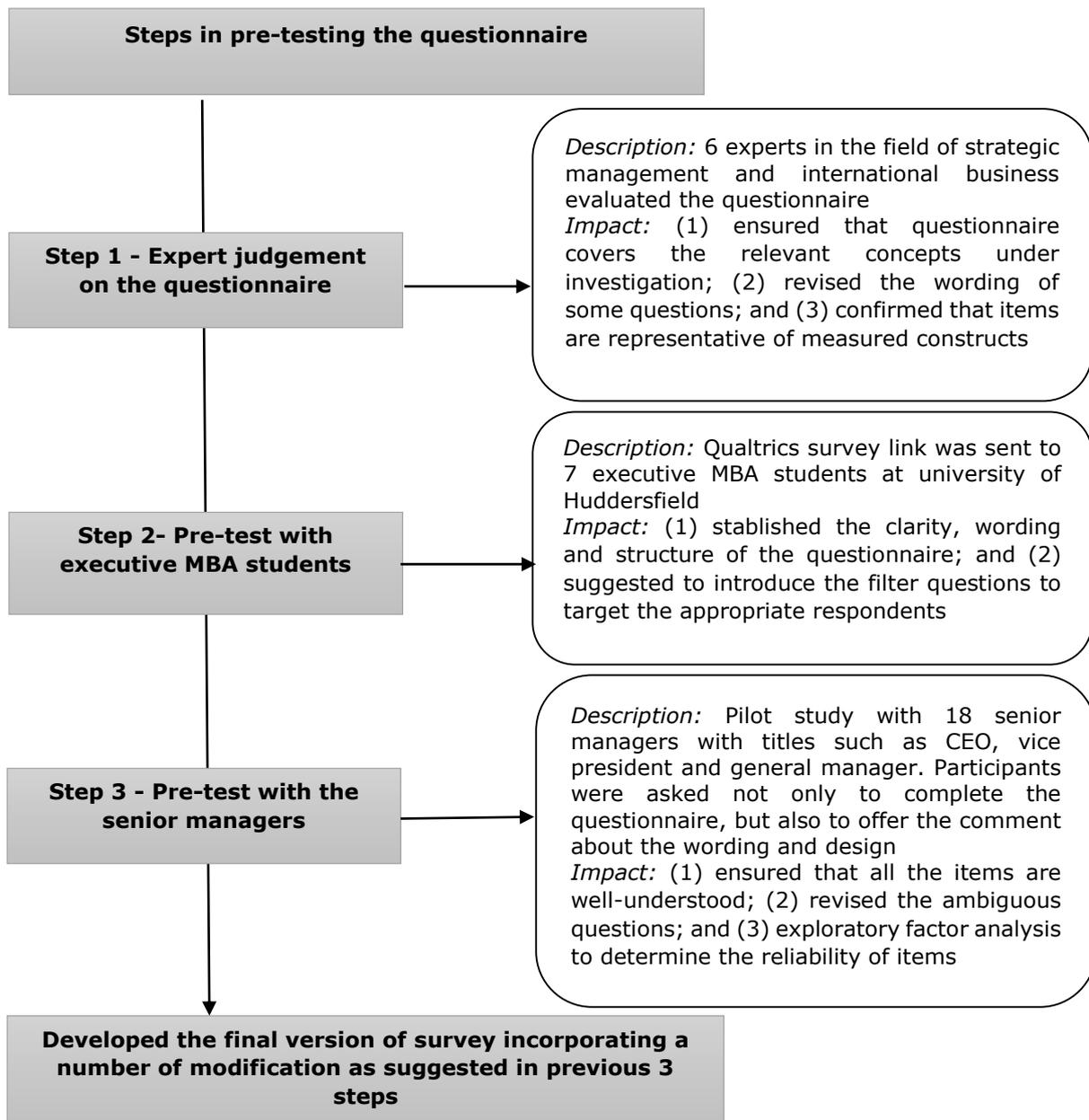


Figure 6-5: Process of pilot study as followed in this study

### 6.5.3.1 Expert judgement on the questionnaire

It is important to establish the face validity because it allows to determine the extent to which a measure reflects the contents of the concept in question (Nevo, 1985). Allen and Yen (2001), define the face validity as the degree to which respondent's judge that the questionnaire items are appropriate to the targeted constructs and assessment objectives. This validity assessment is necessary for both the established items as well as the new items because it ensures whether the measure seems to be getting at the concept that is the focus of the attention (Hair et al., 2010). The establishment of face validity involves a mix of different judgmental procedures and approaches. One way of judging items is to ask a panel of judges to rate items as "clearly representative," "somewhat representative," or "not representative of the construct of interest" (Zaichkowsky, 1985). Another common method using expert judges is to provide the definition of each construct to the judges and ask them to assign each item to one of the construct definitions (Hardesty & Bearden, 2004). Following the first procedure, the five experts in the field of strategy and international business were requested to provide the judgement about relevance and clarity of constructs. Table 6-9 summarises the list of respondents who reviewed the questionnaire of the study.

Table 6-9: Details of experts who reviewed the questionnaire

No:	Name	Area of expertise	General comments
1	Professor Dovev Lavie	Behavioural Science and Management	<ul style="list-style-type: none"> <li>Clarify the focus on a single alliance or the firm level</li> <li>Consideration of remedies for the issue of common method bias</li> </ul>
2	Dr. Sabrina Thornton	Marketing	<ul style="list-style-type: none"> <li>Revise the questionnaire to reduce the length</li> <li>Consideration of remedies for the issue of common method bias</li> </ul>
3	Professor Ha Hoang	Organisational Behaviour and International Relations	<ul style="list-style-type: none"> <li>Items are representative of constructs based on previous literature</li> <li>Suggestion to reverse code some items</li> </ul>
4	Professor Alexander Leischnig	Marketing	<ul style="list-style-type: none"> <li>Clarify the definition of collaboration</li> <li>Revise the questions to determine the level of knowledge of managers about key aspects</li> <li>Items should not be mixed from different sources to avoid serious validity problems.</li> </ul>
5	Dr. Eva Niesten	Innovation, Strategy and Entrepreneurship	<ul style="list-style-type: none"> <li>Revise the question about the structure of the alliance</li> <li>Questionnaire is representative of constructs, which are measured</li> </ul>

All of them were in the agreement that constructs were clearly or somewhat representative of constructs. However, an important issue was raised about the level of alliance activity (portfolio level or individual level). It was important to ensure whether the study is focusing on the individual alliance activity or portfolio of alliances (Kale et al., 2002). As explained in Chapter 4, the focus of current study is on the individual level of alliances rather than alliance portfolio (Flatten, Greve, & Brettel, 2011). Therefore, a statement was mentioned in the questionnaire to reduce ambiguity for respondents: *please refer all following statements to your firm's overall experience for alliance(s) during the 3 years' period 1<sup>st</sup> January 2014 to 31<sup>st</sup> December 2016*. In addition, the experts suggested to consider the issue of common method bias as a single questionnaire was planned to collect the data for all the variables of the study. Consequently, a number of techniques were considered to reduce the issue of common method bias (see section 7.3.3.3). Table 6-10 provides the information about modifications that are made based on the expert judgement.

Table 6-10: Overview of modifications based on expert judgement

No:	Questions of interest	Preliminary items	Modified items
<b>Modifications related to study's introduction or the demographic information</b>			
1	Definition of collaboration	Inter-organisational collaborations are voluntary collaborations between companies. They improve innovations and competitive advantages through the combination of resources (e.g., specialist knowledge) across company boundaries	Inter-organisational collaborations are voluntary inter-organisational interactions between companies. They focus on joint goal setting, share innovation cost, exchange innovation ideas and working together to reduce cost of R&D. It improve innovations and competitive advantages through the combination of resources (e.g., specialist knowledge) across company boundaries.
2	Manager's work experience	How long have you been with your firm? <ul style="list-style-type: none"> <li>• Less than 2 years</li> <li>• 3 to 5 years</li> <li>• 6 to 8 years</li> <li>• 9 to 11 years</li> <li>• 12 to 15 years</li> </ul>	How long have you been with your firm? <ul style="list-style-type: none"> <li>• Less than 3 years</li> <li>• 3 to 5 years</li> <li>• More than 5 years</li> </ul>
3	Alliance structure	What was the structure of the alliance? <ul style="list-style-type: none"> <li>• Equity</li> <li>• Non-equity</li> </ul>	Does the alliance include equity participation? <ul style="list-style-type: none"> <li>• No</li> <li>• We have minority</li> <li>• 50%</li> <li>• Majority participation</li> </ul>
4	Entry mode in foreign markets	What was the entry mode to enter international markets? <ul style="list-style-type: none"> <li>• Export</li> <li>• Import</li> <li>• Foreign licensing</li> <li>• Detachment of personnel abroad</li> <li>• Foreign joint venture</li> <li>• Foreign subsidiary</li> <li>• Other (please specify)</li> </ul>	How did your firm enter foreign markets when it started to internationalise? <ul style="list-style-type: none"> <li>• Equity modes (such as wholly owned foreign subsidiaries and joint ventures)</li> <li>• Non-equity modes (such as licensing, franchising, and exporting)</li> </ul>

No:	Questions of interest	Preliminary items	Modified items
<b>Modifications related to study's introduction or the demographic information</b>			
5	Level of manager's knowledge about key aspects	Please circle to indicate your level of knowledgeability for the following aspects: <ul style="list-style-type: none"> <li>• How knowledgeable you consider yourself about your firm and its product/service programs.</li> <li>• How knowledgeable you consider yourself regarding the collaboration management practices?</li> </ul>	Please circle to indicate your level of knowledge on the following aspects: <ul style="list-style-type: none"> <li>• Your firm and its products/service programs</li> <li>• Your firm's business strategy</li> <li>• Your firm's alliance management system</li> <li>• Your firm's alliance partners</li> </ul>
<b>Modifications related to measurement of study's variables</b>			
6	Inter-organizational coordination	<ul style="list-style-type: none"> <li>• We ensure that our activities are synchronised with the activities of others.</li> </ul>	<ul style="list-style-type: none"> <li>• We ensure that our work is synchronised with the work of our partners.</li> </ul>

### **6.5.3.2 Pre-test with the Executive MBA students**

Another common pre-testing procedure is to test the questionnaire with executive MBA students (Judy & Diane, 2000; Shapira & Shaver, 2014). The survey link (using Qualtrics system) was sent to seven executive MBA students at the University of Huddersfield. The purpose of this activity was to determine the approximate completion time and issues with the contents of the questionnaire. The results of pre-testing suggested that approximate completion time was 15 minutes that is within the suggested limit of 15 to 20 minutes (Galesic & Bosnjak, 2009; Iglesias & Torgerson, 2000). With respect to the contents, the respondents suggested to include the question 'whether a firm has the alliance or no'. This question served the basis for one of the filtering criteria for the sample to take part in the study.

### **6.5.3.3 Quantitative pre-tests with the executives**

The final stage was to pre-test the questionnaire with executives/senior managers of SMEs in the UK. As a part of testing the questionnaire, eighteen structured interviews were conducted with the final sample of the study. Using the behavioural interactive coding, the respondents' behaviour was observed when reading the questionnaire and noted the differences in behaviour of participants from an ideal set of behaviours (Blair & Presser, 1992). The interviews were conducted on the telephone as well as on Skype. During the interview, the participants were requested to read each question and answer at the same time. In addition, it was requested to report on the clarity and language of the questionnaire. The interviewee also observed the behaviour of respondents during the interview. A list of comments with regard to each question was developed and ultimately minor changes were made to the questions based on the feedback (see Table 6-11). The modified version of the questionnaire was tested by a follow-up interview with company executives and approved by expert in the field (see Appendix 4).

Table 6-11: An overview of modification based on quantitative pre-test

No:	Questions of interest	Preliminary items	Modified items
<b>Modifications related to study's introduction or the demographic information</b>			
1.	Year of exporting	<ul style="list-style-type: none"> <li>When did your firm start operating abroad?</li> </ul>	<ul style="list-style-type: none"> <li>When did your firm start exporting abroad?</li> </ul>
<b>Modifications related to measurement of study's variables</b>			
2.	Radical co-innovation	<ul style="list-style-type: none"> <li>The important driver of inter-organisational collaboration is to obtain complementary skills for better innovation.</li> </ul>	<ul style="list-style-type: none"> <li>The important driver of our alliance is to use new, breakthrough technologies.</li> </ul>
3.	Incremental co-innovation	<ul style="list-style-type: none"> <li>The aim of our alliance is to increase efficiency.</li> </ul>	<ul style="list-style-type: none"> <li>The aim of our alliance is to improve efficiency.</li> </ul>
4.	Foreign market knowledge	<ul style="list-style-type: none"> <li>Our manager's knowledge about foreign markets</li> </ul>	<ul style="list-style-type: none"> <li>Our manager's knowledge about foreign markets as compared to competitors</li> </ul>

Next, the reliability of all the items was tested using SPSS 22. The results supported the internal consistency and reliability of all the items as Cronbach's Alpha value is greater than the suggested value of 0.70. The corrected item-total correlation also suggested that a particular item goes well with the rest of items in a particular construct. Next, the Cronbach's Alpha if Item Deleted is inspected to determine what the Cronbach's alpha would be if a particular item would be deleted. Overall the results suggested to retain all the items except TRN2 and RI1. However, considering the small number of observations, it was decided to retain the items, as shown in Table 6-12.

Table 6-12: The reliability results for the quantitative pre-test

Construct	Item-Total Statistics			Cronbach's Alpha
	Item	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted	
Inter-organisational coordination	COD1	.909	.934	0.949
	COD2	.923	.911	
	COD3	.890	.934	
Inter-organisational learning	LRN1	.867	.924	0.942
	LRN2	.863	.926	
	LRN3	.846	.929	
	LRN4	.881	.918	
Alliance proactiveness	PRT1	.682	.884	0.887
	PRT2	.742	.858	
	PRT3	.843	.818	
	PRT4	.773	.847	
Alliance transformation	TRN1	.674	.748	0.818
	TRN2	.592	.830	
	TRN3	.779	.632	
Alliance bonding	BND1	.695	.922	0.921
	BND2	.733	.915	
	BND3	.867	.888	
	BND4	.820	.898	
	BND5	.870	.888	
Radial co-innovation	RI1	.679	.863	0.856
	RI2	.803	.746	
	RI3	.732	.797	
Incremental co-innovation	II1	.775	.843	0.874
	II2	.784	.806	
	II3	.776	.811	

Construct	Item-Total Statistics			Cronbach's Alpha
	Item	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted	
Foreign market knowledge	FMK1	.788	.890	0.912
	FMK2	.716	.915	
	FMK3	.891	.857	
	FMK4	.816	.881	
Internationalisation success	ISU1	.722	.783	0.844
	ISU2	.722	.784	
	ISU3	.681	.813	
	ISU4	.633	.823	

**Note:**

1: The pilot study responses are not used for the main study analysis.

### 6.5.4 Step 4. Preliminary data screening

Having introduced the methods of data collection, this section provides an overview of preliminary data screening/analysis. Preliminary analysis is an essential part of data analysis that examines the characteristics of the data and relationships (Blischke, Rezaul Karim, & Prabhakar Murthy, 2011). It helps to edit the data to prepare it for further analysis (Blischke et al., 2011). Preliminary analysis involves the examination of missing data, outliers and non-response bias test. The examination of missing data and outliers attempts to clean the data to a format most suitable for multivariate analysis (Meyers, Gamst, & Guarino, 2006). In contrast, nonresponse bias is the difference between the respondents and nonrespondents, which can cause the bias to generalise the findings of study (Lambert & Harrington, 1990). The subsequent section is dedicated to the discussion of the issues, namely, missing values, outliers and nonreponse bias, and reviews the technique used to deal with these issues.

#### 6.5.4.1 Missing data

Missing data refer to the data where valid values for one or more variables are not available for analysis (McKnight, McKnight, Sidani, & Figueredo, 2007). It can happen due to any systematic occurrence external to the respondent (for example, issues in entry of data) or any unsystematic act from the respondent (like, denial to response). The avoidance of this issue is difficult for the researchers, particularly in survey research, yet the key challenge

is to address the issue of missing data that may affect the generalisability of results (Hardy, Allore, & Studenski, 2009).

The issue of missing data can be dealt with one of the three methods: (1) case-wise deletion – excludes all cases that have missing data in at least one of the selected variables, (2) pairwise deletion – parameters (correlation coefficients) are calculated on successive pairs of variables and deleted if one solvent measurement is missing and (3) mean substitution – replaces all values by the mean value for that variable (Burke, 2001). The case-wise deletion is a commonly used deletion method in the literature (Delios & Henisz, 2003; Sarstedt, 2008) because pair-wise deletion can result in an unacceptable loss of interesting data (Boxall, Macky, & Rasmussen, 2003). Moreover, mean substitution is considered as a bad choice because it diminish variance and may produce inconsistent bias when there is inequality in the number of missing values in different variables (Acock, 2005). Therefore, the case-wise deletion method was used to detect the missing values in the data.

To find out the missing data, SPSS 22 package was used to identify the minimum and maximum values. The results suggested that 7 out of 286 responses, 2.447%, were missing responses. The missing responses lacks the critical information about outcome variable i.e., internationalisation speed. Relying on case-wise deletion method, it was decided to eliminate these questionnaires as they can cause dramatic effects on the results of the study (Sekaran & Bougie, 2013). These 7 questionnaires were far below the limit of 10% as suggested by Hair et al. (2010) and also the limit of 5% according to Tabachnick and Fidell (2007).

#### **6.5.4.2 Outliers**

Outliers refer to the responses with unique characteristics that are distinctly different from other responses (Everitt & Dunn, 2001). Hair et al. (2010) contend that an outlier is considered to be an unusual high or low value or a combination of values on a variable and/or pairs of variables that create the observation to be striking from others. Outliers cannot be considered beneficial or problematic, but must be observed within the context of analysis and should be evaluated by the type of information they provide (Osborne & Overbay, 2004)

Outliers can be identified from a univariate, bivariate or multivariate perspective based on the number of variables considered. First, the univariate technique examines the distribution of each variable and selects as outliers those observations falling at the outer range of the scattering (Hair et al., 2010). Second, bivariate perceptives assesses the pairs

of variables jointly through a scatterplot (Pallant, 2007). While this method provides the uniqueness of each observation in relation to another variable, Hair et al. (2010) contend that this method should be avoided as the number of scatterplots increases with the increase in number of variables. In addition, this technique is limited to two dimensions at a time. Finally, the multivariate detection method measures the distance of each observation from the mean point in the multidimensional space, providing a unique value for each observation (Tabachnick & Fidell, 2007). Yet more than two variables are considered in the current study, therefore, a combination of univariate and multivariate perspectives was a suitable choice to detect the outliers. The univariate detection can allow the identification of observations as extreme of a distribution or true outliers, whereas multivariate detection can confirm the outliers based on the level of significance (Filzmoser, Garrett, & Reimann, 2005).

In line with the recommendations of Field (2009), two methods are employed to detect outliers: (1) boxplot diagram (a graphical method) to detect univariate outliers and, (2) Mahalanobis  $D^2$  measure to detect multivariate outliers. First, the boxplot identified the outliers with an asterisk (\*) sign. These values are identified as being any point of data that lies over 1.5 inter-quartile range below the first quartile or above the third quartile in a data set. Second, Mahalanobis  $D^2$  perspective measures the distance of each observation from the mean centre of all observations in multidimensional space. For interpretation purpose, the significance of responses is tested by Mahalanobis  $D^2$  divided by the degree of freedom (that is the number of variables involved). According to this test, observations having a  $D^2/df$  value exceeding 2.5 in small sample and 3 or 4 in large samples can be regarded as an outlier. Since the sample size is 279 (after deleting missing values), the value of  $D^2/df = 3$  is considered as a cut-off point.

Overall, the examination of boxplot and the analysis of  $D^2/df$  identified three outliers. According to Hair et al. (2010), outliers should be kept unless perceptible proof shows that they are unusual and not representative of any observation in the population. In case outliers are representative elements of the population, they need to be retained to ensure generalisability. As the response # 137 appeared in several variables and  $D^2/df$  equalled 7.27, it was removed from the final data analysis. Thus, it provides the final sample size of 278.

#### **6.5.4.3 Non-response bias**

Non-response bias refers to the bias that exists when respondents to a survey are different from those who did not respond to survey in terms of attitudinal variables or demographics

(Berg, 2005; Sax, Gilmartin, & Bryant, 2003). In case the responses are obtained from a non-random group that is different from the population in terms of study's variables, such difference can cause misrepresentation of the true effects (Schalm & Kelloway, 2001). Therefore, some *procedural remedies* were implemented to increase the response rate. For example: (1) ambiguity was minimised by ensuring the clarity and relevance of the questions, (2) length of the questionnaire was kept as short as possible, (3) efforts were made to contact the well-informed respondents and (4) respondents were informed that questionnaire is part of academic study.

In addition, there are three different *statistical methods* for estimating nonresponse bias namely, comparison with known values of the population, subjective estimates and extrapolation. Firstly, in comparison with known values' method, results from a given survey can be compared with known values of the population. However, as the known values come from a different source, differences may occur due to response bias rather than nonresponse bias (Wiseman, 1972). While tested variables do not suggest nonresponse bias, it is hard to determine that other variables are free from bias (Groves, 2006). Secondly, the subjective estimate method considers the socioeconomic difference among respondents and non-respondents (Van Loon, Tijhuis, Picavet, Surtees, & Ormel, 2003). However, this method has been criticised due to difficulty to obtain and uncertainty to use the subjective estimates (Green, 1996). Thirdly, the extrapolation method assumes that subjects who respond late are more likely to be non-respondent (Filion, 1976; Lindner, Murphy, & Briers, 2001). The fundamental logic of extrapolation method is based on the purpose of the survey rather than to estimate nonresponse bias for its own sake (Lambert & Harrington, 1990). This method is widely used in social sciences research (Heidenreich, Landsperger, & Spieth, 2016; Hutter et al., 2017). Therefore, the extrapolation method was deemed appropriate to assess nonresponse bias in the data.

Based on the extrapolation method, late respondents are defined as those who responded in the last wave of the survey (Armstrong & Overton, 1977). Following the suggestion of Lindner et al. (2001), 45 responses were considered as late respondents in order to keep the result meaningful practically as well as statistically. In order to compare the early and late respondent's groups, three different statistical tests were used. First, early and late respondents were compared using T-test to examine two variables of interest: job position attribute and job experience. The results suggest no significant difference between two groups at 95% confidence interval. The significance of t-test for equality of means is greater than 0.05, which suggest no difference between early and late respondents (Filzmoser et al., 2005). In addition, the significance of Levene's test is >0.05, which is more than the cut-off point of 0.05 (Pallant, 2007). Second, ANOVA test was used to

examine differences in variance between respondent and non-respondent groups. The test did not result in any statistically significant difference ( $p < 0.10$ ). Third, Pearson chi-square difference test was used to compare early and late respondent groups on the number of employees' variable. The results of this test indicated no significant difference between these groups (value=1.917, Asymp. Sig. 0.590). Based on the results of statistical tests, it can be concluded that non-response bias is not a problem with respect to the above mentioned aspects.

## **6.6 Research ethics**

Research ethics refer to the "norms or standards of behaviour that guide moral choices about our behaviour and our relationships with others" (Cooper & Schindler, 2008, p. 34). Research ethics, therefore, relate to questions about how the research problem is formulated, what is the design of the study, how data is collected, processed and stored, how data is analysed and how to write the information in a responsible way. It indicates that the way a research project is designed should be both methodologically sound and morally defensible for those who are involved (Diener & Crandall, 1978). Ethics in business and consequently in business research is a critical issue to be considered. This is because it ensures that a participant does not suffer physical harm, discomfort, pain, embarrassment or loss of privacy (Blumberg et al., 2014; Cooper & Schindler, 2008). There is no single approach to ethics as it is difficult for a researcher to adhere to a set of laws. However, several scholars have identified a set of key principles that provide the basis to conduct management research (Ghauri & Gronhaug, 2002; Randall & Gibson, 1990). Table 6-13 summarises the key principles and the implications for the current study. Along adhering a set of principles as proposed by scholars (as in Table 6-13), the current study has obtained the approval by the Research Ethics Committee – University of Huddersfield. Consequently, the researcher has paid the considerable attention to ensure the observance of research ethics standards during all the stages of research (i.e., research planning, data gathering, analysing & interpretation and reporting).

Table 6-13: Summary of research ethics

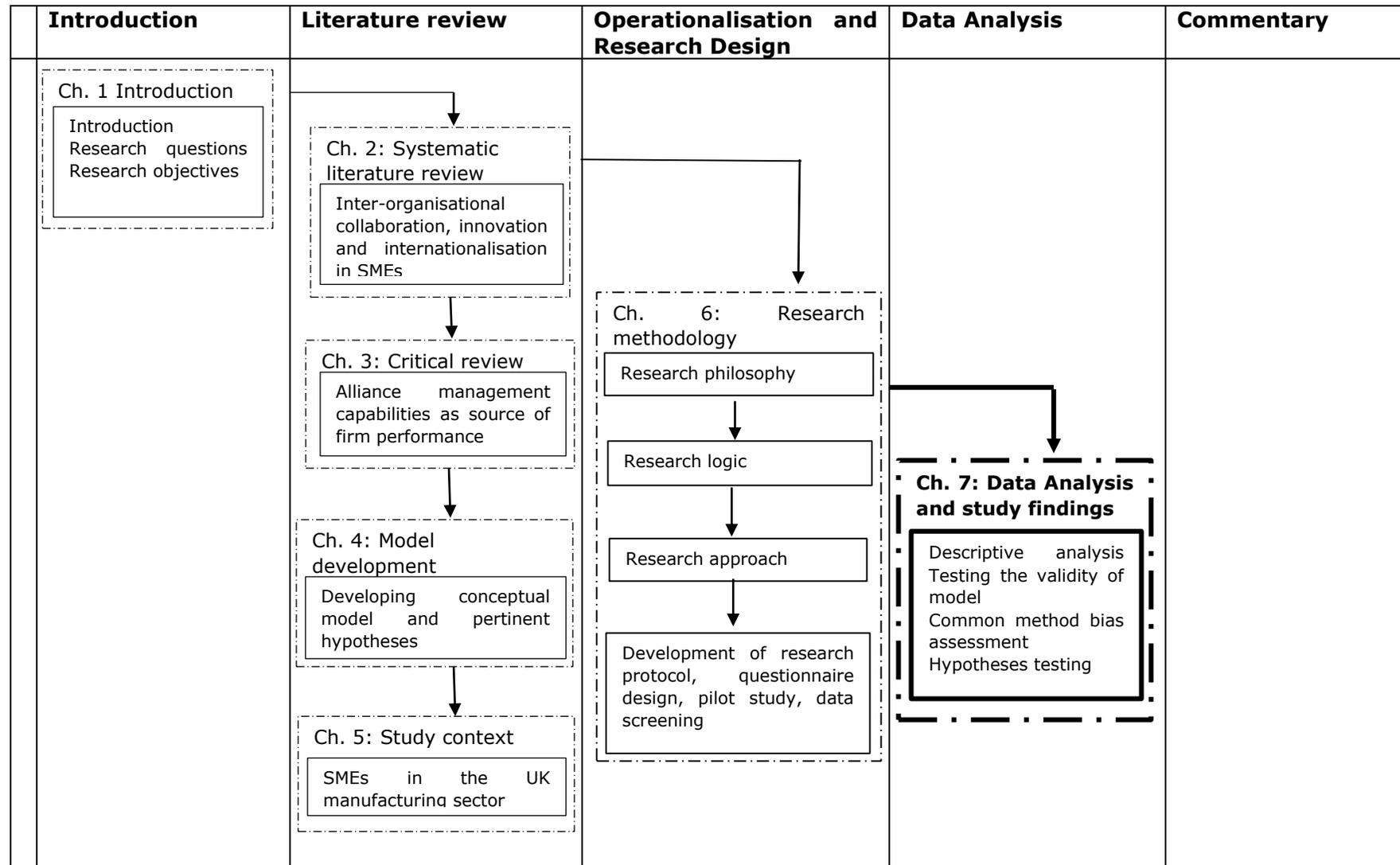
No:	Ethical standards	Description	Implications for the current research
<b>Ethics and your research</b>			
1	Do not harm	Endeavour that no harm should be caused in designing and carrying out the research	Research Ethics Committee – University of Huddersfield has approved the ethical form which suggest that there is no potential harm for the participants
2	Integrity	The researchers have carried out the research as they said they do	Researcher tried to show honesty and fairness in proposing, performing and reporting research
3	Plagiarism	Ensure that somebody’s work is not presented as your own	The researcher has referenced the work properly and attended several workshops to develop such skills.
4	Validity	The research is valid, logical, sound, reasonable and meaningful	The gathered evidences are valid as discussed in chapter 7.
5	Power	Critically examine the engagement of researcher with the project	The researcher decided to remain aware of the ethical implications of data being collected in the project
6	Transparency	Provision of careful attention to avoid potential harm in the design and development of project	The research objectives are honestly and clearly communicated with the participants.
<b>The ethically reflective practitioner</b>			
7	Informed consent	Agreement given by a person to participate in some action	The participants have been informed about the nature of research and possible consequences for them. The participants have provided written consent.
8	Confidentiality	The non-disclosure of certain information	It is assured to the participants that their contribution to this research project will be confidential. The researcher and perhaps the supervisor will have access to the data.
9	Anonymity	Free from identification	The participants are not identified at any time during the research.
10	Affiliation and conflicts of interest	The need to declare the affiliation of research with an organisation	The researcher has informed all participants of her affiliation with the University of Huddersfield.

## **6.7 Conclusion**

This chapter discussed the research methodology adopted in this study. Initially in the section 6.2, research philosophy was explained and the choice of positivism paradigm was justified. In the next section 6.3, the research logic was discussed and the deductive logic was exhibited as followed in the study. Following this, in section 6.4, the issue of research approach was discussed and the choice of quantitative approach was justified for the study. Next, the section 6.5 presented the research process wherein four steps are apprehended. In the first step, the choice of cross-sectional design using the web survey was justified, along with the description of sampling strategy, details of key informants (including CEOs and other senior managers), and explanation for the response rate of 10% in the study. In step 2, the study's questionnaire was designed with information about scale properties and measurements of study's variables. In step 3, the pilot study was conducted using three techniques, namely expert judgment, pre-test with MBA students and quantitative pre-test with SMEs' managers in the UK. The results of pilot study confirmed the reliability and validity of measurement scales. In step 4, preliminary data analysis was conducted, which focused on the issues of missing value, outliers and non-response bias and provided a usable sample of 278. Following the research process, section 6.6 discussed the issue of research ethics as apprehended in the data collection process.

The next chapter, Chapter 7 presents the analysis of the data and findings of the study.

This is that part of the earlier Figure 1-1 that is being addressed in the forthcoming chapter.



# Chapter 7. Data Analysis and Study Findings

## 7.1 Introduction

This chapter focuses on the presentation of empirical findings gathered from the survey data. This chapter is divided into three successive sections (as illustrated in Figure 7-1): 1) descriptive analysis to show the trends in the data, 2) validation of the measurement scales using a number of statistical tests including, exploratory factor analysis (EFA) and confirmatory factor analysis (CFA), and 3) examination of the structural model to test the hypotheses.

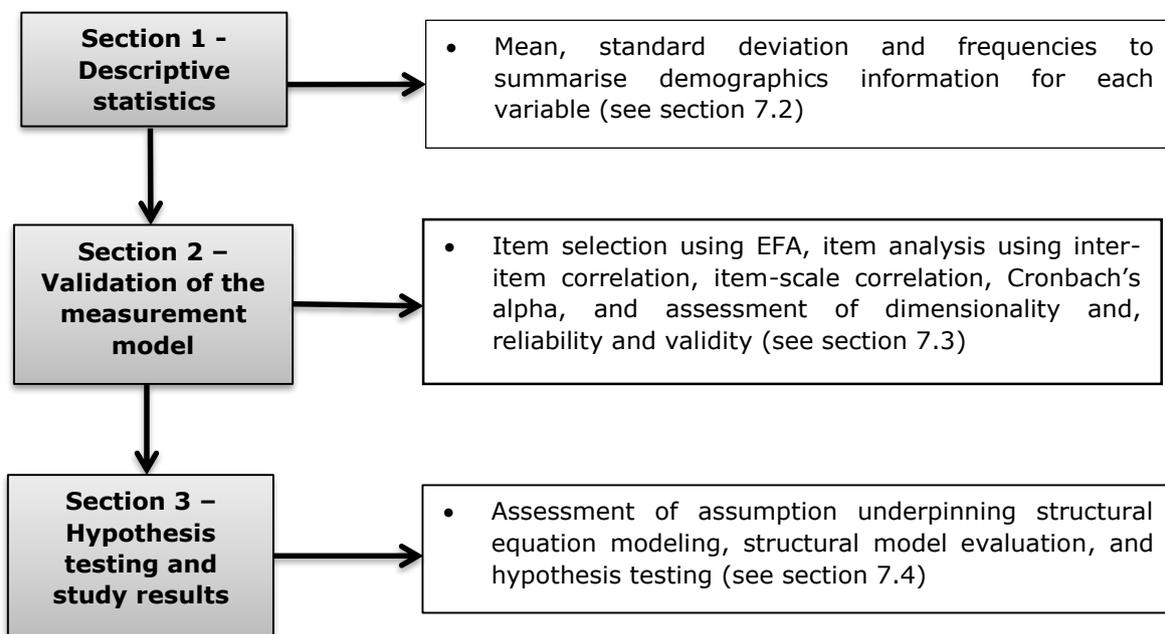


Figure 7-1: Summary of data analysis process

## 7.2 Section 1 - Descriptive analysis

This section presents the descriptive statistics that are employed using SPSS 22 in order to explain the characteristics of sample. The study' variables are assessed against some central tendency measures (such as, mean and median) and variability measures (like standard deviation and range of scores). The use of central tendency and variability measures permits a comparison of the score on the profiling characteristics of the sample (Blumberg et al., 2014; Field, 2009) and hence it helps to identify if there is a significant difference among the respondents.

## 7.2.1 Respondents' characteristics

The data were collected from the SMEs' employees in the UK. The participating employees possess the top management experience by being firm's managers. The completed questionnaires were coded and cleaned before deducing the findings. Preliminary analysis was performed to adjust the issue of missing values and outliers (see section 6.5.4.1 and 6.5.4.2), which resulted in a final sample size of 278. The demographic profile of the respondents includes job position, work experience, full-time employees, R&D employees, firm type, industry sector, number of exporting countries, and equity participation in the alliance. The statistics for the demographic profile of the respondents are summarised in Table 7-1.

Table 7-1: Descriptive statistics for the demographic information of respondents

Demographic	Category	Frequency	Valid Percentage
Job position	Owner/ Top management	111	39.9
	Middle management	138	49.6
	Lower management	29	10.4
	Non-management/operative	0	0
Work experience	Less than 3 years	42	15.1
	3 to 5 years	106	38.1
	More than 5 years	130	46.8
Full-time employees	10-25	44	15.8
	26-50	46	16.5
	51-200	164	59.0
	201-250	24	8.6
R&D Employees	1-25	188	67.6
	26-50	44	15.8
	51-200	43	15.5
	201-250	3	1.1
Firm type	A private limited firm	206	74.1
	A public limited company	52	18.7
	An unlimited company	19	6.8
	Other (please specify)	1	0.4
Industry sector	High-technology industries	114	41.0
	Medium-high-technology industries	76	27.3
	Medium-low-technology industries	18	6.5
	Low-technology industries	70	25.2
	Other (please specify)	0	0.0
Number of exporting countries	1 to 5	237	85.3
	6 to 10	26	9.4
	11 to 15	5	1.8

Demographic	Category	Frequency	Valid Percentage
	15 to 20	3	1.1
	More than 20	7	2.5
Equity participation in alliance	No	30	10.8
	We have minority	82	29.5
	50%	114	41%
	Majority participation	52	18.7

Due to information requirement of the study, managers, including CEO, senior managers and other managers with the knowledge about SMEs' strategy are deemed appropriate to get the views of decision makers. Demographic analysis also supports this decision and suggests that 111 respondents (39.9%) were top level managers, 138 respondents (49.6%) were middle level managers and 29 respondents (10.4%) were lower level managers. The competency of participants was further checked with knowledgeable questions (ranging from low level =1 to high level = 4). With respect to knowledge about the firm's products/services programs, the mean score was 3.87. The respondents' mean score was 3.83 for the knowledge about business strategy. In addition, respondents possess sufficient knowledge about alliance management systems and company's alliance partners with a mean score of 3.81 and 3.82 respectively. The mean value is close to 4, which suggests the high level of knowledgeable of respondents.

To further explore the relevance of participants, the study also asked respondents to provide information about length of service with this firm. Most of the respondents had job experience of 3 to 5 years (38.1%) and more than 5 years (46.8%). Only 15% respondents had experience of less than 3 years, see Table 7-1. The length of experience suggests that respondents were competent to answer the study's questions.

The firm size was assessed by examining the number of full-time employees. About two-third of the firms were medium sized with 51 to 250 employees (68.4%), while others responding firms were small sized with 10 to 50 employees (32.3%) (See Figure 7-2).

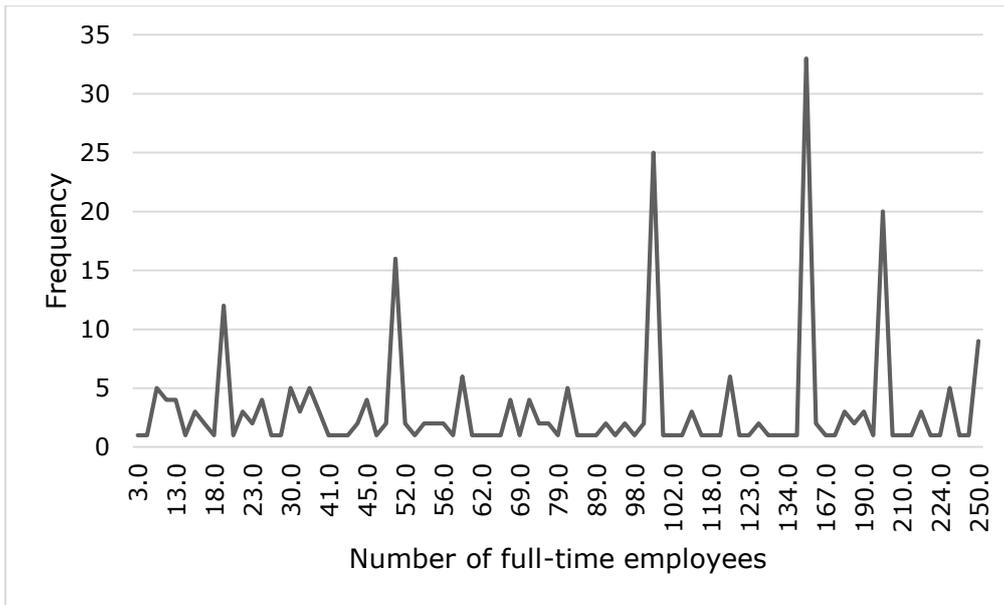


Figure 7-2: Number of full-time employees in the respondents' data

To further explore the innovation potential of firms, respondents were asked about the number of R&D employees. The majority of the firms had 1-25 R&D employees (67.6%) and followed by 26-200 (31.3%). A small proportion of respondents (1.1%) had 201-220 R&D employees, which suggests that SMEs like their counterparts possess strong innovation potential. From Figure 7-3, it is evident that the number of R&D employees ranged from 0 to 220.

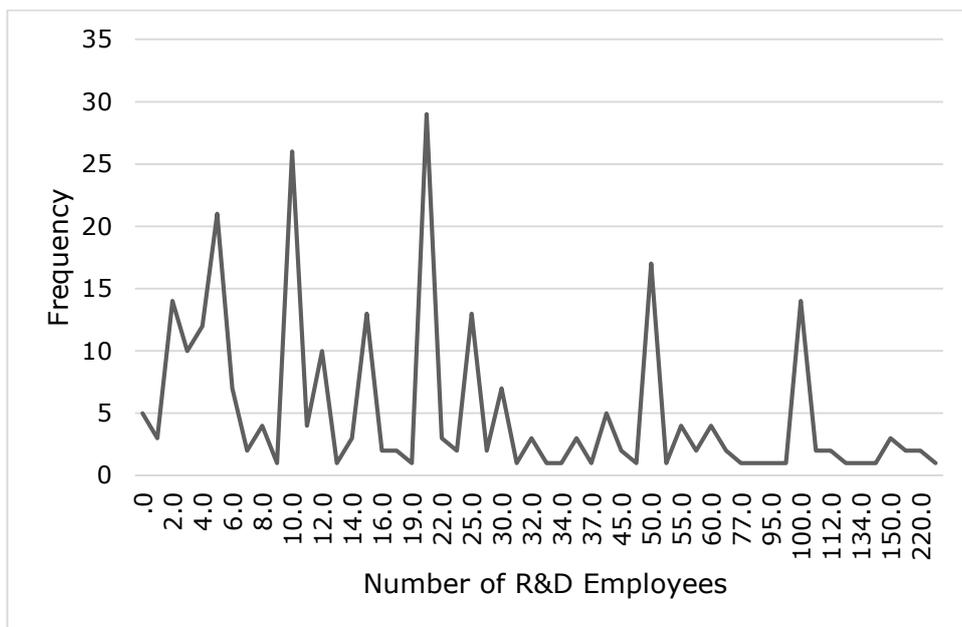


Figure 7-3: Number of R&D employees in the respondents' data

The sample contains a reasonable good spread of firm type. As reported in Table 7-1, most of the firms were private limited (74.1), while the remaining firms were public limited (18.7%) and unlimited firms (6.8%).

The data were collected from manufacturing industry. In terms of classification of manufacturing industry based on technology, the results suggest that a majority of firms were high technology (41.0%). There were some firms in medium-high technology (27.3%) and low technology (25.2%). The small number of firms belonged to medium-low technology industry (6.5%). Figure 7-4 shows the classification of industrial sectors as high, medium and low in the sample data.

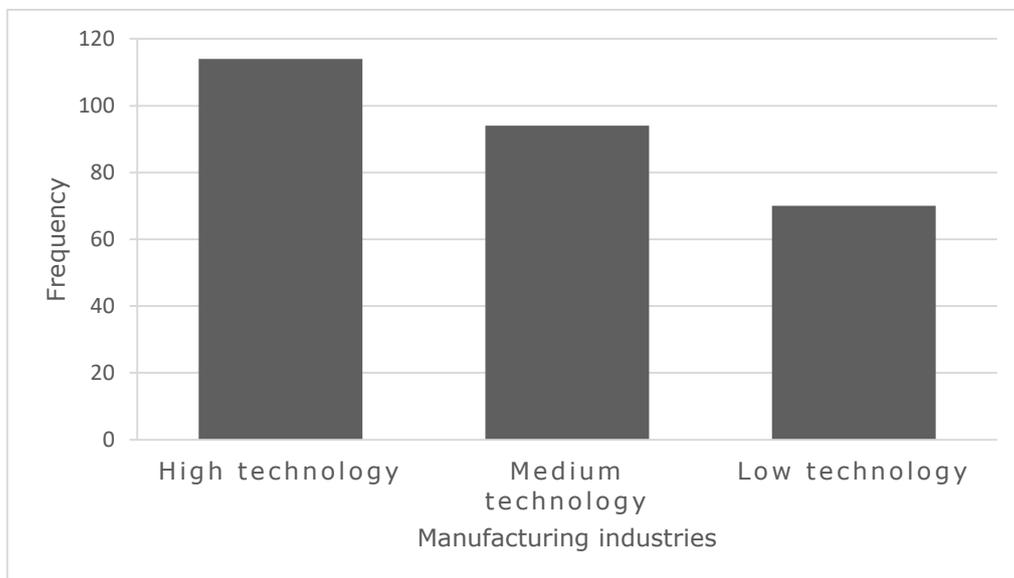


Figure 7-4: Industry sectors in the respondents' data

There were a range of industries within the high, medium and low technology industries. Figure 7-5 exhibits the pattern of industry distribution in the collected data.

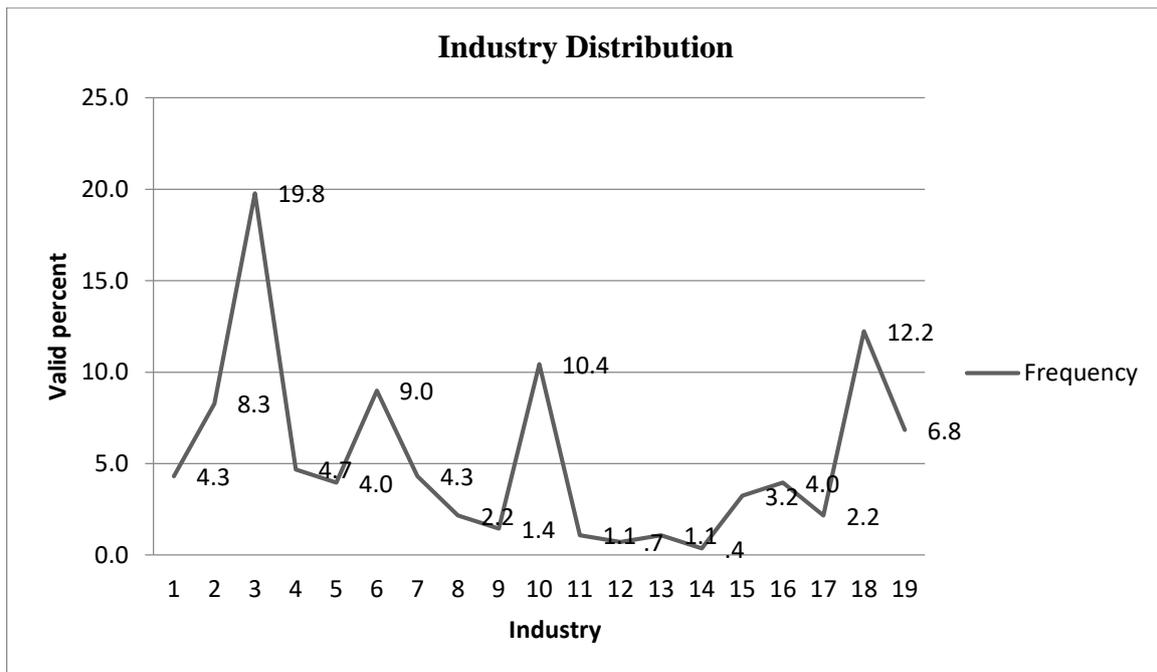


Figure 7-5: Industry distribution in the respondents' data

**Note:**

1=Aircraft and spacecraft, 2=Pharmaceuticals, 3=Office, accounting and computing machinery, 4=Radio, TV and communication equipment, 5=Medical, precision and optical instruments, 6=Electrical machinery and apparatus, 7=Motor vehicle, trailers and semi-trailers, 8=Chemicals excluding pharmaceuticals, 9=Railroad equipment and transport equipment, 10=Machinery and equipment, 11=Building and repairing of ships and boats, 12=Rubber and plastic product, 13=Coke, refined petroleum products and nuclear fuel, 14=Other non-metallic mineral products, 15=Basic metals and fabricated metal products, 16=Recycling, 17=Wood, pulp, paper, paper products, printing and publishing, 18=Food products, beverages and tobacco, 19=Textiles, textile products, leather and footwear.

The sample firms were exporting to other countries. The firms' intensity of exporting was determined by asking the respondents about the number of exporting countries. The mean number of exporting countries was 4. Majority of the firms (85.3%) were involved in exporting to 1 to 5 countries followed by 6 to 10 (9.4%) and more than 20 (2.5%).

In terms of equity participation in alliances, there were mixed evidences where 10.8 percent respondents have no equity participation, 29.5 percent had minority, 41 percent had 50% participation and 18.7 percent had majority participation, see Table 7-1.

Overall, the above-mentioned descriptive analysis of demographic information suggests the wide-spread of respondents across different respondent groups, industrial sectors, alliance modes and internationalisation activities.

## 7.2.2 Descriptive statistics of construct items

The respondents were asked the information about AMC, radical co-innovation, incremental co-innovation, internationalisation success and foreign market knowledge. Table 7-2 highlights the descriptive statistics including mean, median, mode, 5% trimmed mean, standard deviation and minimum and maximum for the study's variables.

Table 7-2: Descriptive statistics of study's variables

	N		Central tendency measures				Variability measures		
	Valid	Missing	Mean	Median	Mode	5% trimmed mean	Std. Deviation	Minimum	Maximum
<b>Inter-organisational coordination</b>									
COD1	278	0	5.4281	6.0000	6.00	5.5356	1.30821	1.00	7.00
COD2	278	0	5.4209	6.0000	6.00	5.4836	1.13964	2.00	7.00
COD3	278	0	5.4353	6.0000	6.00	5.4706	1.08873	1.00	7.00
<b>Inter-organisational learning</b>									
LRN1	278	0	5.4209	6.0000	6.00	5.49956	1.23394	1.00	7.00
LRN2	278	0	5.4245	6.0000	6.00	5.4876	1.20755	1.00	7.00
LRN3	278	0	5.4712	6.0000	6.00	5.5596	1.20957	1.00	7.00
LRN4	278	0	5.4496	6.0000	6.00	5.5276	1.14443	1.00	7.00
<b>Alliance proactiveness</b>									
PRT1	278	0	5.3237	5.0000	5.00	5.3997	1.20897	1.00	7.00
PRT2	278	0	5.3237	5.0000	6.00	5.3877	1.18788	1.00	7.00
PRT3	278	0	5.2806	5.0000	5.00	5.3357	1.19885	1.00	7.00
PRT4	278	0	5.3633	5.0000	5.00	5.3961	1.07197	1.00	7.00
<b>Alliance transformation</b>									
TRN1	278	0	5.2806	5.0000	6.00	5.3277	1.11134	2.00	7.00
TRN2	278	0	5.4388	6.0000	6.00	5.4800	1.07894	2.00	7.00
TRN3	278	0	5.3022	5.0000	5.00	5.3201	1.02429	2.00	7.00
<b>Alliance bonding</b>									
BND1	278	0	5.4424	6.0000	6.00	5.4840	1.09244	2.00	7.00
BND2	278	0	5.3849	5.0000	6.00	5.4361	1.11410	1.00	7.00
BND3	278	0	5.3417	5.0000	5.00	5.4117	1.15345	1.00	7.00
BND4	278	0	5.2590	5.0000	6.00	5.3197	1.17641	1.00	7.00
BND5	278	0	5.2734	5.0000	6.00	5.3357	1.23607	1.00	7.00
<b>Radical co-innovation</b>									
RI1	278	0	5.4317	6.0000	6.00	5.4956	1.18687	2.00	7.00
RI2	278	0	5.3669	5.0000	6.00	5.4277	1.19653	2.00	7.00
RI3	278	0	5.2410	5.0000	5.00	5.3038	1.20596	1.00	7.00
<b>Incremental co-innovation</b>									
II1	278	0	5.2014	5.0000	5.00	5.2518	1.17851	1.00	7.00
II2	278	0	5.2230	5.0000	5.00	5.2798	1.16224	2.00	7.00
II3	278	0	5.2914	5.0000	6.00	5.3557	1.20678	1.00	7.00
<b>Internationalisation success</b>									
ISU1	278	0	5.0468	5.0000	5.00	5.0839	1.20826	1.00	7.00
ISU2	278	0	5.0683	5.0000	5.00	5.0799	1.09759	2.00	7.00
ISU3	278	0	5.0863	5.0000	5.00	5.1239	1.15250	1.00	7.00
ISU4	278	0	5.0899	5.0000	5.00	5.1043	1.06258	2.00	7.00

As shown in Table 7-2, the mean value ranges from 5.08 to 5.47, which suggests that the most respondents agree with the items posed in the questionnaire. The 5% trimmed mean value of all the items is close to the mean value of the relevant item. It indicates that there is no high effect of the outliers on the mean values (Miller, 1993). The standard deviation value ranges from 1.06 to 1.152, which suggests that the data is normally distributed with less concentration around the mean (this is further discussed in section 7.4.1.1).

### 7.3 Section 2 - Validation of the measurement model

The following section addresses the measurement development and assessment used in this study. The goal is to address the issues of establishing unidimensionality, reliability and validity of scales. The process of measurement development and assessment is conducted in four stages, as exhibited in Figure 7-6.

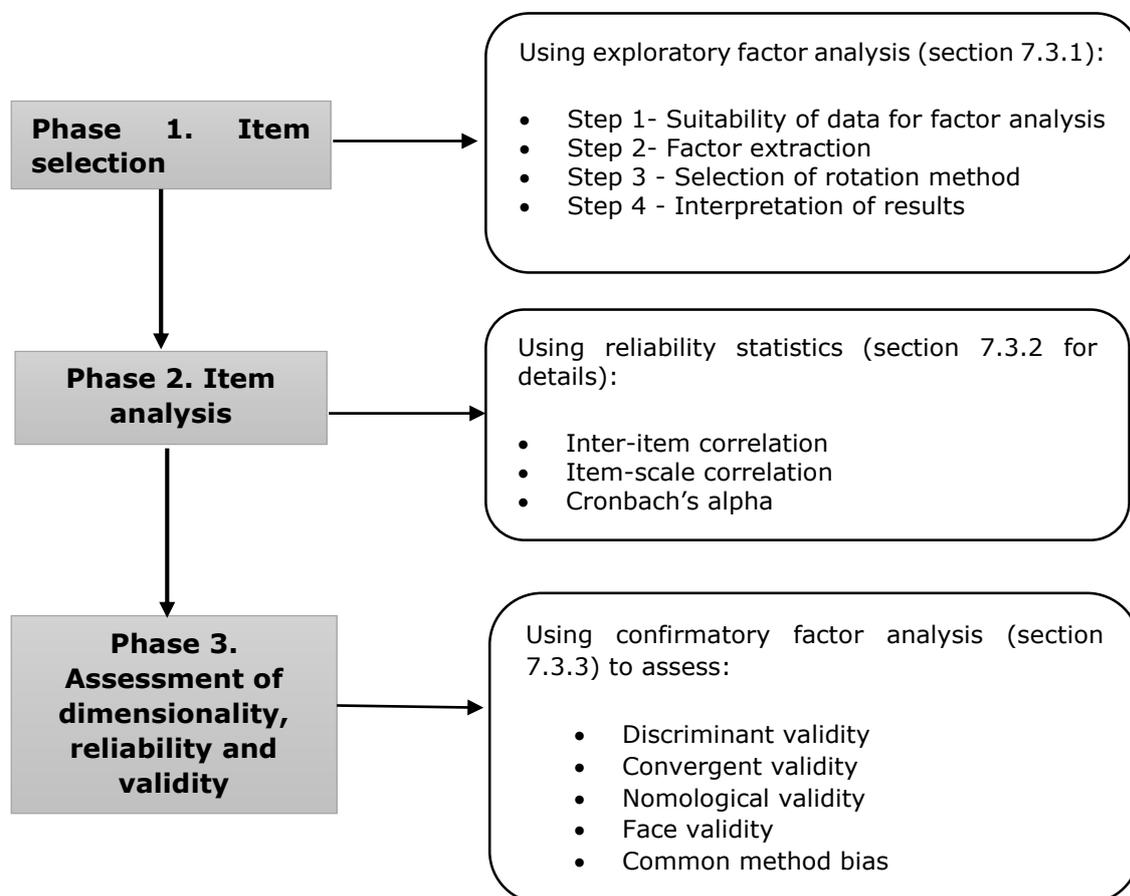


Figure 7-6: Validation of the measurement model procedures to be followed

### 7.3.1 Phase 1. Item selection using EFA

This section concerns the selection of items, as exhibited in Figure 7-6 – phase 1. The choice of appropriate analytical technique is as important as the compilation of an initial item pool. Earlier literature has documented exploratory factor analysis (hereafter EFA) as the appropriate technique for the item selection (Clark & Watson, 1995; Hayton, Allen, & Scarpello, 2004). The primary purpose of EFA is to ascertain the number of distinct constructs assessed by a set of variables (items) among a set of variables (Fabrigar & Wegener, 2011). Accordingly, EFA is considered as an appropriate technique for this study to decide on the number of items to retain and to analyse whether the items load on their respective dimensions (Ford, MacCallum, & Tait, 1986).

The process of EFA for this study is discussed in four steps, as explained in Table 7-3: suitability of data for factor analysis, extraction of factors, selection of rotation method and interpretation of EFA results (Pallant, 2007; Williams, Onsman, & Brown, 2010).

Table 7-3: An overview of steps involved in EFA

Step No:	Step name	Description	Requirement/Test	Rule of thumb
1	Suitability of data for EFA	This step is concerned with the character and composition of variables (items) included in the analysis.	Adequate sample size	<ul style="list-style-type: none"> <li>Sample size to variable ratio (3:1, 6:1, 10:1)</li> <li>Sample size of 100 to 400</li> </ul>
			Correlation coefficient	<ul style="list-style-type: none"> <li>Greater than 0.30</li> </ul>
			Barlett test of sphericity	<ul style="list-style-type: none"> <li>Statistically significant (&lt;0.05)</li> </ul>
			KMO - Measure of sampling adequacy	<ul style="list-style-type: none"> <li>Ranges between 0 and 1, with 0.50 as minimum value</li> </ul>
2	Factor extraction	It represents the decision made about the method of extracting the factors and number of factors selected.	Factor extraction method	<ul style="list-style-type: none"> <li>Principal component analysis or principal axis factoring</li> </ul>
			Number of factors to be extracted	<ul style="list-style-type: none"> <li>Conceptual foundation</li> <li>Latent root criterion</li> <li>Scree plot criterion</li> </ul>
3	Selection of rotation method	Rotation method helps to achieve the theoretically meaningful factor solution	<ul style="list-style-type: none"> <li>Oblique method (Oblimin, Promax, Orthoblique)</li> <li>Orthogonal methods (Varimax, Equimax, Quartimax)</li> </ul>	NA

Step No:	Step name	Description	Requirement/Test	Rule of thumb
4	Interpretation of results	The factor loadings are observed to identify those most indicative of the underlying structure.	<ul style="list-style-type: none"> <li>• Examine the factor matrix of loadings</li> <li>• Identify the significant loadings</li> <li>• Assess the communalities of the variables</li> <li>• Respecify the factor model if needed</li> <li>• Label the factors</li> </ul>	<ul style="list-style-type: none"> <li>• Factor loadings <math>\geq 0.50</math></li> <li>• Communalities <math>\geq 0.50</math></li> <li>• Cross-loadings <math>\geq 0.40</math></li> </ul>

**Note:**

1: NA refers to not applicable

**Step 1- Suitability of data for EFA:** The three critical conditions underlying the suitability of EFA are more conceptual than statistical (Tabachnick & Fidell, 2007), namely adequacy of sample size, correlation coefficient and statistical significance of correlation matrix. First, the sample size needs to be adequate to perform EFA. To date, scholars have disagreement about the small size for EFA (Hogarty, Hines, Kromrey, Ferron, & Mumford, 2005). According to Tabachnick and Fidell (2007), at least 300 cases are needed to perform the factor analysis. Hair et al. (2010) suggest a sample size of 100 or greater. Some other scholars contend that sample size of 100 is poor, 200 is fair, 300 is good, 500 is very good and 1000 is excellent (Gorsuch, 1983; Pett, Lackey, & Sullivan, 2003). However, only the sample size as a determinant of EFA can be sometimes misleading as it does not consider the complex dynamics of factor analysis (Henson & Roberts, 2006). For instance, in the case of high communalities ( $>0.60$ ) and prevalence of several items for each factor, the smaller sample size is desirable (MacCallum, Widaman, Zhang, & Hong, 1999), because the quality of EFA will improve with the level of communalities rather of sample size. However, it is difficult to ascertain the level of communality beforehand (Mundfrom, Shaw, & Ke, 2005). Therefore, some authors suggest that sample size is not only of concern, but sample to variable ratio is an important determinant of EFA (Hogarty et al., 2005). For example, as a rule of thumb, sample to variable ratio can be 3:1, 6:1 and 10:1 (Everitt, 1975; Nunnally, 1978). The current study involves 33 items for 9 distinct dimensions. Considering the sample size to variable ratio, this study meets the recommended criteria of 3:1 ( $99 < 278$ ) and 6:1 ( $198 < 278$ ) (Everitt, 1975). The sample size of 278 is also in accordance with the suggestions of Hair et al. (2010), and Tabachnick and Fidell (2007).

Second, there should be a correlation among constructs. As a rule of thumb, the correlation coefficients should be greater than 0.30 (Tabachnick & Fidell, 2007). In contrast, Hair et al. (2010) categorise the loadings in the following manner:  $\pm 0.30$ =minimal,  $\pm 0.40$ =important, and  $\pm 0.50$ =practically significant. If inspection of correlation reveals no substantial correlations greater than 0.30, then factor analysis is not an appropriate choice. In this study, the inspection of correlation matrix (Appendix 5) shows the evidence of correlation coefficients greater than 0.3, which meets the condition of correlation coefficient (Pallant, 2007; Tabachnick & Fidell, 2007).

Third, it is important to test the statistical significance of the correlation matrix and quantify the degree of inter-correlations using Bartlett's Test of Sphericity and KMO measure of sampling adequacy respectively. The Bartlett's Test of Sphericity should be significant ( $p < 0.05$ ) to be suitable for factor analysis (Hair et al., 2010). The KMO index ranges from 0 to 1, with 0.50 suggested a minimum value for factor analysis and 0.80 suggested as the excellent value (Hair et al., 2010). In the current study, the results of Bartlett's Test of Sphericity ( $< 0.001$ ) and KMO measure of sampling adequacy (0.914) suggest the adequacy of data for factor analysis.

Drawing on the previous results, it can be concluded that the data of the current study satisfies the fundamental conditions of EFA. Accordingly, the next section discusses the results of factor extraction.

**Step 2: Factor extraction:** After meeting the necessary conditions of EFA, the next step is to reduce a large number of items into factors, named as factor extraction. The extraction of factors involves two key decisions: (1) method of factor extraction and (2) number of factors to be extracted. First, the key issue is to choose the method of factor extraction in order to represent the structure of variables in the analysis. There are different ways to extract factors, including , principal components analysis, principal axis factoring, image factoring, maximum likelihood, alpha factoring and canonical (Thompson, 2004). However, the literature widely relies on principal components analysis and principal axis factoring to extract the factors (Hair et al., 2010). In the principal component analysis, communalities for the measure are set at 1.0 and it is assumed that all of the variance in a variable is potentially explicable by the factors that are derived (Gorsuch, 1990). Due to the value of 1 for communalities for the measure, factors are extracted based on the correlations among the variables. In contrast, principal axis factoring employs the squared multiple correlation between that variable and other variables used in the analysis (Gorsuch, 1990). This method extracts the factors using a reduced correlation matrix, where the 1.0 value on the diagonal of the correlation matrix is replaced by the initial communality estimates (Henson & Roberts, 2006). The application of principal component analysis against principal axis factoring is hotly debated (Thompson & Daniel, 1996). Despite

the fact that principal component analysis yields component scores that have a high correlation, this method suffers from factor indeterminacy such that for any individual respondent several different factor scores can be calculated from a single factor model (Henson & Roberts, 2006; Widaman, 1993). In contrast, principal axis factoring has high properties that are equal or superior to those of principle component analysis (Osborne & Costello, 2004). Despite considerable debate remains over which factor model is appropriate, the empirical researchers demonstrate similar results in both instances (Lance, Lance, & Vandenberg, 2010; Velicer & Jackson, 1990). In addition, Hair et al. (2010) argue that the choice between principal component or principal axis factoring should be made on one's purpose in conducting the analysis. This study aims to identify the latent dimensions represented in original variables, and therefore principal component analysis is used (Fernandez-Feijoo, Romero, & Ruiz, 2014).

Second, it is vital to agree on the number of factors to be extracted. There are different criteria to agree on the number of factors to extract namely eigenvalues criterion, a prior criterion and scree test criterion (B. Williams et al., 2010). First, eigenvalues criterion asserts that an individual factors can be retained for the interpretation if it accounts for the variance of at least a single variable (Ford et al., 1986). Consequently, any individual factor with eigenvalues greater than 1 is considered significant. The scholars suggest that eigenvalues criterion is desirable criterion only if the number of variables are between 20 and 50 (Hayton et al., 2004). Second, a prior criterion is a reasonable criterion to apply if the researcher is aware of the number of factors to be extracted already before conducting the factor analysis (O'Rourke & Hatcher, 2013). This is a useful criterion to apply when testing a theory or replicating earlier work to obtain the identical number of factors as formerly obtained (Velicer & Jackson, 1990). Finally, the Scree test criterion identifies the optimum number of factors that can be extracted before the amount of unique variance starts to dominate the common variance structure (Thompson, 2004). In order to identify the number of factors, the shape of scree plot is used that plots the latent roots against the number of factors in their order of extraction (Pallant, 2007). The conflicting conclusion can be traced to different criterion of factor extraction (Zwick & Velicer, 1986). Zwick and Velicer (1986) review the most widely used criteria and found that eigenvalues criterion is generally an inaccurate procedure and scree plot is recommended as a useful adjunct. Relying on the recommendations of Hayton et al. (2004), the researcher used a combination of stopping criteria rather than relying on stand-alone procedure, namely, eigenvalues, scree plot and priori criterion. Second, eigenvalues ( $\geq 1$ ) and the shape of scree plot (the point at which plot slopes become horizontal) assisted to decide the number of factors as nine (Pallant, 2007). Furthermore, the previous empirical evidences suggest nine different constructs with thirty-three items.

**Step 3: Selection of rotation method:** While deciding on the number of factors to extract, another consideration is whether a variable might relate to more than one variable. Factor rotation produces more simplified and interpretable results by maximising high item loading and minimising low item loading (B. Williams et al., 2010). There are two rotation methods: orthogonal rotation and oblique rotation. Orthogonal rotation (like Varimax, Equimax and Quartimax) produces the factor structures that are uncorrelated (Costello & Osborne, 2011; Thompson, 2004). On the contrary, oblique rotation (that is Oblimin, Promax and Orthoblique) produces the factors that are correlated, which is often seen as producing more accurate results. The researcher can use any of the rotation method as the primary purpose of rotation is to facilitate the interpretation of results and provide a parsimonious solution (Kieffer, 1999). In the current study, EFA was conducted using Promax (an oblique rotation method) method. The choice of Promax method is justified based on the logical argument of correlation (Conway & Huffcutt, 2003). It was known in the study that some of the variables are correlated. For instance, AMC is a second construct with five first order constructs, where all the constructs may have a strong correlation. Therefore, application of the Promax rotation method can yield a simple structure and better representation of relationships among study variables (Lance et al., 2010).

**Step 4: Interpretation of results:** The task of interpreting the results is to identify the structure among the variables based on a strong conceptual foundation (Tabachnick & Fidell, 2007). The process of factor interpretation is circular in nature. Firstly, the factor matrix is computed using principal component factor extraction method with Promax rotation. The initial results were evaluated, which suggested the nine-factor solution. The scree plot criterion (Figure 7-7) showed inflections that justified the nine factors. The nine factors solution is also in accordance with the previous strategy and management literature. The extracted factors account for 69.9% of the variance, which displays an adequate level of explanatory power (Berthon, Ewing, & Hah, 2005).

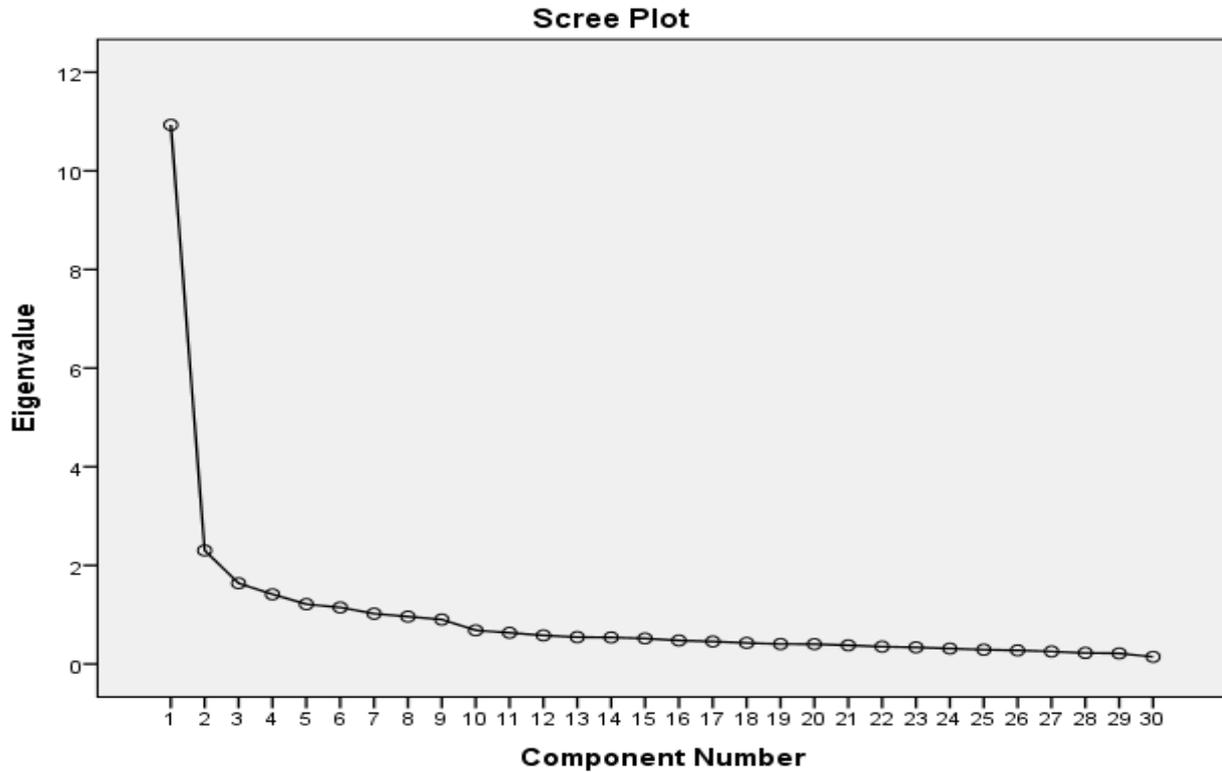


Figure 7-7: Scree plot

Second, the factor matrix of loadings was examined in SPSS 22 using the factor structure matrix. The factor matrix was evaluated by underlining all significant loadings for a variable on all the other variables. However, it was found that PRT1, BND1 and BND2 have high cross-loadings (>0.40) with inter-organisational coordination, alliance transformation and alliance proactiveness.

Third, the factor model was respecified using the alternative rotation method (Direct Oblimin and Varimax) and principal axis factoring (Hair et al., 2010). However, none of these options resolved the issue of cross-loadings. Therefore, it was decided to delete PRT1, BND1 and BND2 and exclude from the further analysis. This is a common practice in the literature to obtain the satisfactory results of EFA (Arnold & Reynolds, 2003; Worthington & Whittaker, 2006). Table 7-4 provides the summary of eliminated and retained items along with the source.

Table 7-4: A summary of eliminated and retained measurement items

Construct	Source	Items		
		Original	Eliminated	Retained
Inter-organisational coordination	Schilke and Goerzen (2010)	3	0	3
Inter-organisational learning	Schilke and Goerzen (2010)	4	0	4
Alliance proactiveness	Schilke and Goerzen (2010)	4	1 (PRT1)	3
Alliance transformation	Schilke and Goerzen (2010)	3	0	3
Alliance bonding	Schreiner et al. (2009)	5	2 (BND1, BND2)	3
Radical co-innovation	Parmigiani and Rivera-Santos (2011); Bierly and Daly (2007)	3	0	3
Incremental co-innovation	Parmigiani and Rivera-Santos (2011); Bierly and Daly (2007)	3	0	3
Internationalisation success	Musteen et al. (2010); Khalid and Bhatti (2015)	4	0	4
Foreign market Knowledge	Zhou (2007)	4	0	4
<b>Total</b>		<b>33</b>	<b>3</b>	<b>30</b>

The model was again defined, where the extracted factors account for 72.207% variance. The extracted nine factors represent: inter-organisational coordination, inter-organisational learning, alliance proactiveness, alliance transformation, alliance bonding, radical co-innovation, incremental co-innovation, internationalisation success and foreign market knowledge. Table 7-5 provides the final results of EFA using principal component analysis with Promax rotation.

Table 7-5: Exploratory factor analysis results

Structure Matrix									
	Factor								
	1	2	3	4	5	6	7	8	9
<b>Inter-organisational coordination (COD)</b>									
COD1 - Our activities with our partners are well-coordinated.	.87								
COD2 - We ensure that our work is synchronised with the work of our partners.	.90								
COD3 - There is a great deal of interaction with our partners on most decisions.	.72								
<b>Inter-organisational learning (LRN)</b>									
LRN1 - We have skills to learn successfully from our partners.		.90							
LRN2 - We have the managerial competencies to absorb new knowledge from our partners.		.88							

Structure Matrix									
	Factor								
	1	2	3	4	5	6	7	8	9
LRN3 - We have effective routines to analyse the information obtained from our partners.		.84							
LRN4 - We can successfully integrate our existing knowledge with new information acquired from our partners.		.80							
<b>Alliance proactiveness (PRT)</b>									
PRT2 - We often take the initiative in approaching firms with alliance proposals.			.79						
PRT3 - Compared to our competitors, we are proactive and responsive in finding and "going after" partnerships.			.88						
PRT4 - We actively monitor our environment to identify alliance opportunities.			.82						
<b>Alliance transformation (TRN)</b>									
TRN1 - We are willing to put aside contractual terms to improve the outcome of our alliances.				.81					
TRN2 - When an unexpected situation arises, we would rather modify an alliance contract than insist on the original terms.				.85					
TRN3 - Flexibility, in response to a request for change, is characteristic of our alliance management process.				.82					
<b>Alliance bonding (BND)</b>									
BND3 - We care about the concerns of our partners even if we do not expect any advantages to arise for us in the short term.					.77				
BND4 - When discussing points of disagreement, we always try to see our partner point of view.					.87				
BND5 - During conversations, we feel intuitively what our partner actually wants.					.77				
<b>Radical co-innovation (RIN)</b>									
RIN1 - The important driver of our alliance is to use new, breakthrough technologies.						.79			
RIN2 - The intent of our alliance is to create radical new ideas or ways of doing things.						.88			
RIN3 - Our alliance helps us to come up with creative ideas that challenge conventional ideas.						.78			
<b>Incremental co-innovation (IIN)</b>									
IIN1 - The aim of our alliance is to improve efficiency.							.81		
IIN2 - We can rationalise our business operations with alliance.							.84		
IIN3 - Our alliance facilitates the improved quality of existing innovations.							.79		
<b>Internationalisation success (ISU)</b>									
ISU1 - Market share relative to its stated objectives								.76	
ISU2 - Sales relative to its stated objectives								.82	
ISU3 - Profit margin relative to its stated objectives								.87	
ISU4 - Return on investment relative to its stated objectives								.80	
<b>Foreign market knowledge (FINK)</b>									

Structure Matrix									
	Factor								
	1	2	3	4	5	6	7	8	9
FBK1 - Our manager's knowledge about foreign competitors									.85
FBK2 - Our manager's knowledge about the needs of foreign clients/customers									.80
FBK3 - Our top managers' international business experience									.79
FBK4 - Our top managers' ability in determining foreign business opportunities									.78

**Note:**

1: Extraction Method: Principal Axis Factoring.

2: Rotation Method: Promax with Kaiser Normalization.

Specifically, the factor loadings for the retained items are as follows: inter-organisational coordination (COD2- 0.895, COD1- 0.874, COD3- 0.719), inter-organisational learning (LRN1- 0.902, LRN2- 0.880, LRN3- 0.838, LRN4- 0.800), alliance proactiveness (PRT3- 0.875, PRT4- 0.819, PRT2- 0.792), alliance transformation (TRN2- 0.845, TRN3- 0.820, TRN1- 0.807), alliance bonding (BND4- 0.865, BND5- 0.773, BND3- 0.770), radical co-innovation (RI2- 0.876, RI1- 0.792, RI3- 0.780), incremental co-innovation (II2- 0.836, II1- 0.831, II3- 0.789), internationalisation success (ISU3- 0.866, ISU2- 0.820, ISU4- 0.799, ISU1- 0.755) and foreign market knowledge (FBK1- 0.85, FBK2- 0.80, FBK2- 0.79, FINK2- 0.78).

**7.3.2 Phase 2. Item analysis using reliability statistics**

This phase (phase 2 as demonstrated in Figure 7-6) primarily aims to assess the internal consistency and reliability of scales (De Vaus, 2013). In particular, this phase has three objectives, namely, to determine the internal consistency of items, to establish unidimensionality and to test the reliability of items.

First, this phase reveals the internal consistency of items using inter-item correlation. The inter-item correlation is a common method to establish the reliability of a construct (DeVellis, 1991). Inter-item correlation examines the extent to which scores on one item are related to scores on all other items in the same construct (Swerdlik & Cohen, 2005). The strong inter-item correlation suggests that items share a common cause meaning that items are measuring the same construct (Bollen & Lennox, 1991). It has been suggested that inter-item correlation should be in a range of 0.40 to 0.50 to be considered as a valid measure of construct (Robinson, Shaver, & Wrightsman, 1991).

Second, it confirms the unidimensionality of scales using the corrected-item-total correlation (De Vaus, 2013). Corrected-item-total-correction is the widely used measure for the item-scale

correlation, which refers to the correlation between a specific item and the remaining items constituting the scale, excluding the specific item from the scale (Roberti, Harrington, & Storch, 2006). As a threshold of item deletion, the corrected-item-total-correction should be 0.50 or higher (Fabrigar & Wegener, 2011). Consequently, the items with low item-scale correlation were considered for the deletion in this study.

Finally, it allows to recognise the reliability of items using the Cronbach's alpha coefficient (Knight & Kim, 2009; Ritter & Gemünden, 2004). A scale is considered reliable if it produces similar results under consistent conditions (Eisinga, Grotenhuis, & Pelzer, 2013). The threshold value of Cronbach's alpha coefficient was interpreted with the following guidelines: excellent;  $\geq 0.90$ , very good;  $\geq 0.80$ , adequate;  $\geq 0.70$  and questionable;  $\geq 0.60$  (George & Mallery, 2003). However, the value below 0.50 should be avoided to ensure the internal consistency of the items in the scale (Gliem & Gliem, 2003). Generally, the output of SPSS indicated that the overall reliability of the questionnaire, as indicated by Cronbach's alpha, was 0.93. This value shows that the items are reliable as the coefficient value is far above the cut-off point of 0.60 (George & Mallery, 2003; Nunnally & Bernstein, 1994b). In addition, the item-correlation was calculated (see Appendix 5). The results suggested that all items correlate strongly meeting the minimum threshold of 0.40 (Hair et al., 2010). The Cronbach's alpha and corrected-item-total correlation was also calculated for each scale. Table 7-6 provides the results of scale reliability analysis. All scales exceeded the cut-off point of 0.70 in Cronbach's alpha and cut-off point of 0.50 in corrected-item-total correlation (Nunnally & Bernstein, 1994a).

Table 7-6: Scale reliability analysis: corrected-item-total correlation, Cronbach's Alpha if item deleted and Cronbach's Alpha

Constructs	Item-Total Statistics			
		Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted	Cronbach's Alpha
Inter-organisational coordination	COD1	0.67	.77	0.82
	COD2	0.76	.67	
	COD3	0.61	.82	
Inter-organisational learning	LRN1	0.82	.83	0.89
	LRN2	0.79	.84	
	LRN3	0.70	.87	
	LRN4	0.70	.87	
Alliance proactiveness	PRT2	0.59	.75	0.79
	PRT3	0.69	.64	
	PRT4	0.61	.73	
Alliance transformation	TRN1	0.63	.74	0.80
	TRN2	0.68	.68	
	TRN3	0.62	.65	
Alliance bonding	BND3	0.58	.74	0.78
	BND4	0.67	.66	
	BND5	0.61	.72	
Radical co-innovation	RI1	0.57	.71	0.76
	RI2	0.68	.59	
	RI3	0.55	.74	
Incremental co-innovation	II1	0.56	.69	0.75
	II2	0.60	.65	
	II3	0.58	.67	
Internationalisation success	ISU1	0.61	.81	0.83
	ISU2	0.67	.78	
	ISU3	0.73	.76	
	ISU4	0.64	.80	
Foreign market knowledge	FBK1	0.68	.77	0.83
	FBK2	0.67	.77	
	FBK3	0.67	.77	
	FBK4	0.59	.81	

### **7.3.3 Phase 3. Assessment of dimensionality, reliability and validity using CFA**

This phase involves the assessment of the measurement model to determine the dimensionality, as shown in Figure 7-6 – phase 3. This task was accomplished using confirmatory factor analysis (hereafter CFA). CFA is a sophisticated approach to test the extent to which a priori theoretical pattern of factor loadings on prespecified constructs represents the actual data (Gerbing & Anderson, 1988). CFA is a tool to provide a confirmatory test for the measurement model (a model that specifies a series of relationships that suggest how measured items represents a latent construct that is not measured directly) (Hair et al., 2010). For the current study, CFA is an appropriate technique to ensure the dimensionality, reliability and validity of the constructs. With respect to dimensionality assessment, CFA provides an opportunity to assess the item's relationship not only with the items in the same construct but also with other items in the measurement model (Gerbing & Anderson, 1988). Although the dimensionality has been assessed using traditional EFA method, Gerbing and Anderson (1988) argue that traditional techniques do not account for the external consistent as they fail to discriminate between a set of items that represent distinct but correlated items. Consequently, CFA provides the strict interpretation of unidimensionality compared to traditional techniques (Koufteros, 1999). The application of CFA involves two key steps: developing the measurement model and assessment of model fit.

#### **7.3.3.1 Development of measurement model**

The development of measurement model is a necessary condition to obtain useful results (Hair et al., 2010). Notwithstanding, an effort was made to operationalise the study's construct by using a Likert scale, which is widely used in the literature (Stoian et al., 2017; Zaefarian, Forkmann, Mitreğa, & Henneberg, 2017). In addition, constructs were defined and operationalised as they were in the previous studies. In addition, pretesting technique was applied in a manner identical to the final model analysis as well as some alternative techniques were used (see section 6.5.3) (MacKenzie & Lutz, 1989). The measurement model consisted of 9 independent constructs with 30 items.

It is vital to determine the measurement relationship for the items and constructs (Bagozzi, 1981; Bollen, 1989). The measurement relationship of the items and constructs can be formative or reflective, as shown in Figure 7-8 (Edwards & Bagozzi, 2000). In the Figure 7-8,  $\eta$  is the common underlying construct,  $x_i$  are the observed items and  $\xi_i$  is the error terms.

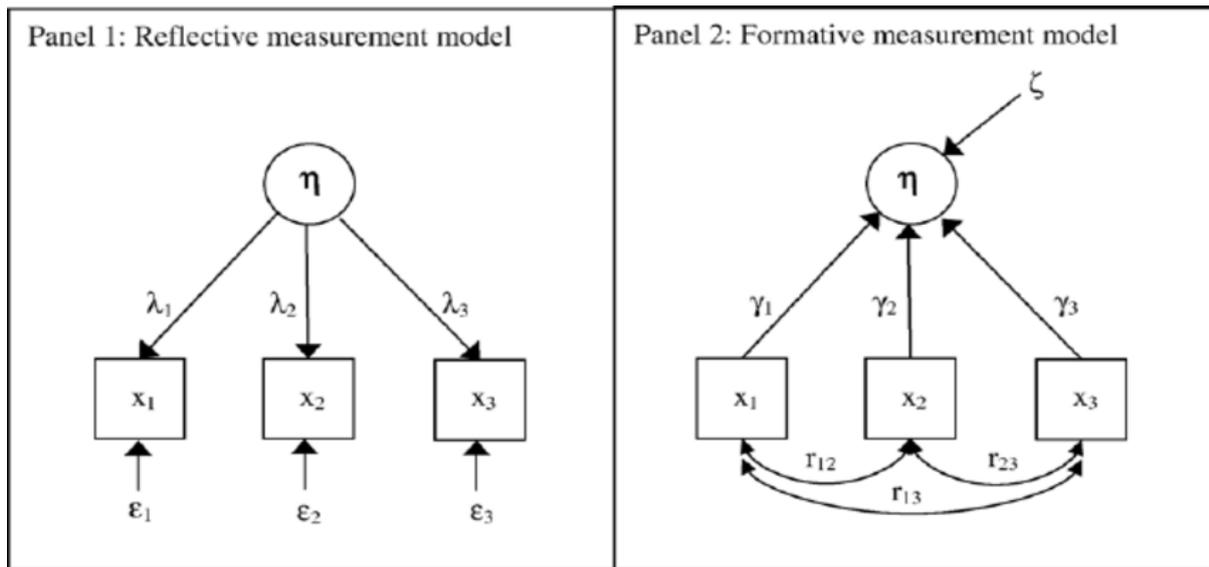


Figure 7-8: Formative versus reflective model

The distinction between formative and reflective measures is vital because the appropriate specification of the measurement model helps to assign the significant relationships in the structural model (Anderson & Gerbing, 1988). The formative measurement model contains multidimensional and unrelated items reflecting the same construct (Diamantopoulos, Riefler, & Roth, 2008). In a formative model, the causality flows from the items to the construct (Diamantopoulos & Winklhofer, 2001). In contrast, the reflective measurement persists to the assumption of classical test theory, which suggests that measures denote the effect of an underlying latent construct (Bollen & Lennox, 1991). In view of that, within a reflective measurement model, the causality flows from the latent construct to the items. The reflective model has a long tradition in business studies (Venaik, Midgley, & Devinney, 2004), and management literature (Coltman, Devinney, Midgley, & Venaik, 2008). Based on the theoretical and empirical implications of formative and reflective measurement models (see Table 7-7), the current study used the reflective model because the correlation between the observed items is considered as an outcome of the underlying common construct ( $\eta$ ) (Netemeyer, Bearden, & Sharma, 2003).

Table 7-7: Comparison of reflective and formative model

Characteristics	Reflective Model	Formative Model
<b>Theoretical Considerations</b>		
Nature of construct	Latent construct exists	Latent construct is formed
Direction of causality	Causality from construct to items	Causality from items to construct
Features of items as representative of constructs	Items are demonstrated by the construct	Items define the construct
<b>Empirical Considerations</b>		
Item inter-correlation	There should be positive inter-correlations among items	There can be any form of inter-correlation among items, but it should be the same directional relationship
Relationship between item and construct antecedents and consequences	There is similar sign and significance of relationships between the item and the antecedents/consequences as the construct	There may not be similar significance of relationships between the items and the antecedents/consequences as the construct
Measurement error and collinearity	It is possible to identify the error term in items	Identification of the error term in items is not possible if the formative measurement model is estimated in isolation

**Note:**

1: Source - Adapted: Coltman et al. (2008)

The researcher also needs to choose the estimation technique. Ordinary least square (OLS) regression was used earlier to perform the CFA (Chin, 1998). These efforts were supplanted by the maximum likelihood estimation (MLE). MLE is the most efficient and unbiased approach when the assumption of data normality is met. (Savalei, 2008). Some other estimation techniques are also available such as, generalised least square (GLE), weighted least square (WLE) and asymptotically distribution free (ADF). Researchers compared all the estimation techniques, but MLE produced reliable results under many circumstances (Olsson, Foss, Troye, & Howell, 2000). This study decided to use maximum likelihood estimation method, which is a commonly estimation method in the social sciences research (Brammer & Millington, 2008; Darnall, Henriques, & Sadorsky, 2010). AMOS 22 was used to perform the CFA.

**7.3.3.2 Assessment of measurement model fit**

With the measurement model specified and the decision about estimation technique already made, the subsequent step is to make the important decision about the validity of measurement model. The validity of the measurement model is contingent on acceptable levels of goodness-of-fit for the measurement model. Goodness-of-fit (GOF) indices indicate how well the specified model reproduces the observed covariance matrix among the indicator items (that is the

similarity between the observed and estimated covariance matrices) (Hair et al., 2010). Accordingly, to assess the measurement model of the study, a combination of goodness-of-fit measures were used, namely, chi-square, goodness-of-fit index (GFI), root mean square error of approximation (RMSEA), standardised root mean residual (SRMR), comparative fit index (CFI), Tucker-Lewis index (TLI), normed fit index (NFI), parsimony normed fit index (PNFI), parsimony comparative fit index (PCFI) and adjusted goodness-of-fit index (AGFI).

The study estimated two separate measurement models: CFA1 - to test the hypothesised structure of the AMC construct using the second-order CFA and, CFA 2 - to test the first-order measurement model as a whole including AMC and the remaining variables (Thornton et al., 2015). The following section exhibits the results of two distinct measurement models and assessment of construct validity.

### **CFA 1 - AMC as a higher-order model**

Following the recent literature on alliance capabilities (e.g. Schilke & Goerzen, 2010; Schreiner et al., 2009), AMC in this study was conceptualised as a higher-order construct, which reflects inter-organisational coordination, inter-organisational learning, alliance proactiveness, alliance transformation and alliance bonding. Accordingly, a second-order factor model was tested to confirm that AMC is a second-order reflective construct. The goodness-of-fit statistics for the measurement model were:  $\chi^2 (df = 99) = 158.120$  ( $n = 278$ )  $P$ -value  $< .05$ ,  $\chi^2/df = 1.597$ , CFI = .97, RMSEA = .05. Other fit statistics include TLI = .97, IFI = .97, PCFI = .80, SRMR = .04 and GFI = .93. The fit indices were well-above the threshold value, which suggested the excellent model fit (Dangelico, Pujari, & Pontrandolfo, 2017; Owens & Hekman, 2016).

As illustrated in Figure 7-9, the standardised factor loadings between the first-order and the second-order factors are significant at a significance level of  $p < 0.001$  with their values greater than 0.70 (inter-organisational coordination: .82, inter-organisational learning: .76, alliance proactiveness: .78, alliance transformation: .77, and alliance bonding: .84). In addition, all the first-order factor loadings are significant ( $p < 0.001$ ) and standardised loadings are greater than .70.

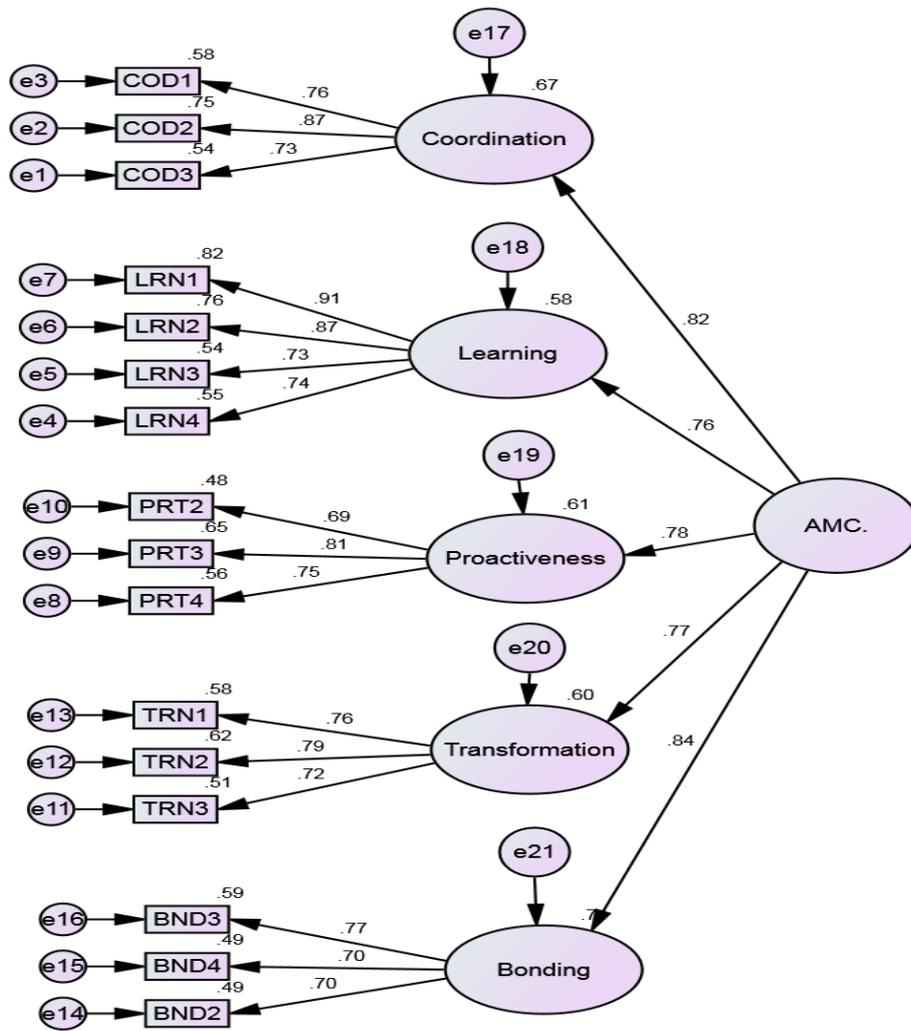


Figure 7-9: Second-order measurement model for AMC

Given that AMC is the focal construct, it was vital to undertake the additional model assessment to ensure that the model fits the data. Subsequently, the above mentioned second-order model is compared to other theoretical plausible models. For example, one could argue that AMC comprises of four dimensions (inter-organisational coordination, inter-organisational learning, alliance proactiveness and alliance transformation) (Leischnig et al., 2014). Furthermore, Kauppila's (2015) three dimension model (alliance coordination, alliance proactiveness and alliance learning) could also be a plausible alternative to the hypothesised five-factor model. The oblique factor model (first-order model) was also tested to confirm the AMC as a second-order construct. Table 7-8 provides the fit measures of the three alternative models along with the fit measures of the current study's model.

Table 7-8: Results of comparative AMC measurement model assessment

Fit Measures	Proposed model	Alternative model 1	Alternative model 2	Alternative model 3
$\chi^2$	158.120	100.049	68.158	152.510
<i>df</i>	99	61	32	94
$\chi^2/df$	1.597	1.640	2.130	1.62
PCFI	.80	.77	.69	.76
PNFI	.77	.74	.68	.73
AGFI	.91	.92	.92	.91
AIC	232.120	160.049	114.158	236.510

**Note:**

Proposed model= current study’s second-order model with five first-order factors; Alternative model 1= second-order model with four first-order factors; Alternative model 2= second-order model with three first-order factors; Alternative model 3= first-order factor model

Considering the guidelines of Hair et al. (2010) based on sample size and model complexity, the current study’s model best fits the data. Particularly,  $\chi^2/df$ , PNFI, and PCFI are designed to provide information about which model among a set of competing model is best (Bentler, 2011). The results suggest that the current study’s model has the smallest  $\chi^2/df$  value (1.597), largest PNFI value (.77) and PCFI value (.80). To conclude, the results suggested that it is appropriate to view AMC as a multi-dimensional second-order factor (Gerbing & Anderson, 1988).

**CFA 2: Measurement model as a whole**

Following the second-order AMC measurement model, a separate first-order measurement model was estimated.

**Model Specification:** The constructs of the model were considered reflective and allowed to load onto one pre-identified factor (Coltman et al., 2008). The measurement model consisted of 9 independent constructs with 30 items. There were 97 parameters to be estimated, thereby leaving the *df* of 368 (465-97 = 368). Overall, these results suggested that the measurement model is over-identified and can be used to provide the estimation results (Hair et al., 2010).

**Overall model fit:** The goodness-of-fit statistics for the measurement model were:  $\chi^2(df=368)$  = 548.585 (n=278) P-value < .01,  $\chi^2/df$  = 1.491, CFI = .96, RMSEA = .04. Other fit statistics include TLI = .95, IFI = .96, PCFI = .81, SRMR = .04 and GFI = .89. The fit indices were well-above the threshold value, which suggested the excellent model fit. The  $\chi^2$  value is insignificant, which suggests the rejection of the null hypothesis (the model fits the data well). However, Hair et al. (2010) suggest that when the sample size is more than 250 and the observed variables are between 12 and 30, a significant  $\chi^2$  can be expected and suggest a good model fit. Therefore,

it was concluded that the fit of the measurement model is deemed to be good, given the excellent goodness-of-fit indices.

**Factor loadings:** The factor loadings show the strength of the relationship between the items and the latent construct. It is commonly accepted that factor loadings should be (1) significant and (2) at least .50 or ideally .7 or higher (Tabachnick & Fidell, 2007), solely representing the convergent validity. The standardised factor loadings and critical ratios are provided in Table 7-9.

Table 7-9: Summary for the factor loadings for all the constructs

Construct	Items	Factor loadings $\lambda$	Standard error	Critical ratio
Inter-organisational coordination	COD1	0.77	0.10	12.04
	COD2	0.87	0.09	13.26
	COD3	0.73	0.06	13.26
Inter-organisational learning	LRN1	0.91	0.09	15.12
	LRN2	0.87	0.09	14.52
	LRN3	0.74	0.09	12.17
	LRN4	0.74	0.08	12.17
Alliance proactiveness	PRT2	0.70	0.10	10.64
	PRT3	0.80	0.10	11.79
	PRT4	0.75	0.07	11.79
Alliance transformation	TRN1	0.77	0.11	11.07
	TRN2	0.79	0.10	11.22
	TRN3	0.71	0.08	11.22
Alliance bonding	BND3	0.69	0.08	10.94
	BND4	0.75	0.08	12.04
	BND5	0.78	0.09	12.04
Radical co-innovation	RI1	0.75	0.11	9.61
	RI2	0.78	0.11	10.16
	RI3	0.71	0.09	10.16
Incremental co-innovation	II1	0.67	0.10	9.20
	II2	0.73	0.10	9.69
	II3	0.73	0.11	9.69
Internationalisation success	ISU1	0.70	0.10	10.71
	ISU2	0.77	0.10	11.59
	ISU3	0.80	0.10	12.07
	ISU4	0.72	0.07	12.07
Foreign market knowledge	FBK3	0.80	0.08	12.86
	FBK4	0.65	0.07	10.46
	FBK1	0.72	0.07	11.65
	FBK2	0.77	0.12	10.46

All the standardised factor loadings are greater than the minimum level of .50 and adequate level of .70 with the deception of  $II1 = .67$  and  $FBK2 = .65$ . Given that the values are close to the ideal threshold and considerably higher than the minimum level, it was decided to keep these items in the measurement model. The critical ration (factor loadings divided by its standard error) is greater than 1.96, which suggests that all the loadings are statistically significant at the 0.001 significance level.

**Standardised residual:** It refers to "individual difference between observed covariance terms and the estimated covariance terms" (Hair et al., 2010, p. 692). It is used as a diagnostic measure of model fit, where the smaller residual value suggests a better fit to the measurement model data. The residuals can be either positive or negative depending on whether the estimated covariance is under or over the corresponding observed covariance (Hair et al., 2010). The standardised residual less than 2.5 do not suggest a problem; but a lot of residuals with value greater than 4.0 raise the concern for attention (Tabachnick & Fidell, 2007). The results suggested that all the standardised residuals had an absolute value of less than 2.50 with the largest value as .129. Thus, it can be concluded that there was no need to delete any items from the measurement model.

### **7.3.3.3 Assessment of construct's validity**

This section examines the construct' validity. Validity allows the research to establish the accuracy of research and to discuss the results based on validated summated scales. Specifically, construct validity refers to the extent to which a number of items in fact indicates the latent construct those items are intended to measure (Tabachnick & Fidell, 2007). It is made up of four components: convergent validity, discriminant validity, nomological validity and face validity. The following section provides the results of construct validity. In addition, the issue of common method bias is discussed.

#### *a. Convergent validity*

The items that are indicators of the same construct should correlate positively with each other, known as convergent validity (Bryan, 2004). In EFA, the convergent validity can be determined if items significantly load on the related latent construct (Doney & Cannon, 1997). On the other hand, in CFA, convergent validity can be estimated based on a number of indicators: (1) factor loadings, (2) average variance extracted and, (3) composite reliability. First, the size of factor loadings is an important indicator of convergent validity. In case of the high convergent validity, the high factor loadings (greater than 0.5 or ideally greater than 0.7) suggest that they converge on a common latent construct (Tabachnick & Fidell, 2007). Second, the AVE indicates the overall amount of variance in items that is estimated by the latent constructs. The AVE of 0.5 or higher

is an indicator of convergent validity (Farrell, 2010). Following the lead of Fornell and Larcker (1981), it can be calculated using the following formula:

$$AVE = \frac{\text{The total of all squared standardised factor loadings}}{\text{The number of items}}$$

The composite reliability is related to the testing of the reliability of a construct or a latent variable (Hair et al., 2010). It is defined as the proportion of item variance attributable to the true score of latent construct (DeVellis, 1991). As a rule of thumb, composite reliability estimate should be 0.70 or higher to suggest a model's convergent validity. It can be computed using the following formula (Fornell & Larcker, 1981):

$$\text{Composite reliability} = \frac{\text{Squared sum of factor loadings for construct items}}{(\text{Squared sum of factor loadings for construct items}) + (\text{Sum of the estimation error variance for a construct})}$$

Considering the above discussion, the convergent validity was tested in this study. Firstly, as presented in EFA results, the items were significantly loaded on the expected latent construct without any cross loading. Accordingly, it supported the convergent validity of the constructs. Second, as presented in Figure 7-9, all the factor loadings were significant and well above the threshold value of .50, thus supporting the convergent validity of the constructs. Third, the AVE of the all the latent constructs was considerably higher than the minimum accepted level of 0.50. Finally, the estimates of composite reliability supported the convergent validity because the value met the minimum level of 0.70. Table 7-10 provides the composite reliability and AVE for all the constructs.

Table 7-10: Composite reliability and AVE of the constructs

<b>Constructs</b>	<b>Composite reliability</b>	<b>AVE</b>
Inter-organisational coordination	0.832	0.624
Inter-organisational learning	0.888	0.666
Alliance proactiveness	0.792	0.561
Alliance transformation	0.799	0.571
Alliance bonding	0.783	0.547
Radical co-innovation	0.792	0.560
Incremental co-innovation	0.752	0.502
Foreign market knowledge	0.826	0.544
Internationalisation success	0.835	0.559

### b. Discriminant validity

Discriminant validity refers to the extent to which a construct is different from other constructs (Hair et al., 2010). Consequently, a high discriminant validity suggests that a construct is unique and capture the phenomena that other constructs do not. The discriminant validity can be measured using two ways: (1) comparing the square root of the AVE for any two constructs with the correlation between these two constructs (Fornell & Larcker, 1981), and (2) comparing the AVE, maximum shared variance (MSV) and average shared variance (ASV) (Hair et al., 2010).

Following the first procedure, the AVE for any given two constructs was greater than squared correlation between all pairs of constructs (see Table 7-11), which is consistent with the suggested guidelines (Fornell & Larcker, 1981).

Table 7-11: Construct correlations, squared correlation matrix and AVE

Construct	1	2	3	4	5	6	7	8	9
1. Inter-organisational coordination	<b>0.62</b>	0.66	0.63	0.65	0.70	0.61	0.56	0.45	0.49
2. Inter-organisational learning	0.43	<b>0.67</b>	0.59	0.55	0.61	0.51	0.41	0.40	0.51
3. Alliance proactiveness	0.40	0.35	<b>0.56</b>	0.61	0.68	0.62	0.52	0.39	0.52
4. Alliance transformation	0.42	0.31	0.37	<b>0.57</b>	0.73	0.53	0.44	0.51	0.54
5. Alliance bonding	0.49	0.38	0.47	0.53	<b>0.55</b>	0.60	0.55	0.57	0.62
6. Radical co-innovation	0.38	0.26	0.38	0.28	0.36	<b>0.56</b>	0.58	0.57	0.53
7. Incremental co-innovation	0.32	0.17	0.27	0.19	0.30	0.34	<b>0.50</b>	0.43	0.49
8. Foreign market knowledge	0.20	0.16	0.15	0.26	0.33	0.33	0.18	<b>0.54</b>	0.72
9. Internationalisation success	0.24	0.26	0.27	0.29	0.39	0.28	0.24	0.52	<b>0.56</b>

**Notes:**

- 1: Bold numbers on the diagonal show the AVE
- 2: Upper diagonal represent correlation
- 3: All correlations are significant at .01 p-value
- 4: Lower diagonal represent squared correlation

Second, the independence of the dimension was determined by comparing the estimates of AVE, MSV and ASV. The results suggested that  $AVE > MSV > ASV$ , thus supporting the discriminant validity (Chin, 1998). Table 7-12 presents the results of AVE, MSV and ASV.

Table 7-12: Estimates of AVE, MSV and ASV

<b>Construct</b>	<b>AVE</b>	<b>MSV</b>	<b>ASV</b>
Inter-organisational coordination	0.559	0.517	0.359
Inter-organisational learning	0.624	0.491	0.289
Alliance proactiveness	0.666	0.434	0.332
Alliance transformation	0.561	0.468	0.330
Alliance bonding	0.571	0.526	0.404
Radical co-innovation	0.547	0.526	0.326
Incremental co-innovation	0.560	0.382	0.251
Foreign market knowledge	0.502	0.341	0.266
Internationalisation success	0.544	0.517	0.310

### *c. Nomological validity*

Nomological validity examines whether a correlation among constructs in a measurement theory make sense (Hair et al., 2010). It can be tested by testing the relationship of a specific construct with other constructs in the model (Steenkamp & Van Trijp, 1991). For the current study, nomological validity is supported as constructs are significantly related to each other (see Table 7-11). For instance, based on learning perspective, the coordination of activities among alliance partners is a key task to continuously learn in an interactive manner (Dodgson, 1993). In accordance with this viewpoint, the results suggested a significant relationship (.659) between inter-organisational coordination and inter-organisational learning. These findings provided the empirical support for nomological validity.

### *d. Face validity*

Face validity refers to the extent to which the contents of an item are coherent with the definition of corresponding construct (Hair et al., 2010). It is important to establish the face validity as early as formulation of the construct definition. For the current study, face validity was assessed by piloting the questionnaire with experts in the field and a number of executive MBA students; all from the Huddersfield Business School. In addition, structured interviews were conducted with the senior managers of SMEs. The feedback resulted in minor modification in terms of the wording of items.

### *e. Common method bias*

The results of a study can be vulnerable to the inflation of correlations by common method bias. During the design of the study, several procedural and statistical remedies were considered to minimise the potential common method bias (see Table 7-13).

Table 7-13: Remedies to address the issue of common method bias

Remedies	Implication for this study
<b>Procedural remedies</b>	
Protecting respondent anonymity	<ul style="list-style-type: none"> <li>• Respondents' responses are kept anonymous</li> </ul>
Reducing social anxiety	<ul style="list-style-type: none"> <li>• Respondents are ensured that there is no right or wrong answer and they should answer as honestly as possible</li> </ul>
Improving scale items	<ul style="list-style-type: none"> <li>• Questions are kept simple, specific and concise</li> <li>• Complicated syntax is avoided</li> <li>• Labels are provided for all the of scale</li> <li>• Different scale endpoints for the dependent and independent variables</li> <li>• Counterbalancing question order</li> </ul>
Knowledgeability	<ul style="list-style-type: none"> <li>• Four knowledgeability questions are included to ensure that only respondents who are capable to answer should reply</li> </ul>
Attention checks	<ul style="list-style-type: none"> <li>• A number of attention checks are added to ensure that respondents are paying attention to questions.</li> </ul>
Method variance marker variable	<ul style="list-style-type: none"> <li>• Two items are included in the questionnaire that are not theoretically linked with dependent variable</li> </ul>
<b>Statistical Remedies</b>	
Harman's single factor test (exploratory factor analysis and confirmatory factor analysis)	
CFA marker variable	

**Procedural remedies:** A number of procedural techniques are used to control the potential bias as introduced in the earlier literature. First, it was ensured that participants' identity remains anonymous. It was achieved by stating that "*all provided information will be held securely and confidentially, used only for academic research purpose, and will never be shared with any third-party*". Second, the reduction of social anxiety was sought by informing participants that there is no right or wrong answer in order to reduce evaluation anxiety (Podsakoff, MacKenzie, & Podsakoff, 2012). Third, according to Podsakoff et al. (2003), ambiguous items can cause respondents to be uncertain about items' contents, which increase the likelihood of systematic response tendencies (extreme or midpoint responses). Therefore, it was tried to avoid the ambiguity by providing the definition of key constructs (i.e., SMEs, alliance/collaboration, AMC, radical innovation, incremental innovation, internationalisation) (Johnson, 2004). In addition, the questionnaire was pretested with the executives and MBA students, which helped to identify and revise ambiguous terms (Podsakoff et al., 2012). Labels were provided for all the scale points rather than just the end point in order to reduce the ambiguity for the respondents

(Podsakoff et al., 2012). The scale properties of dependent and independent were minimised. For instance, the independent variable was measured on the basis of strongly agree/strongly disagree whereas dependent variable was measured on the scale of far below average/far above average (Weijters, Geuens, & Schillewaert, 2009). Moreover, the categorical questions were mentioned between the sections of Likert scale questions. The order of dependent and independent variables was counterbalanced. Finally, the knowledgeability questions were introduced in the questionnaire to verify the knowledge of each respondent (Zaefarian et al., 2017).

**Statistical remedies:** It is not necessary that procedural remedies meet all the requirements of a study and totally eliminates the common method bias. Therefore, it is important to use the statistical remedies (Podsakoff et al., 2003). Therefore, statistical assessment of common method bias was performed using three techniques: 1) Harman's single factor test using to exploratory factor analysis (EFA), 2) Harman's single factor test using to confirmatory factor analysis (CFA) and, 3) marker variable technique.

First, Harman's single factor test is a common statistical technique (Harman, 1967). Harman's single factor test using EFA checks whether one factor emerges from the un-rotated factor solution and also whether the first factor accounts for the majority of variance (Podsakoff & Organ, 1986). If common method bias is an issue, the results would show a single latent factor that would account for (Chang, Van Witteloostuijn, & Eden, 2010; Garrido-Moreno, Lockett, & García-Morales, 2014). Following this procedure, all the items of the study (consisting of items measuring inter-organisational coordination= 3, inter-organisational learning= 4, alliance proactiveness= 4, alliance transformation= 3, alliance bonding= 5, radical co-innovation= 3, incremental co-innovation= 3, internationalisation success= 4 and foreign market knowledge= 4) were subjected to factor analysis using SPSS 22.0. Based on the principal component extraction method, more than one factor emerged as a solution, which accounted for 69.475% of the variance. The first factor explained 36.357% of the variance. This method was replicated with only those items that are used in the final CFA model. Again the results suggested more than one factor and the first extracted factor accounts for 36.441% variance. Such common bias is evident in previous management studies (i.e., 38%) (Paulraj, 2009) or strategy (i.e., 33%) (Rutherford, Buchholtz, & Brown, 2007). Thus, it can be concluded that the common method bias is not an issue in this study, considering the relatively large number of items.

Second, this study assessed common method bias by Harman's single factor test CFA approach. Using this technique, a single factor measurement model was proposed with one latent construct connected with all the items (n= 30). Later, the theorised multi-factor measurement model was compared with a single factor model using the goodness-of-fit indices. The single factor

measurement model produced a significantly inadequate fit  $\chi^2 (df= 405) = 1749.198$  ( $n= 278$ );  $\chi^2/df= 4.319$ ; CFI= .67; TLI= .645; GFI= .659; PCFI= .623 and RMSEA .109. Comparing these results against  $\chi^2(df= 368) = 548.585$ ; CFI= .96; RMSEA= .04 for the theorised measurement model yields a  $\Delta\chi^2$  of 1200.613 with  $df= 37$ ,  $p < .001$ . Thus, it was concluded that one latent construct does not account for all the items (Podsakoff et al., 2012), therefore supporting the assumption that the common method bias is not an issue.

Finally, in addition to Harman's single factor test, a further test was conducted. According to this approach, unmeasured latent method construct with marker variable was introduced in the theorised measurement model (Podsakoff et al., 2012). Unmeasured latent method construct is assumed to be common method variance (Richardson, Simmering, & Sturman, 2009). On the other hand, a marker variable<sup>3</sup> refers to a variable that is not theoretically related to any other variable in the study (Williams, Hartman, & Cavazotte, 2010). This study correlated the marker variable with all the other multi-dimensional constructs of study. Later, an unmeasured latent construct was introduced with all of the measurement items (including marker variable) as its indicators. This is consistent with the approach of Podsakoff et al. (2003), L. J. Williams et al. (2010) and MacKenzie and Podsakoff (2012). Since the average path coefficient between the principal construct and unmeasured latent construct turned to be 0.19, and thus falls under the common threshold of 0.30 (Futterer, Schmidt, & Heidenreich, 2017), it can be concluded that the common method bias is not an issue in this study.

The purpose of section 2 was to establish the validation of measurement development. Specifically, this section established the internal consistency, unidimensionality, items' reliability and construct validity using EFA and CFA techniques. Overall, the results suggested a good fit to the measurement model. Following this, the next section formally tests the conceptual model.

#### **7.4 Section 3 - Hypothesis testing and study's results**

Having confirmed the reliability and validity of measurement model, the next stage is to test the conceptual model. This study adopts the structural equation modelling (or SEM) approach to analyse the relationship among study's variables. The choice is rationalised based on the following arguments. The traditional modelling techniques (i.e., ANOVA, Poisson regression and logistic regression) offer useful insights about the direct relationship. However, the prevalence of complex relationship between real life issues necessitates the simultaneous analysis of the web

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<sup>3</sup> In this study, perceived career success of the respondents was considered as a theoretically unrelated marker variable. It was measured using two statements: 1) I am satisfied with the success I have achieved in my career, and 2) I am satisfied with the progress I have made toward meeting my goals for income.

of relationships (Tabachnick & Fidell, 2007). Consequently, it has been suggested to use SEM technique to assess and modify the theoretical models (Anderson & Gerbing, 1988).

This section is comprised of four stages, namely, testing the assumptions underpinning the SEM technique, assessing the structural fit, testing the hypothesised structural relationship and post-hoc analysis, as shown in Figure 7-10.

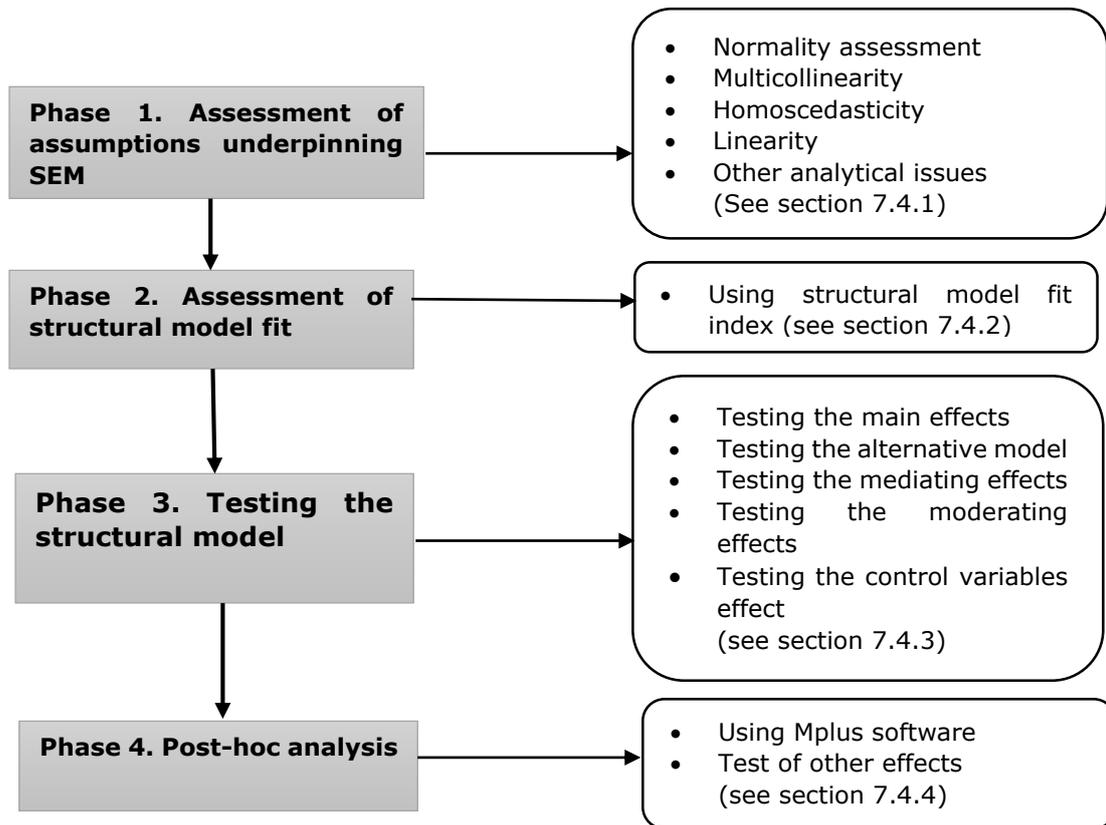


Figure 7-10: Procedures to be followed for hypothesis testing and study's results

### 7.4.1 Phase 1 - Assumptions underpinning the SEM technique

Phase 1 concerns the testing of assumptions underpinning the SEM technique. The literature suggests the five major assumptions underlying the SEM techniques, which needs to be satisfied in order to draw the valid conclusion from structural equation analysis (Hair et al., 2010). These assumptions include normality, multicollinearity, homoscedasticity and linearity (see Table 7-14 for details). The violation of any of these assumptions can undermine the validity of conclusions that can be drawn from the study's results (Tabachnick & Fidell, 2007). The following section addresses these assumptions.

Table 7-14: Overview of statistical assumptions in multivariate analysis

Assumptions	Description	Test	Rule of Thumb
Normality	It refers to "shape of the data distribution for an individual metric variable and its correspondence to the normal distribution, the benchmark for statistical methods" (Hair et al., 2010, p. 71).	Skewness and Kurtosis	z-value of skewness and kurtosis $\pm 1.96$ or $\pm 2.58$
Homoscedasticity	Homoscedasticity is defined as the assumption that dependent variable shows equal level of variance across the range of independent variables.	Levene test	>0.05
Multicollinearity	Multicollinearity refers to the extent to which one variable can be explained by other variables in analysis.	Correlation	
		VIF	<10; ideally <3
Linearity	Linearity refers to the patterns of association between each pair of variables and the ability of correlation coefficients to represent the relationship.	Graph	NA
		ANOVA for Deviation from Linearity	>0.05

**Note:**

1: NA refers to not applicable

**7.4.1.1 Normality assessment**

This study used graphical as well as statistical methods to test the normality using SPSS. First, the graphical analysis is a visual check of the histogram and Q-Q plot. The visual inspection of histogram and Q-Q plot suggests that actual data closely follow the diagonal, which is indicative of normal distribution (see Appendix 6). Second, the statistical tests of normality are based on skewness and kurtosis values. Skewness is used to describe the balance of the distribution; that is balanced or shifted to one side. In contrast, kurtosis refers to the peakedness of the distribution in comparison with the normal distribution. The skewness and kurtosis values usually have values of zero, which is relatively uncommon in social sciences. As a rule of thumb, the statistical value for skewness and kurtosis should not exceed the critical value of  $\pm 2.58$  (0.01 significance level) and  $\pm 1.96$  (0.05 error level). The results show that, in most cases, values range from 0.048 to 2.52 with an extreme value of 4.52, as in Appendix 7. Overall, the diagnosis suggests that data is moderately normal (Pallant, 2007).

### 7.4.1.2 Multicollinearity

The issue of multicollinearity can be detected using two methods: (1) by inspecting the correlation matrix and (2) by calculating the variance inflation factor (VIF) and tolerance impact (Grewal, Cote, & Baumgartner, 2004). First, the correlation matrix was computed using Pearson’s correlation coefficient (as in Table 7-15). The results confirm that multicollinearity is not a problem as the highest Pearson correlation coefficient value is 0.619.

Table 7-15: Pearson correlation coefficients

<b>Correlations</b>							
	1	2	3	4	5	6	7
Inter-organisational coordination	1						
Inter-organisational learning	.59**	1					
Alliance proactiveness	.60**	.56**	1				
Alliance transformation	.53**	.47**	.55**	1			
Alliance bonding	.62**	.57**	.63**	.61**	1		
Radical co-innovation	.52**	.47**	.54**	.43**	.54**	1	
Incremental co-innovation	.45**	.35**	.43**	.33**	.46**	.46**	1

**Note:**

1: \*\*. Correlation is significant at the 0.01 level (2-tailed).

To obtain VIF value, seven multiple regressions were performed. In each of them a formative indicator was regressed on the remaining six in order to obtain the variance inflation factors (VIF). The value of VIF ranges from 2.151 to 1.611, which is well below the threshold of 10 (Pallant, 2007) and within more rigid cut-off point of 3 (Petter, Straub, & Rai, 2007). The minimum tolerance impact value was 0.44 which was well above the threshold of 0.1 (see Appendix 8). The results suggested that multicollinearity can be ruled out.

### 7.4.1.3 Homoscedasticity

It is desirable to test homoscedasticity, which describes a situation where the standard deviation is same across all the values of the independent variables (Hair et al., 2010). Homoscedasticity can be tested using (1) graphical test of equal variance dispersion and (2) statistical test for homoscedasticity. The researcher applied both the graphical test and statistical test. The

graphical test shows the consistent pattern among two variables (see Figure 7-11). The statistical test is Levene's test that assesses the equality of variance for a variable across any number of groups. As the data was collected from two groups: firms entered into foreign markets through equity mode and firms entered in foreign market using non-equity mode. The Leven test helped to assess the dispersion of variance in the key variables across these two groups. As shown in Table 7-16, the insignificance of the Levene's test suggests an equal level of variance across dependent and independent constructs.

Table 7-16: Test of homogeneity of variances

		<b>Levene Statistic</b>	<b>df1</b>	<b>df2</b>	<b>Sig.</b>
Radical innovation	CO-	.050	1	276	.823
Incremental innovation	CO-	.005	1	276	.944
Inter-organisational coordination		1.910	1	276	.168
Alliance bonding		.241	1	276	.624
Inter-organisational learning		3.121	1	276	.078
Alliance transformation		.117	1	276	.733

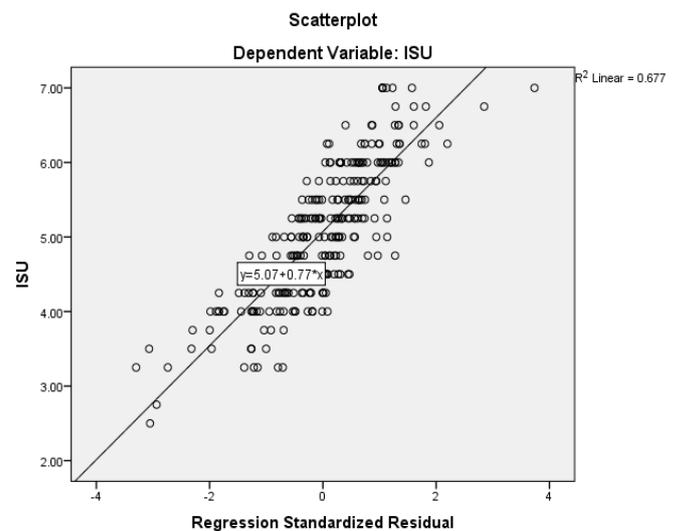


Figure 7-11: Scatter plot to test homoscedasticity

#### 7.4.1.4 Linearity

The next issue concerns with the linearity of the relationship between dependent and independent variables. There are two methods to assess the linearity: (1) graphical method and (2) statistical method. Following graphical method, the scatter plots suggest the linear relationship between variables (see Figure 7-12).

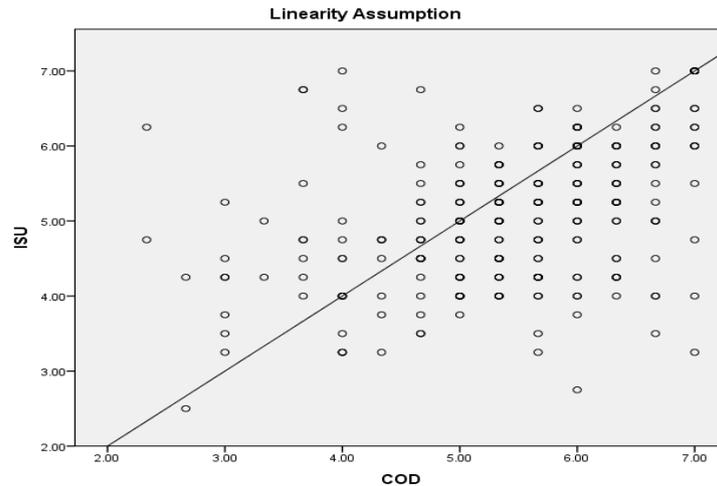


Figure 7-12: Scatter plot to test Linearity assumption

#### 7.4.1.5 Other analytical issues

The literature also suggests some analytical issues that have implications for the SEM. These issues relate to (1) the assumption of independence and (2) issue of statistical power. First, the assumption of independence implies that observation between groups should be independent (Abadi, Gimenez, Arlettaz, & Schaub, 2010). It requires that different sets have no individual in common. This assumption has been established in the current study as the sample was drawn randomly. In addition, an effort was made to ensure that all participants answer only one questionnaires without any communication among respondents. This was further validated by the IP addresses of the respondents. Second, the issue of statistical power determines the confidence in the study results. Statistical power refers to the probability of rejecting the null hypothesis when the alternative hypothesis is true (Ellis, 2010). As the power increases, there are decreasing the chance of error and high probability of making a correct decision (Ellis, 2010). Statistical power is associated with the size of the sample. A sample size of 200 can be deemed appropriate (Finney & DiStefano, 2006). With respect to model complexity, this study involves nine constructs with 29 items. Relying on Bentler and Chou's (1987) suggested ratio between 5:1 and 10:1, it was suitable to rely on the sample size of 278 in this study.

Overall, the results of assumptions underpinning SEM suggest that the data is suitable for the covariance-based SEM (Bouncken & Fredrich, 2016), which provides several advantages over variance-based SEM (Muthén & Muthén, 2012), such as, goodness-of-fit indices, dependencies in error terms and multicollinearity between independent variables. Accordingly, it was decided

to use SEM for hypothesis testing using ML estimation method, which was carried out in AMOS 22.

### 7.4.2 Phase 2 – Assessment of structural model fit

Prior to testing the hypotheses and in line with previous strategic management studies, it was important to validate the structural model (Hair et al., 2010). Structural model is a conceptual representation of structural relationships between constructs through path estimates (Schreiber, Nora, Stage, Barlow, & King, 2006). Accordingly, structural model was defined in AMOS as exhibited in Figure 7-13. The goodness-of-fit statistics for the structural model were:  $\chi^2 (df = 314) = 503.242$  ( $n=278$ )  $P\text{-value} < .01$ ,  $\chi^2/df = 1.603$ ,  $CFI = .95$ ,  $RMSEA = .05$ . Other fit statistics include  $TLI = .94$ ,  $IFI = .95$ ,  $PCFI = .85$ ,  $SRMR = .05$  and  $GFI = .89$ . The fit indices were well-above the threshold value, which suggested the good model fit (Dangelico et al., 2017; Um, Lyons, Lam, Cheng, & Dominguez-Pery, 2017). As a rule of thumb with a high degree of freedom, the best-fitting model should have  $\chi^2/df$  of 2 to 5 (Kelloway, 1998). In this study, the  $\chi^2/df$  equals 1.577, which is below the suggested limit of 5 and more concise limit of 2. Overall, the fit indices suggested that the structural model provides a good representation of the relationship among variables in the hypothesised model.

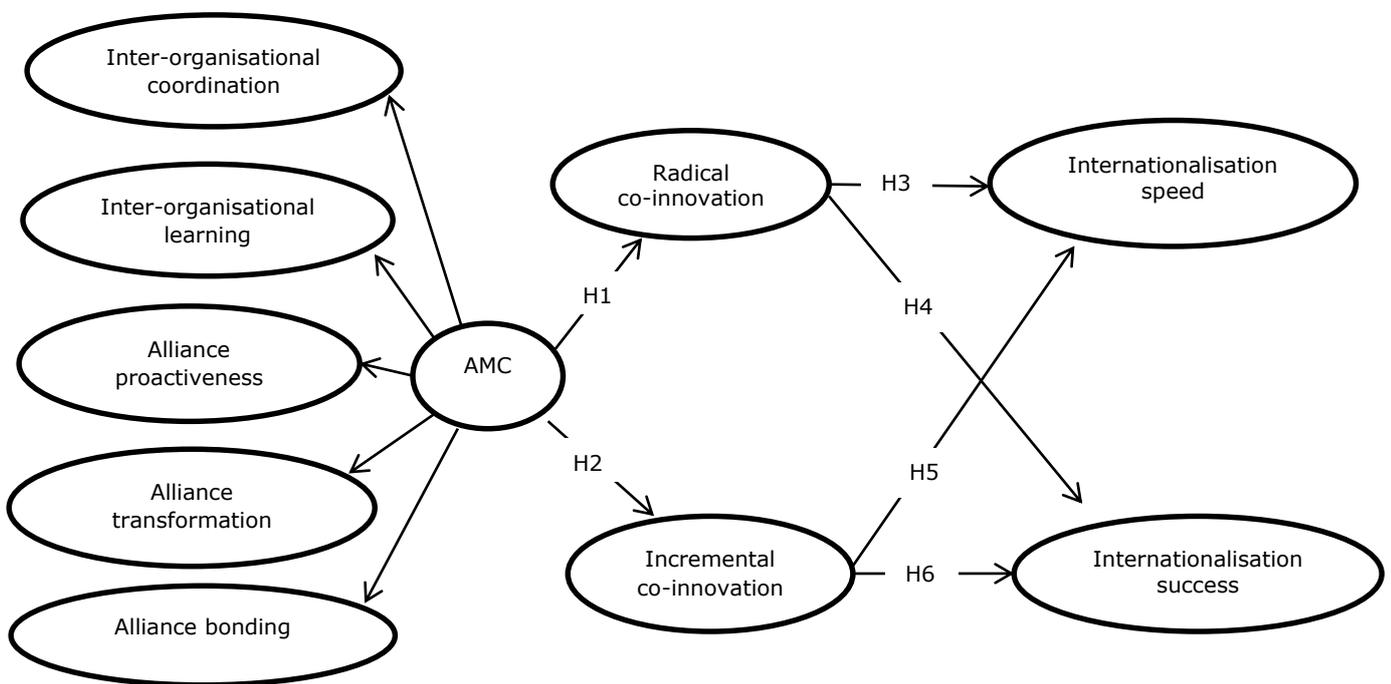


Figure 7-13: Structural model of the study

### 7.4.3 Phase 3 – Testing the structural model

As presented in Figure 7-13, the conceptual model of the study incorporates AMC, radical co-innovation, incremental co-innovation, internationalisation success and internationalisation speed. The unique hypotheses were developed in Chapter 5 for each of the relationships between five variables. Following Milanov and Shepherd (2013), four levels of significance are employed to test hypotheses:  $\leq 0.10$ ,  $\leq 0.05$ ,  $\leq 0.01$  and  $\leq 0.001$ . The lower the significance level, the more the data deviates from the null hypothesis (estimates equal zero). Thus,  $\leq 0.05$  is considered marginal significance level, while  $\leq 0.001$  is considered a high significance level. Earlier literature widely employed these significance levels to test the hypotheses (van de Vrande et al., 2009; Zeng et al., 2010). The hypotheses are tested in the following section.

#### 7.4.3.1 Testing the main effects of hypothesised relationships

To test the hypotheses, the approach of Schilke and Goerzen (2010) is followed and a reflective higher-order analysis is performed by way of structural equation modeling using AMOS 22, wherein five AMC constructs were set as first-order indicators of a second-order construct named as 'AMC'. The higher-construct was linked to radical co-innovation and incremental co-innovation. In addition, the radical co-innovation and incremental co-innovation were linked to internationalisation speed and internationalisation success. Five of the six hypotheses were significant in the main effects structural model. A summary of the path estimates along with T-value and significance level is presented in the Table 7-17.

Table 7-17: Standardised path coefficients, T-values and significance of the main effects

Code	Constructs	Standardised estimates	T-value	Standard error	Sig.	Outcome
H1	AMC -----> Radical co-innovation	.770***	7.804	.127	Yes	Supported
H2	AMC -----> Incremental co-innovation	.658***	7.134	.125	Yes	Supported
H3	Radical co-innovation -----> Internationalisation speed	.149 <sup>†</sup>	1.765	2.233	Yes	Supported
H4	Radical co-innovation -----> Internationalisation success	.449***	5.051	.092	Yes	Supported
H5	Incremental co-innovation --- --> Internationalisation speed	.010 <sup>ns</sup>	.139	2.155	No	Unsupported
H6	Incremental co-innovation --- --> Internationalisation success	.284***	3.341	.082	Yes	Supported

**Note:**

Sig. – Statistical significance; Sig. level - \*\*\* significant at  $\leq 0.001$  level; \*\* significant at the  $\leq 0.01$  level; \* significant at the  $\leq 0.05$  level, <sup>†</sup> significance at  $\leq 0.10$  level (two-tailed), ns – not significant

Hypothesis 1 predicted a positive relationship between AMC and radical co-innovation. The structural path estimates between AMC and radical co-innovation were positive ( $\beta = .770$ ) and statistically significant at a  $p$ -value  $< 0.001$ . Further, the results provided support for Hypothesis 2 suggesting that AMC positively influence incremental co-innovation with  $\beta = .658$  and  $p$ -value  $< 0.001$ . With respect to Hypothesis 3, the results suggested a statistically significant ( $\beta = .149$ ,  $p$ -value  $< 0.10$ ) relationship between radical co-innovation and internationalisation speed. Hypothesis 4 was supported with  $\beta = .449$  at  $p < 0.001$ , suggesting a positive relationship between radical co-innovation and internationalisation success. In terms of hypothesis 5, no significant result was found between incremental co-innovation and internationalisation speed ( $\beta = .010$ ,  $p$ -value  $> 0.10$ ). Hypothesis 6 suggested a positive relationship between incremental co-innovation and internationalisation success ( $\beta = .284$ ,  $p < 0.001$ ). Figure 7-14 presents the hypotheses-testing results for SMEs' internationalisation performance. Significant paths are depicted with solid lines and insignificant paths are shown with dotted lines.

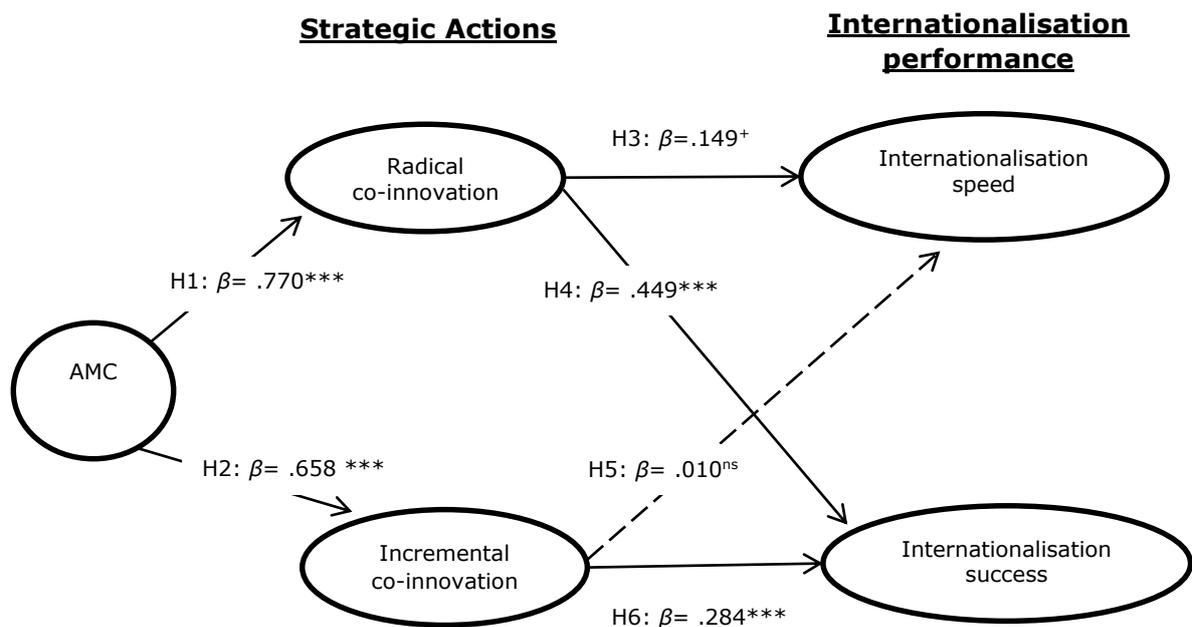


Figure 7-14: Structural model for SMEs' internationalisation performance

**Note:**

Sig. level - \*\*\* significant at  $\leq 0.001$  level; \*\* significant at the  $\leq 0.01$  level; \* significant at the  $\leq 0.05$  level, † significance at  $\leq 0.10$  level (two-tailed), ns – not significant

### 7.4.3.2 Testing the alternative model 1

To validate the results of the main effects structural model, an alternative model was tested wherein the linkage was drawn from each dimension of AMC towards radical co-innovation and incremental co-innovation (see Figure 7-15). Moreover, the radical co-innovation and incremental co-innovation were linked to internationalisation speed and internationalisation success respectively. The primary objective of alternative model was to empirically discover the consequences of concurrently analysing multiple alliance management routines versus single routine.

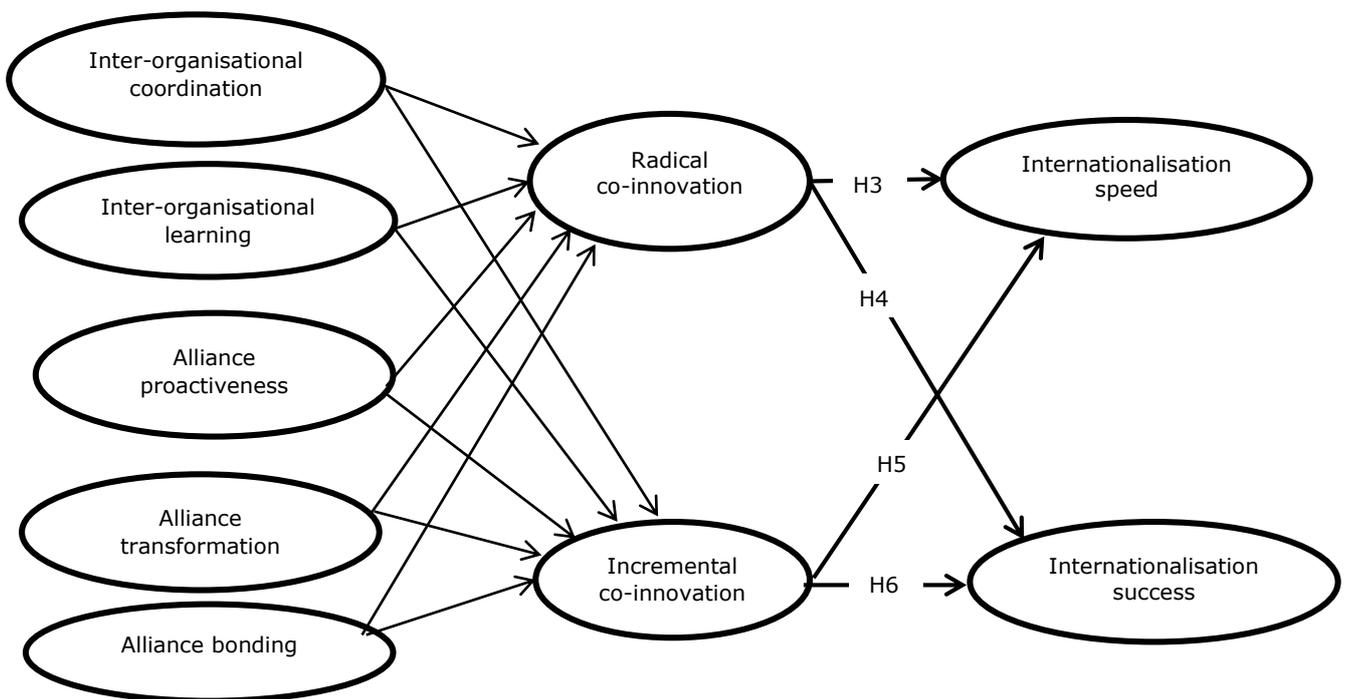


Figure 7-15: Alternative structural model

The goodness-of-fit indices for the alternative model were:  $\chi^2(df=311) = 1017.577$  ( $n=278$ )  $P$ -value < .01,  $\chi^2/df = 3.272$ , CFI = .79, RMSEA = .09. Other fit statistics include TLI = .73, IFI = .80, PCFI = .71, SRMR = .25 and GFI = .75. Compared to baseline model, the fit indices for alternative model 1 were well-below the threshold value, which suggested the poor model fit.

Having confirmed the validity of the alternative structural model, the path estimates are estimated. The summary of path estimates along with the significance is provided in Table 7-18. There were some contradicting estimates compared to the baseline model. For instance, the beta coefficients for radical co-innovation consist of inter-organisation coordination = .316, inter-organisational learning = .157, alliance proactiveness = .297, alliance transformation = .136 and

alliance bonding= .281, with all paths being significant ( $P < 0.10$  to  $p < 0.001$ ). On the other hand, the beta coefficients for incremental co-innovation consist of inter-organisation coordination= .323, inter-organisational learning= .036, alliance proactiveness= .249, alliance transformation= .058 and alliance bonding= .267, with only three paths being significant ( $p < 0.05$ ). While the path estimates from radical co-innovation to internationalisation speed and internationalisation success were  $\beta = .119^{ns}$  and  $\beta = .403^{***}$  respectively, those of the incremental co-innovation to internationalisation speed and internationalisation success were  $\beta = .015$  and  $\beta = .279$  respectively. The results showed that some of the AMC's dimensions have insignificant effect on both, radical co-innovation and incremental co-innovation. Thus, it can be concluded that it is 'package nature' of AMC that makes it relevant for strategic actions, which ultimately leads to internationalisation performance.

Table 7-18: Standardised path coefficients, T-values and significance of the main effects

Code	Constructs	Standardised estimates	T-value	Standard error	Sig.
Un-hypothesised	Inter-organisational coordination -----> Radical co-innovation	0.316***	4.09	0.069	Yes
Un-hypothesised	Inter-organisational learning ---- -> Radical co-innovation	0.157*	2.277	0.055	Yes
Un-hypothesised	Alliance proactiveness -----> Radical co-innovation	0.297***	3.792	0.067	Yes
Un-hypothesised	Alliance transformation -----> Radical co-innovation	0.136 <sup>†</sup>	1.870	0.066	Yes
Un-hypothesised	Alliance bonding -----> Radical co-innovation	0.281***	3.593	0.057	Yes
Un-hypothesised	Inter-organisational coordination -----> Incremental co-innovation	0.323***	4.146	0.081	Yes
Un-hypothesised	Inter-organisational learning ---- -> Incremental co-innovation	0.036 <sup>ns</sup>	0.524	0.064	No
Un-hypothesised	Alliance proactiveness -----> Incremental co-innovation	0.249***	3.221	0.077	Yes
Un-hypothesised	Alliance transformation -----> Incremental co-innovation	0.058 <sup>ns</sup>	0.789	0.077	No
Un-hypothesised	Alliance bonding -----> Incremental co-innovation	0.267***	3.390	0.066	Yes
H3	Radical co-innovation -----> Internationalisation speed	0.119 <sup>ns</sup>	1.588	2.422	No
H4	Radical co-innovation -----> Internationalisation success	0.403***	4.527	0.103	Yes
H5	Incremental co-innovation -----> Internationalisation speed	0.015 <sup>ns</sup>	0.197	2.092	No
H6	Incremental co-innovation -----> Internationalisation success	0.279***	3.405	0.082	Yes

**Note:**

1: Sig. level - \*\*\* significant at  $\leq 0.001$  level; \*\* significant at the  $\leq 0.01$  level; \* significant at the  $\leq 0.05$  level, + significance at  $\leq 0.10$  level (two-tailed)

### 7.4.3.3 Testing the mediating effects

In the conceptual model, the existence of strategic action suggests a significant intervening mechanism between the AMC and internationalisation performance. This relationship indicates mediating effect when a third variable intervenes between two other variables (Baron & Kenny, 1986). In order to test the mediation effect, this study adopted Baron and Kenny's (1986) widely used methodology to examine the mediation effect. As a robustness check, the mediation analysis is supplemented with the Sobel test and bootstrapped confidence interval test to determine the type and significance of mediation effect (Ndofor et al., 2011).

#### *a. Baron and Kenny's approach*

Following Baron and Kenny's (1986) approach, four conditions are required for mediation (MacKinnon, Fairchild, & Fritz, 2007; Zhao, Lynch, & Chen, 2010): (1) the independent variable must affect the mediator; (2) the independent variable must affect the dependent variable; (3) the mediator must affect the dependent variable; and (4) the effect of the independent variable on the dependent variable is less when the mediator variable is included in the model.

As a first instance, the mediating effect of radical co-innovation between AMC and internationalisation speed, as well as internationalisation success was estimated. The results found that the four steps are fulfilled. **Step 1** is fulfilled as a positive effect and significant relationship existed between AMC and radical-co-innovation ( $\beta = .726$ ;  $p < 0.001$ ); **step 2** is verified as a significant relationship existed between AMC and internationalisation speed ( $\beta = .126$ ;  $p < 0.05$ ) and AMC and internationalisation success ( $\beta = .605$ ;  $p < 0.001$ ); **step 3** is satisfied as a significant and positive relationship existed between radical-co-innovation and internationalisation speed ( $\beta = .129$ ;  $p < 0.05$ ), and radical co-innovation and internationalisation success ( $\beta = .424$ ;  $p < 0.001$ ); and in **step 4**, the results suggested that the magnitude and significance of the coefficient for AMC are reduced for internationalisation speed ( $\beta = .126^*$  to  $\beta = .068_{ns}$ ) and internationalisation success ( $\beta = .605^*$  to  $\beta = .536^*$ ), when the mediator variable radical co-innovation is included in the model. Thus, the results supported the presence of mediation effect.

Next, the mediating effect of incremental co-innovation between AMC and internationalisation success was estimated. Again, the results suggested that the four steps are fulfilled. Step 1 is fulfilled as a positive effect and significant relationship existed between AMC and incremental-co-innovation ( $\beta = .621$ ;  $p < 0.001$ ); step 2 is verified as a significant relationship exists between AMC and internationalisation success ( $\beta = .664$ ;  $p < 0.001$ ); step 3 is satisfied as a significant and positive relationship exists between incremental-co-innovation and internationalisation success ( $\beta = .490$ ;  $p < 0.001$ ); and in step 4, the results suggests that the magnitude of the coefficient

for AMC is reduced ( $\beta = .664^*$  to  $\beta = .582^*$ ) when the mediator variable incremental co-innovation is included in the model, as in Figure 7-14. Thus, the results supported the presence of mediation effect.

While the popularity of the Baron and Kenny's procedure continues to grow, the literature has shown some flaws in Baron and Kenny's logic. First, the concept of partial and full mediation in Baron and Kenny's procedure (step 4) is disputed with the argument that the effect of mediation should be measured by the presence of indirect effect and not in the absence of direct effect (Zhao et al., 2010). Second, in step 2, it is argued that there need not be a significant effect between dependent and independent variables for mediation (Hayes, 2009). However, the strength of the relationship should be measured by the size of indirect effect (that has a  $\times b$  been significant), not by the lack/reduction of direct effect (Zhao et al., 2010). In order to accommodate this criticism against Baron and Kenny's procedure, the previous studies used the Sobel test in conjunction with bootstrapped confidence interval (Ethiraj, Ramasubbu, & Krishnan, 2012; Reiche, Kraimer, & Harzing, 2011; Rodríguez & Nieto, 2016). While the Sobel test assumes that the indirect effect of independent variable on dependent variable is normally distributed (Sobel, 1982), bootstrapped confidence interval avoids power problems introduced by asymmetric and non-normal sampling distribution of an indirect effect (MacKinnon, Lockwood, & Williams, 2004). Therefore, Sobel test and Bootstrapping confidence interval were used to estimate the mediation effect.

### *b. Sobel's test*

According to Sobel's test, "there is no significant indirect relationship if Sobel test z-value is not significant ( $<1.96$ ); the mediation relationship is partial if the Sobel test z-value is significant ( $>1.96$ ) and the effect ratio is lower than 0.8; and the mediation relationship is full if the Sobel test z-value is significant ( $>1.96$ ) and the effect ratio is over 0.8" (Ndofor et al., 2011, p. 651).

The following formula was used to calculate z score of Sobel test:

$$z\text{-value} = a*b/\text{SQRT}(b^2*s_a^2 + a^2*s_b^2)$$

Where, a= unstandardised estimate of independent variable to mediator; b= unstandardised estimates of mediator to dependent variable;  $s_a$ = standard error of a;  $s_b$ = standard error of b. The effect ratio is calculated by  $a \times b/c$ , where c is the path between independent variable and dependent variable.

As shown in Table 7-19, for the mediator *radical co-innovation*, the z score for internationalisation speed was 2.23 ( $p < 0.05$ ) and internationalisation success was 5.01 ( $p < 0.001$ ), providing support for the presence of indirect effect. In terms of effect ratios of 0.90 for

internationalisation speed indicated a full mediation relationship. The effect ratio of 0.74 for internationalisation success suggested the partial mediation effect.

As for the mediator *incremental success*, the z score for internationalisation speed was 0.71 ( $p > 0.10$ ), which is far below the standard value of 1.96. Thus, results are sufficient to conclude that incremental co-innovation has no mediating effect between AMC and internationalisation speed. With respect to internationalisation success, the z score of Sobel's test was 5.03, providing support for the presence of indirect effect. In terms of effect ratios of 0.51 for internationalisation success, indicated a partially mediated relationship.

### c. *Bootstrapped confidence interval*

With respect to bootstrapped confidence interval, the resulting bootstrapped confidence interval should not contain the value 0 in order to be a significant indirect effect (Rodríguez & Nieto, 2016). The bootstrapped confidence interval (bias-corrected= .033, .235) and (bias-corrected CI= .347, .622), for mediator *radical co-innovation*, showed significant evidence of the existence an indirect effect (see Table 7-19). The findings offered supports for indirect effect of AMC on both internationalisation speed and internationalisation success through *radical co-innovation*.

Similarly, the bootstrapped confidence interval (bias-corrected CI= .257, .654) showed evidence of mediating effect of *incremental co-innovation* for internationalisation success (see Table 7-19). However, the bootstrapped results did not suggest the indirect effect of AMC on internationalisation speed through incremental co-innovation as bootstrapped confidence interval values contained zero (bias-corrected CI= -.005, .190). Thus, the results are sufficient to draw the conclusion that AMC exerted an indirect effect only on internationalisation success via incremental co-innovation.

Table 7-19: Mediating effect using Sobel's test and bootstrapped confidence interval

Mediators	Dependent variables	Sobel test	Effect ratio	Bootstrapped confidence interval) <sup>a</sup> (95%	
		Z		Lower bound	Upper bound
Radical innovation	co-Internationalisation speed	2.23*	0.90	.033	.235
	Internationalisation success	5.01***	0.74	.347	.662
Incremental innovation	co-Internationalisation speed	0.71 <sup>ns</sup>	0.25	-.005	.190
	Internationalisation success	4.35***	0.51	.257	.654

**Note:**

1: <sup>a</sup>- Bias-corrected confidence interval. \* $p < 0.05$ , \*\*\* $p < 0.001$ , ns-not significant

### 7.4.3.4 Testing the moderating effects

Moderation is a situation when the effect of an independent variable on a dependent variable varies in terms of strength or direction due to another variable (Baron & Kenny, 1986). In the current study, two moderating variables are conceptualised, namely alliance partner diversity and foreign market knowledge. First, if the relationship between AMC and strategic action differs significantly by the level of alliance partner diversity, it can be said that the relationship between AMC and strategic action is moderated by alliance partner diversity. Second, if the relationship between strategic action and internationalisation performance differs significantly by the level of foreign market knowledge, it can be said that the relationship between strategic action and internationalisation performance is moderated by foreign market knowledge. This study used multi-group analysis with AMOS 22.

#### a. Alliance partner diversity

Following the approach of Koufteros and Marcoulides (2006) and Marsh and Hocevar (1985), this study used two partner diversity groups: low partner diversity (n= 162) and high partner diversity (n= 116). The multi-group analysis was carried in three steps to test the change in chi-square for the moderating effect. First, the structural paths were freely estimated to form a baseline model (M1) with  $\chi^2_{(df=440)} = 712.101$ , CFI= .912, TLI= .90, IFI= .912 and RMSEA= .05. Second, the structural paths were constrained between the two groups to form a constrained model (M2) with  $\chi^2_{(df=447)} = 773.536$ , CFI= .90, TLI= .88, IFI= .90 and RMSEA= .05. The results suggested the significant difference in the  $\chi^2$  statistics of all the paths between high and low

partner diversity groups  $\Delta\chi^2(\Delta df=7) = 61.435, p < 0.001$ . The results suggested that paths estimates between two groups varied significantly.

To further test the moderating effect on the radical co-innovation and incremental co-innovation, the structural paths are constrained one-by-one and compared the  $\chi^2$  change with the baseline model (M1). Significant differences were found in  $\chi^2$  value between the high and low partner diversity groups for the following paths: AMC  $\rightarrow$  radical co-innovation ( $\Delta\chi^2(\Delta df=1) = 4.134, p < 0.05$ ) and AMC  $\rightarrow$  incremental co-innovation ( $\Delta\chi^2(\Delta df=1) = 9.028, p < 0.01$ ). The path estimates are summarised in Figure 7-16 and Figure 7-17.

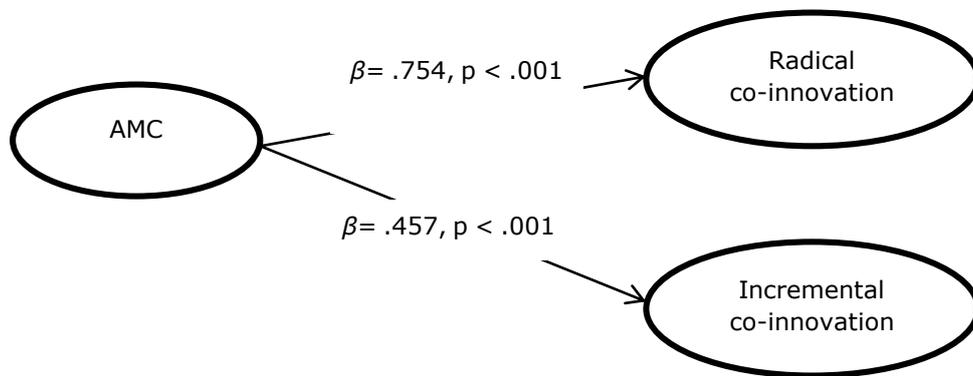


Figure 7-16: High partner diversity group

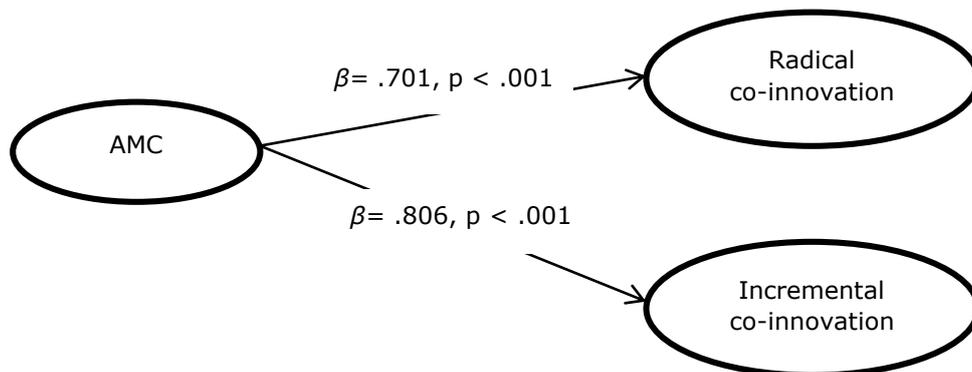


Figure 7-17: Low partner diversity group

The path estimates varied between high and low partner diversity groups. This provided support for hypotheses H7 and H8. This implies that the relationship between AMC and strategic actions demands a different level of alliance partner diversity. Figure 7-18, which is based on the beta coefficients, depicts the moderating effect of alliance partner diversity on the relationship

between AMC and strategic actions. To create this graph, the effect of AMC on radical co-innovation and incremental co-innovation was examined at different level of alliance partner diversity. The vertical axis of the graph represents the value of regression coefficients for AMC and strategic actions and the horizontal axis represents value of alliance partner diversity between two groups low and high.

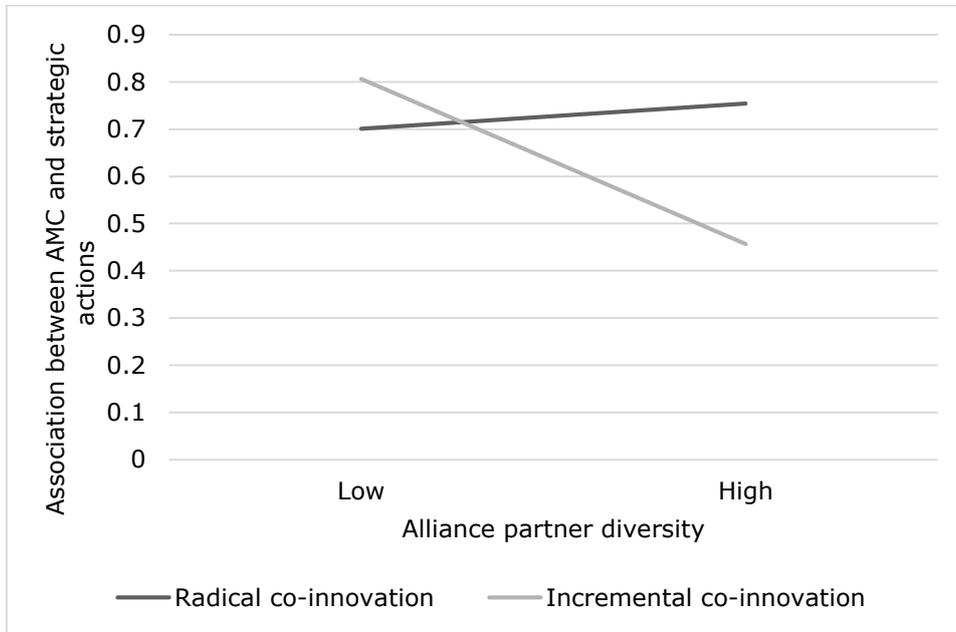


Figure 7-18: The moderating effect of alliance partner diversity on strategic actions

The results that emerges from the Figure 7-18 is in line with the predicted effects. Corresponding to H7, the figure reveals that utilising AMC with high level of alliance partner diversity is highly beneficial for radical co-innovation. The slope results indicated that AMC has a positive effect on radical co-innovation at a lower level of alliance partner diversity, but this effect size increases at a high level of partner diversity. With regard to H8, AMC with low partner diversity is benefiting for incremental co-innovation. Figure 7-18 provides a plot to represent this significant moderating effect. Slope of the line indicates that AMC is strongly associated with incremental co-innovation at a low level of alliance partner diversity.

*b. Foreign market knowledge*

For testing the moderating effect of foreign market knowledge, a dummy variable was considered based on the scale of foreign market knowledge. Following Baloglu (2001), using the median as the dividing point, respondents were divided into two groups: the low foreign market knowledge

group with a score of 1 (n= 157) and high foreign market knowledge group with a score of 2 (n= 121).

As explained in the previous section, the multi-group analysis was carried in three steps. First, the structural paths were freely estimated to form a baseline model (M1) with  $\chi^2_{(df=80)} = 117.190$ , CFI= .95, TLI= .93, IFI= .95 and RMSEA= .04. Second, the structural paths were constrained between the two groups to form a constrained model (M2) with  $\chi^2_{(df=87)} = 127.594$ , CFI= .95, TLI= .93, IFI= .95 and RMSEA= .04. The results suggested the insignificant difference in the  $\chi^2$  statistics of all the paths between both knowledge groups  $\Delta\chi^2 (\Delta df=7) = 10.404$ ,  $p < 0.167$ . The results suggested that group's paths estimates between two groups are not varied at the model level.

Therefore, in order to test the moderating effect for the two groups, the structural paths are constrained one-by-one and compared the  $\chi^2$  change with the baseline model (M1). Insignificant differences were found in  $\chi^2$  value between the high and low groups with respect to foreign market knowledge for the following paths: radical co-innovation  $\rightarrow$  internationalisation speed ( $\Delta\chi^2_{(\Delta df=1)} = 0.188$ ,  $p > 0.10$ ), incremental co-innovation  $\rightarrow$  internationalisation speed ( $\Delta\chi^2_{(\Delta df=1)} = 0.729$ ,  $p > 0.10$ ), and incremental co-innovation  $\rightarrow$  internationalisation success ( $\Delta\chi^2_{(\Delta df=5)} = 0.709$ ,  $p > 0.10$ ). The results of path estimates suggested that both groups are same for all the estimated paths. However, the groups are different for radical co-innovation and internationalisation success ( $\Delta\chi^2_{(\Delta df=1)} = 119.90$ ,  $p < 0.10$ ). The path estimates are summarised in Figure 7-19 and Figure 7-20.

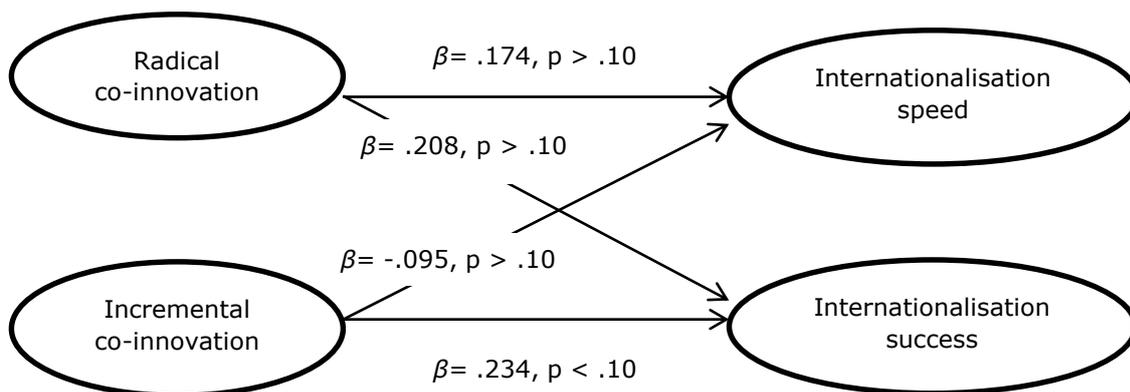


Figure 7-19: Low foreign market knowledge group

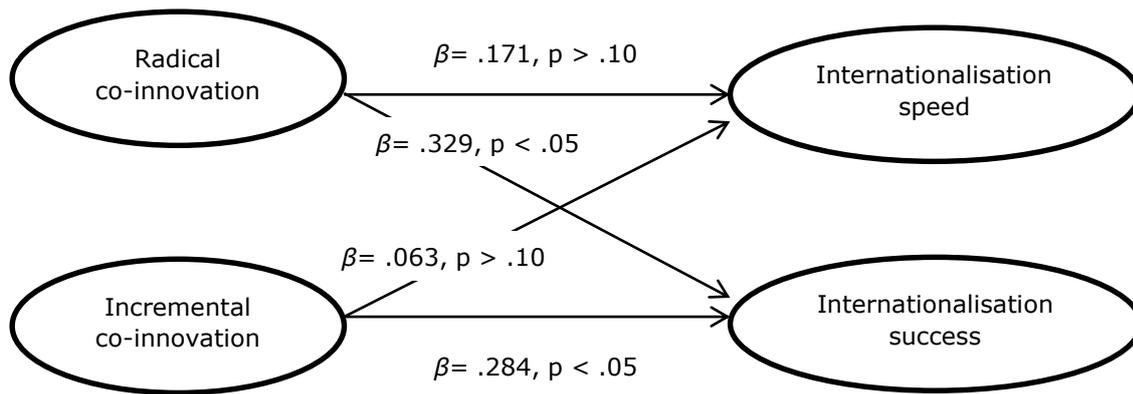


Figure 7-20: High foreign market knowledge group

### 7.4.3.5 Testing the control variable effect

This section examines the role of control variables for the hypotheses relationship in the conceptual model. The results of control variables are provided using multiple-group analysis and comparison of squared correlation ( $R^2$ ).

#### a. Industry – high-technology, medium-technology and low-technology

The industry within which a firm is working accounts for different properties to collaborate, innovate, and internationalise (Laursen & Salter, 2006; O'Regan & Ghobadian, 2005). Controlling for the industry can allow the better understanding of complex phenomena, such as innovation and internationalisation (Qian & Li, 2003). To test whether there are differences between high-technology, medium-technology and low-technology SMEs in terms of the variables examined in this study, a multiple-group analysis was performed, which allows to compare the different relationships between different industrial groups (Byrne, 2013; Yee, Yeung, & Edwin Cheng, 2010).

The sample is grouped based on a dummy variable: 1= high-technology industry (n= 114), 2= medium-technology industry (n= 94) and 3= low-technology industry (n= 70). Based on multiple-group analysis, the conceptual model was tested against three groups. First, two models were defined: (1) unconstrained multiple-group model ( $\chi^2_{(df=942)} = 1493.822$ ) and (2) constrained multiple-group model ( $\chi^2_{(df=959)} = 1560.950$ ). The chi-square difference test showed a significant difference between three groups:  $\Delta\chi^2_{(\Delta df=17)} = 67.128, p < 0.001$ . This suggested that there is a significant difference between three industrial groups. Next, structural paths were constrained one-by-one and compared with the unconstrained model (see Table 7-20). The comparison of unconstrained model with the path constrained model suggested the significant variance with regard to two relationships. These relationships are: radical co-innovation -----> internationalisation success and incremental co-innovation -----> internationalisation success.

In addition, some paths are not significant in high-technology, medium technology or low-technology groups. Thus, it supports the argument that there are significant differences between three industrial groups.

Table 7-20: Multiple-group analysis controlling for the industry type

Path	Basic model loading	Groups (Industry type)			Path constrained model	$\chi^2$	$\Delta\chi^2$
		High-technology	Medium-technology	Low-technology			
AMC -----> Radical co-innovation	.770***	.845***	.704***	.764***	M1	1495.673	$\Delta\chi^2=1.851$
AMC -----> Incremental co-innovation	.658***	.510***	.767***	.697***	M2	1496.758	$\Delta\chi^2=2.936$
Radical co-innovation -----> Internationalisation speed	.149 <sup>+</sup>	.385**	.010 <sup>ns</sup>	-.068 <sup>ns</sup>	M3	1501.297	$\Delta\chi^2=1.851$
Radical co-innovation -----> Internationalisation success	.449***	.766***	.067 <sup>ns</sup>	.544***	M4	1508.822	$\Delta\chi^2=7.475^{**}$
Incremental co-innovation -----> Internationalisation speed	.010 <sup>ns</sup>	.008 <sup>ns</sup>	-.086 <sup>ns</sup>	.093 <sup>ns</sup>	M5	1494.361	$\Delta\chi^2=0.539$
Incremental co-innovation -----> Internationalisation success	.284***	.016 <sup>ns</sup>	.605***	.049 <sup>ns</sup>	M6	1501.105	$\Delta\chi^2=7.283^{**}$

**Note:**

1: Sig. level - \*\*\* significant at  $\leq 0.001$  level; \*\* significant at the  $\leq 0.01$  level; \* significant at the  $\leq 0.05$  level, + significance at  $\leq 0.10$  level (two-tailed), <sup>ns</sup> not significant

The prediction of industry' effect on the hypothesised relationships is supported with Figure 7-21.

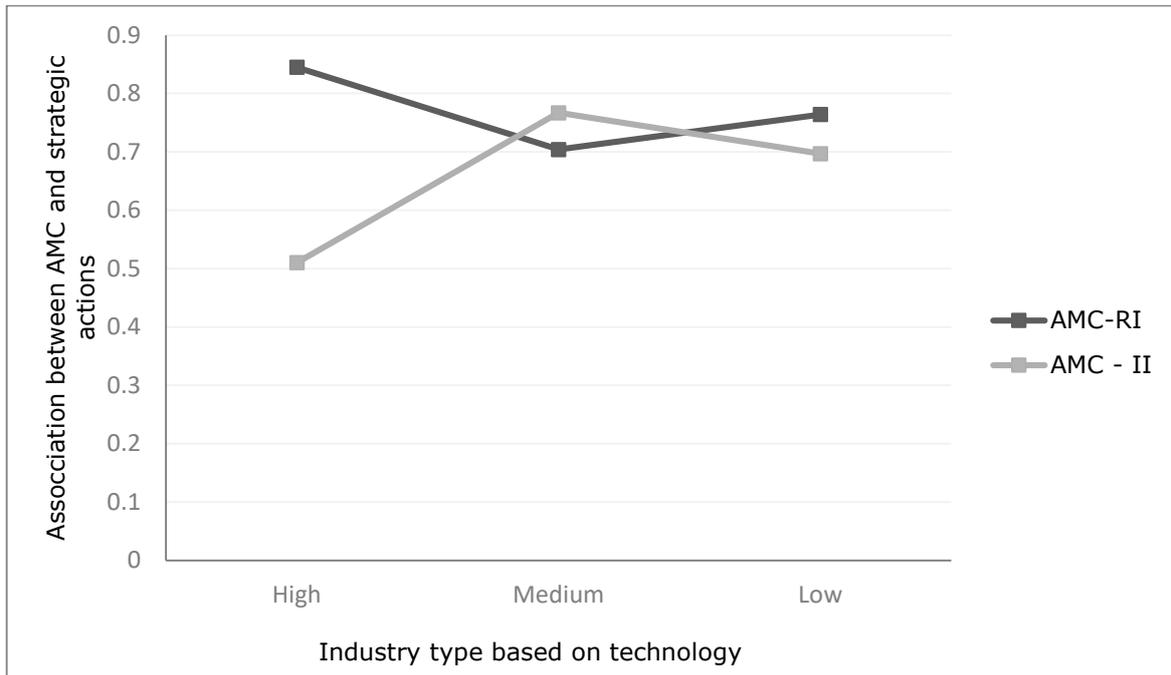


Figure 7-21: Effect of industry type on the association between AMC and strategic actions

Figure 7-21 is the respective full representation of the study's conceptual model after controlling the effect of industry type. The Y axis represents the association between AMC and strategic actions, and the X axis represents the industry type classified in three categories - high-technology, medium-technology and low-technology. In particular, some of the relationships are over-represented and under-represented across three industry types. For example, SMEs in medium-technology industry have a strong effect of AMC for incremental co-innovation (AMC-II). In contrast, in high-technology and low technology industries, there is strong significant relationship between AMC and radical co-innovation (AMC-RI).

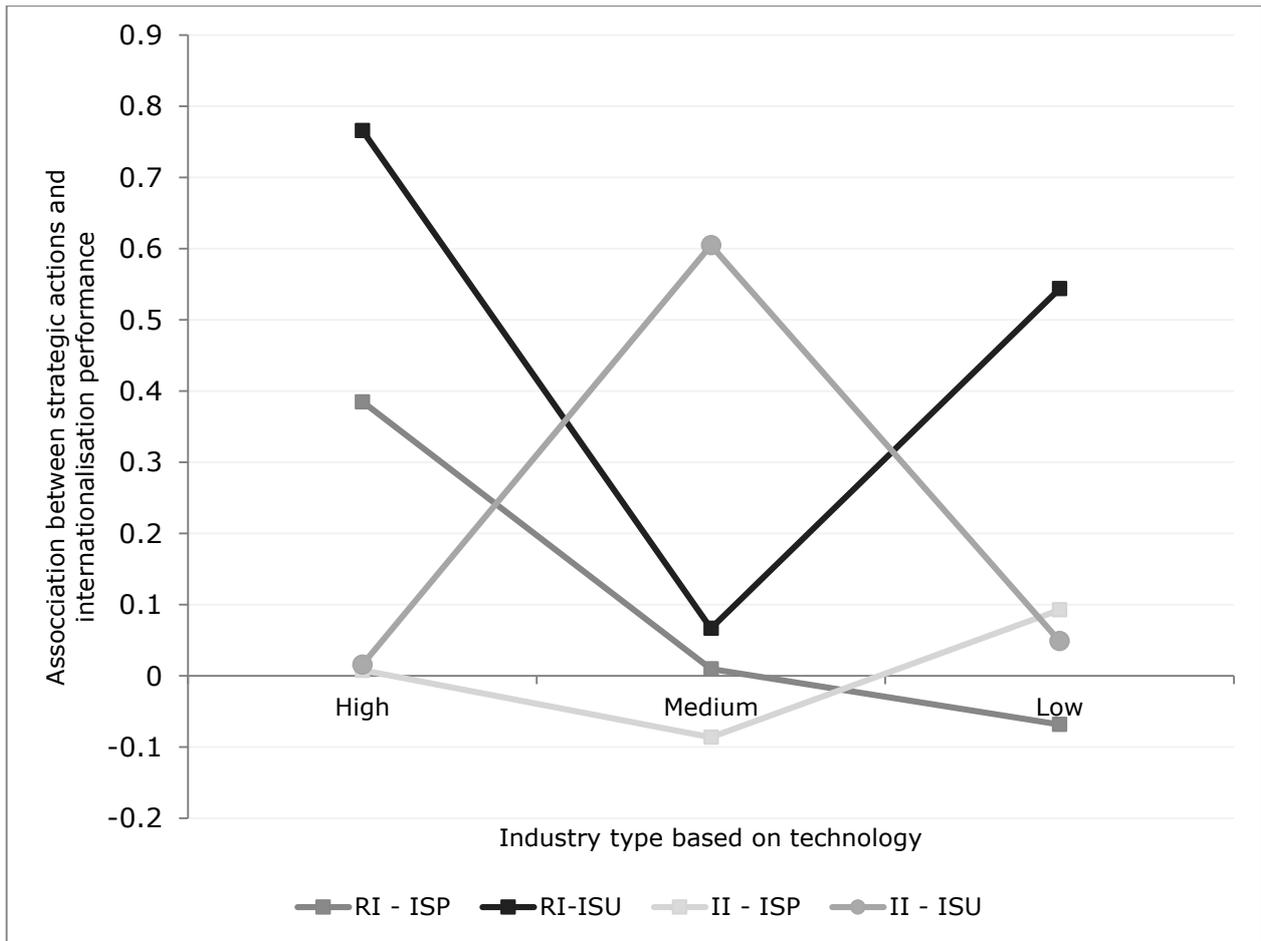


Figure 7-22: Effect of industry type on the association between strategic actions and internationalisation performance

Figure 7-22 is the representation of the relationship between strategic actions and internationalisation performance after controlling the effect of industry type. The Y axis represents the association between strategic actions and internationalisation performance, and the X axis represents the industry type classified in three categories – high-technology, medium-technology and low-technology. Figure 7-22 suggests that medium-sized firms are only advantageous in terms of incremental co-innovation and internationalisation success (II-ISU). In high technology and low-technology SMEs, the effect of radical co-innovation on internationalisation success (RI-ISU) is stronger. Low technology SMEs are particularly disadvantaged in terms of the relationship between radical co-innovation and internationalisation speed (RI-ISP) and incremental co-innovation, and internationalisation success (II-ISU). The relationship between incremental co-innovation and internationalisation speed (II-ISP) is very weak across all the three industries, high, medium and low technology.

### *b. Firm size – Small-sized enterprises and medium-sized enterprises*

The relationship between strategic actions and internationalisation performance can depend on the firm size (Bougrain & Haudeville, 2002; Wagner, 2001). Therefore, this study considered the total number of full-time employees as a control variable. As the focus of study was on SMEs, two groups were identified: small-sized firms (n= 90) and medium-sized firms (n= 188). Using the multiple-group analysis, a significant chi-square difference ( $\Delta\chi^2_{(\Delta df=11)} = 31.355, p = 0.001$ ) was found between the unconstrained model ( $\chi^2_{(\Delta df=628)} = 989.965$ ) and constrained model ( $\chi^2_{(\Delta df=639)} = 1021.32$ ), as shown in Table 7-21. The results suggested that small and medium-sized firms are different at group level.

In order to estimate the difference at path level, each structural path was constrained one at a time and compared with the unconstrained model. A number of path estimates are different between small and medium sized firms, suggesting that firm size has a significant impact on the study variables. In addition, it was found that medium firms are better able to utilise radical co-innovation as well as incremental co-innovation particularly for internationalisation success.

Table 7-21: Multiple-group analysis controlling for the size of the company

Path	Basic model loading	Groups (firm size)		Path constrained model	$\chi^2$	$\Delta\chi^2$
		Small-sized firms	Medium-sized firms			
Radical co-innovation -----> Internationalisation speed	.149 <sup>†</sup>	-.037 <sup>ns</sup>	.163 <sup>†</sup>	M1	991.068	$\Delta\chi^2=1.103$
Radical co-innovation -----> Internationalisation success	.449***	.487**	.438***	M2	989.995	$\Delta\chi^2=0.03$
Incremental co-innovation -----> Internationalisation speed	.010 <sup>ns</sup>	.189 <sup>ns</sup>	-.004 <sup>ns</sup>	M3	990.683	$\Delta\chi^2=0.539$
Incremental co-innovation -----> Internationalisation success	.284***	.270 <sup>†</sup>	.292**	M4	990.073	$\Delta\chi^2=0.108$

**Note:**

1: Sig. level - \*\*\* significant at  $\leq 0.001$  level; \*\* significant at the  $\leq 0.01$  level; \* significant at the  $\leq 0.05$  level, + significance at  $\leq 0.10$  level (two-tailed), <sup>ns</sup> not significant

In order to better explain that firm size is significant in explaining variations in internationalisation success and internationalisation speed, the interaction effect is plotted in Figure 7-23. Firm size is plotted on X-axis and beta coefficients for strategic actions and internationalisation performance are plotted on Y-axis.

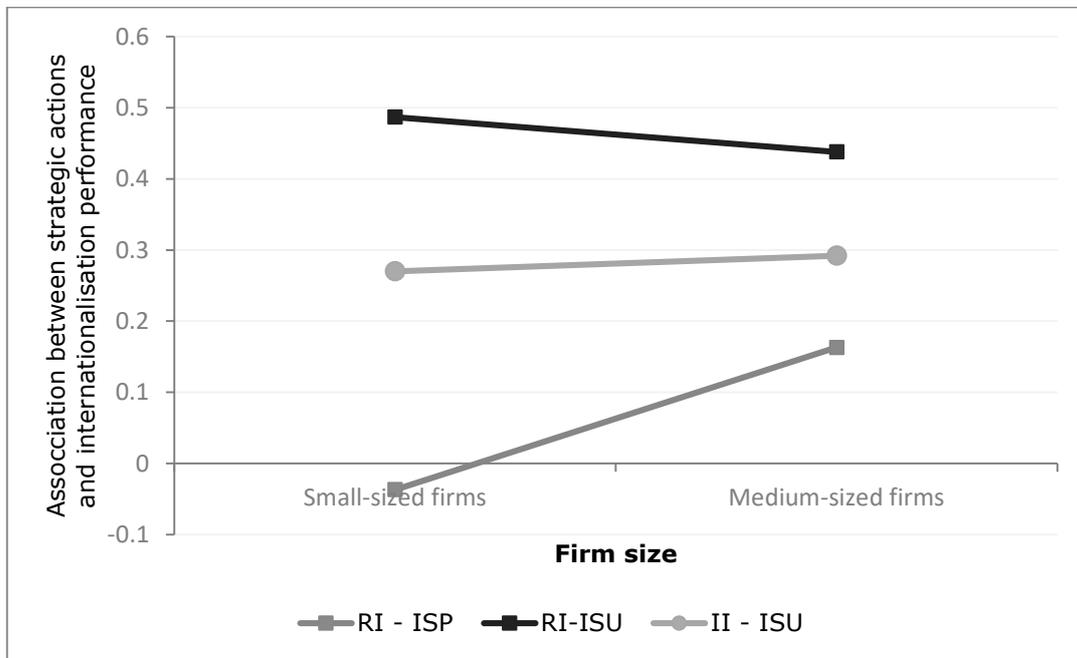


Figure 7-23: Control effect of firm size on the association between strategic actions and internationalisation performance

Relative firm size has significant influence on the relationship between radical co-innovation and internationalisation speed (RI-ISP); relationship between radical co-innovation and internationalisation success (RI-ISU); and the relationship between incremental co-innovation and internationalisation success (II-ISU). Figure 7-23 indicates that internationalisation success and internationalisation speed depends on firm size. In particular, it seems that the potential for internationalisation success and internationalisation speed increases with an increase of firm size, with medium-sized firms being able to commit additional resources to develop their internationalisation prospects.

### c. R&D intensity

R&D intensity of SMEs might control the collaborative innovation efforts (Keupp & Gassmann, 2009; Laursen & Salter, 2006). Accordingly, R&D intensity is considered in order to control the effect of R&D on strategic actions. Since R&D intensity is measured as the proportion of full time

employees to R&D employees (Nieto & Santamaría, 2007), the control effect was examined by comparing the degree to which dependent variable is explained (that is squared correlation  $R^2$ ) by the control variables (Blut, Frennea, Mittal, & Mothersbaugh, 2015; Evanschitzky et al., 2014). Therefore, two models were considered: 1) a basic model with study variables and, 2) a controlled model with structural paths from the R&D intensity to strategic actions. The results of both, the basic model and control model, are presented in Table 7-22 for comparison. The chi-square difference between the basic model ( $\chi^2_{(\Delta df=202)} = 331.325$ ) and controlled model ( $\chi^2_{(\Delta df=221)} = 341.557$ ) was insignificant ( $\Delta\chi^2_{(\Delta df=19)} = 10.232, p > 0.10$ ), suggesting no significant role of R&D intensity as a control variable. As seen in the Table 7-22, neither the path estimates nor the squared correlation is significantly different between the basic model and controlled model. Thus, R&D intensity does not have an impact on the radical co-innovation and incremental co-innovation.

Table 7-22: The effects and squared correlations in the basic Model and the control Model

Dependent variable	Independent variable	Basic model	Control model
Radical co-innovation	AMC (H1)	.743***	.743***
	R <sup>2</sup>	.552	.552
Incremental co-innovation	AMC (H2)	.643***	.643***
	R <sup>2</sup>	.414	.415

**Note:**

1: Sig. level - \*\*\* significant at  $\leq 0.001$  level; \*\* significant at the  $\leq 0.01$  level; \* significant at the  $\leq 0.05$  level, + significance at  $\leq 0.10$  level (two-tailed), <sup>ns</sup> not significant

#### 7.4.4 Phase 4 - Post-hoc analysis

To further verify the findings of study and gain additional insights, a series of post-hoc analyses were conducted. First, to ensure the results were not driven by the AMOS model specification, the hypothesis test was rerun using Mplus’s maximum likelihood with robust standard errors and chi-square estimation command, which allows the consistent estimation of continuous dependent variables. The fit statistics for the structural model suggested an excellent model fit: CFI = 0.968, TLI = 0.964, RMSEA = 0.03 and SRMR = 0.05. The fit indices are similar to those of the AMOS, thus suggesting the consistency of results. The estimation results shown in Table 7-23 of the hypothesis tests are highly consistent with those of the AMOS results reported in Table 7-17.

Table 7-23: Standardised estimates for the main effects

Code	Constructs	Standardised estimates	Sig.	Outcome
H1	AMC -----> Radical co-innovation	.774***	Yes	Supported
H2	AMC -----> Incremental co-innovation	.658***	Yes	Supported
H3	Radical co-innovation -----> Internationalisation speed	.148 <sup>†</sup>	Yes	Supported
H4	Radical co-innovation -----> Internationalisation success	.449***	Yes	Supported
H5	Incremental co-innovation -----> Internationalisation speed	.011 <sup>ns</sup>	No	Unsupported
H6	Incremental co-innovation -----> Internationalisation success	.283**	Yes	Supported

Second, to further explore the ambidextrous effects of radical co-innovation and incremental co-innovation, this study further performed a post hoc analysis. In doing so, ambidexterity is conceptualised as a multidimensional construct comprised of the combination of radical co-innovation and incremental co-innovation (that is, as the multiplicative interaction of the two strategic actions). This is commonly used operational approach in the ambidexterity literature (Cao, Gedajlovic, & Zhang, 2009). Also, following He and Wong (2004), only ambidexterity dimension is entered in the model to link with internationalisation speed and internationalisation success. The results suggested that ambidexterity has a significant effect on internationalisation speed ( $\beta = .10^{\dagger}$ ) and internationalisation success ( $\beta = .53^{***}$ ). The results are particularly in favour of the need for both radical co-innovation and incremental co-innovation for internationalisation speed. SMEs that engage in incremental co-innovation to the exclusion of radical co-innovation are found that they exhibit too many underdeveloped ideas, which are too little to gain the advantage of internationalisation speed. Figure 7-24 contains the plot of the interaction effect.

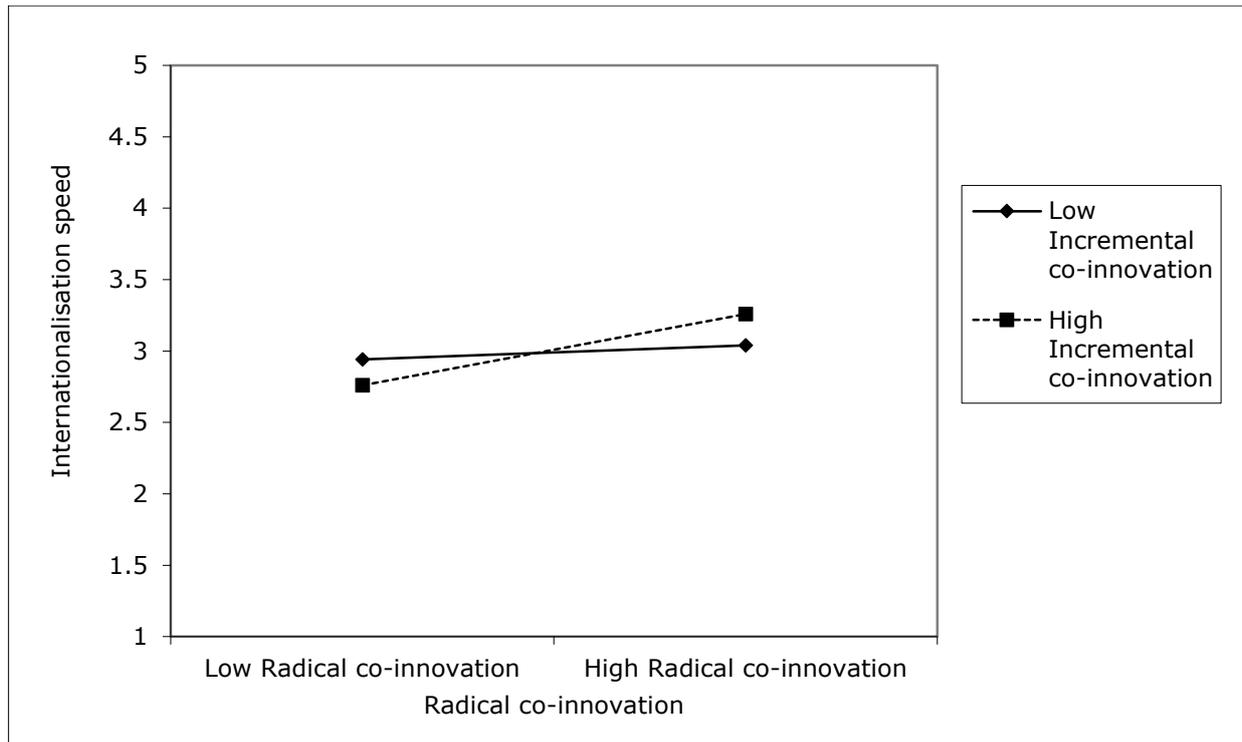


Figure 7-24: Interaction effect between radical co-innovation and incremental co-innovation on internationalisation speed

Consistent with the reasoning that combined effect of radical and incremental co-innovation will lead to more internationalisation speed, Figure 7-24 suggests that although the benefits of radical co-innovation extend to both levels of incremental co-innovation, high level of incremental co-innovation benefits more. Specifically, the positive internationalisation speed effect of a high level of radical co-innovation is significantly enhanced by a high level of incremental co-innovation. Thus, there appear to be a synergistic effect on internationalisation speed from achieving high levels of radical co-innovation and incremental co-innovation. In addition, the plot shows that the internationalisation speed is lowest at a low level of radical co-innovation and incremental co-innovation. Under such conditions, SMEs are at a risk to lose the opportunities for internationalisation speed, thus suggesting the importance of the ambidextrous effect of strategic actions.

## 7.5 Conclusion

This chapter focuses on the long sequence of statistical analysis and findings of a set of hypotheses that were developed in Chapter 4. It started with the descriptive analysis in section 7.2, which revealed the consistent pattern of respondents' characteristics and frequency of the study's variables. Following this, in section 7.3, a series of statistical tests were performed to

validate the measurement scales. This procedure resulted in removing three items from the original pool of 33 items. Furthermore, the combination of exploratory and confirmatory factor analysis was undertaken to evaluate the measurement model and to check the reliability and validity of model's constructs.

Next, in section 7.4, the conceptual model was examined after validating the assumptions of structural equation modelling and establishing the structural model fit. The main effects of conceptual model were tested, where five out of six hypotheses were supported. Next, the mediating effect of strategic actions on the relationship between AMC and internationalisation performance was tested using three alternative approaches: Baron and Kenny's approach, Sobel's test and Bootstrapped confidence interval. All of the three approaches revealed the consistent findings suggesting the partial and full mediation effect for different relationships. Next, the conceptual model was tested from the moderating perspective. The results suggested the moderating effect of alliance partner diversity on the relationship between AMC and strategic actions as predicted in Chapter 4. Particularly, the relationship between AMC and radical co-innovation is positive at a high level of partner diversity, but the relationship between AMC and incremental co-innovation is positive at low level of partner diversity. With respect to the moderating effect of foreign market knowledge, the effect is only supported for the relationship between radical co-innovation and internationalisation success. Following this, the effect of control variables was examined, which revealed some interesting results. In particular, the results indicated that firm size and industry type have intervened effect on the study's relationships.

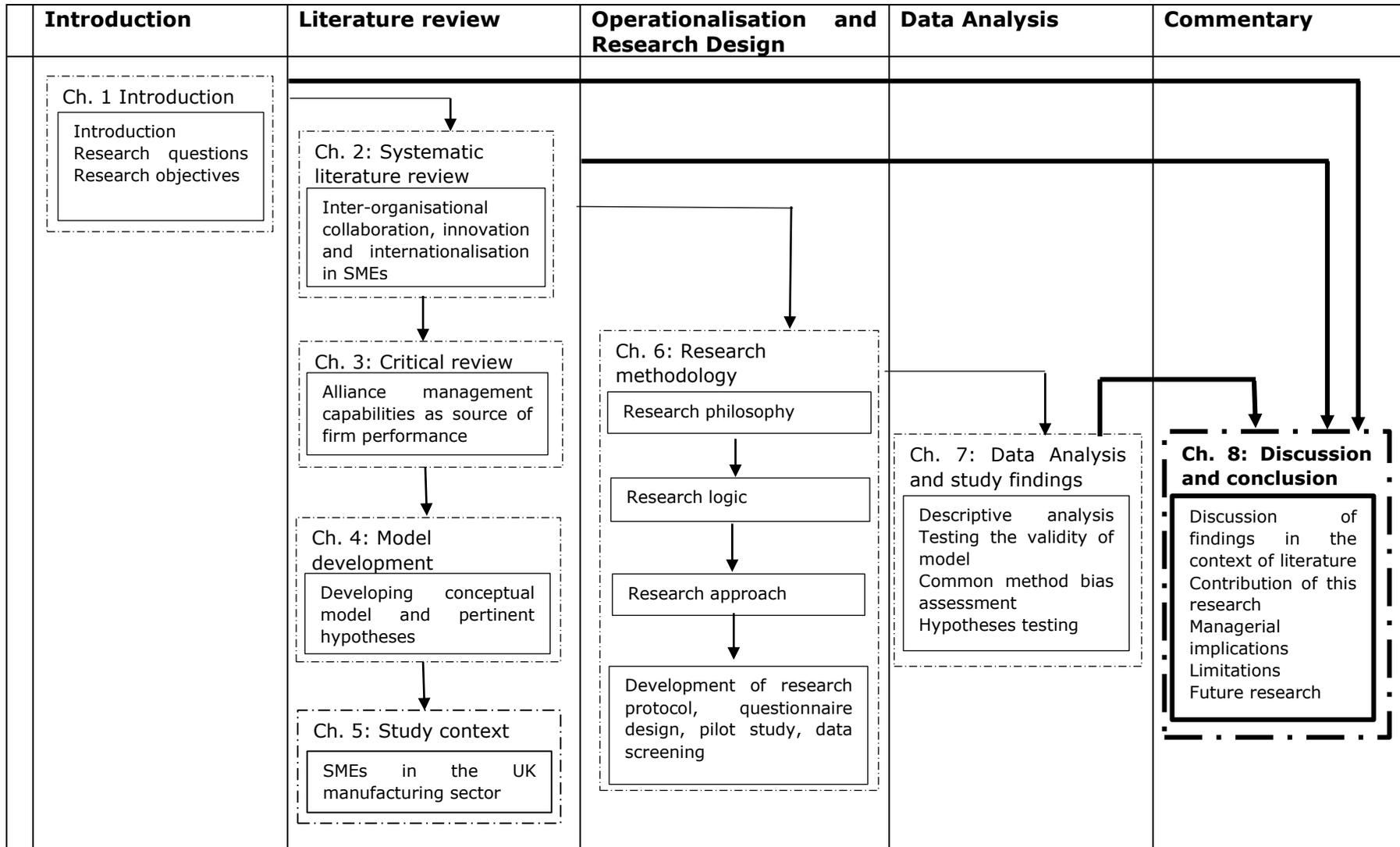
Finally, post-hoc analysis confirmed that AMOS provided identical results as of Mplus. In addition, post-analysis provided some compelling evidence suggesting the ambidextrous effect of radical co-innovation and incremental co-innovation on internationalisation speed. Table 7-24 provides a summary of results for the research hypotheses.

Table 7-24: Summary of research findings

No:	Description	Prediction	Finding	Conclusion
H1	AMC → Radical co-innovation	(+)	(+)	Supported
H2	AMC → Incremental co-innovation	(+)	(+)	Supported
H3	Radical co-innovation → Internationalisation speed	(+)	(+)	Supported
H4	Radical co-innovation → Internationalisation success	(+)	(+)	Supported
H5	Incremental co-innovation → Internationalisation speed	(+)	(0)	Unsupported
H6	Incremental co-innovation → Internationalisation success	(+)	(+)	Supported
H7	AMC * High alliance partner diversity → Radical co-innovation ( <i>moderating effect of alliance partner diversity</i> )	(+)	(+)	Supported
H8	AMC * Low alliance partner diversity → Incremental co-innovation ( <i>moderating effect of alliance partner diversity</i> )	(+)	(+)	Supported

<b>No:</b>	<b>Description</b>	<b>Prediction</b>	<b>Finding</b>	<b>Conclusion</b>
H9a	Radical co-innovation * Foreign market knowledge → Internationalisation speed ( <i>moderating effect of foreign market knowledge</i> )	(+)	(0)	Unsupported
H9b	Radical co-innovation * Foreign market knowledge → Internationalisation success ( <i>moderating effect of foreign market knowledge</i> )	(+)	(+)	Supported
H9c	Incremental co-innovation * Foreign market knowledge → Internationalisation speed ( <i>moderating effect of foreign market knowledge</i> )	(+)	(0)	Unsupported
H9d	Incremental co-innovation * Foreign market knowledge → Internationalisation success ( <i>moderating effect of foreign market knowledge</i> )	(+)	(0)	Unsupported

This is that part of the earlier Figure 1-1 that is being addressed in the forthcoming chapter.



## **Chapter 8. Discussion and Conclusion**

### **8.1 Introduction**

This study aims to broaden the understanding of the relationship between IOC, innovation, and internationalisation in the SMEs setting. In specific, it focuses on exploring the relationship between AMC, strategic actions and internationalisation performance of SMEs. Using a quantitative approach, primary data was collected from various manufacturing industries within the SMEs' sector. Overall, the results suggest that the UK SMEs' can leverage the alliance management routines through innovation as strategic actions, which in turn can boost their internationalisation performance.

The purpose of this chapter is to discuss the study key findings and present its theoretical contributions. The chapter comprises four key sections: 1) study overview, 2) interpretation of study outcomes, 3) theoretical contributions and implications for practice, and 4) research limitations and future research directions.

### **8.2 Overview of the research**

The IOC is seen as instrumental in promoting innovation and internationalisation performance of SMEs. As informed by the systematic review of this study, there is a clear increase in using collaborations for innovation (Nieto, Santamaria, & Fernandez, 2015) and internationalisation by SMEs (Zhang et al., 2016). In the meanwhile, the success rate of IOC (such as strategic alliances) remains low, where many alliances are discontinued without achieving the desired results (Li et al., 2017; Madhok et al., 2015). The high failure rate has evoked researchers' attention. Accordingly, attempts have been made to investigate the factors that determine the success or failure of alliances. Recently, scholars started to devote the attention towards the organisational capabilities as an organisational domain relevant to management of collaborations (Ireland et al., 2002; Schreiner et al., 2009). Particularly, it has been argued that the most important success factor is not the alliance characteristics, but the capability of alliance partners in managing the alliance (AMC) (Ireland et al., 2002; Kale & Singh, 2007). This is in line with the RBV, which suggests that possession of resources contribute to firm performance (Barney, 1991). Notwithstanding the mounting research on AMC and strategic alliance in general, two important gaps remain.

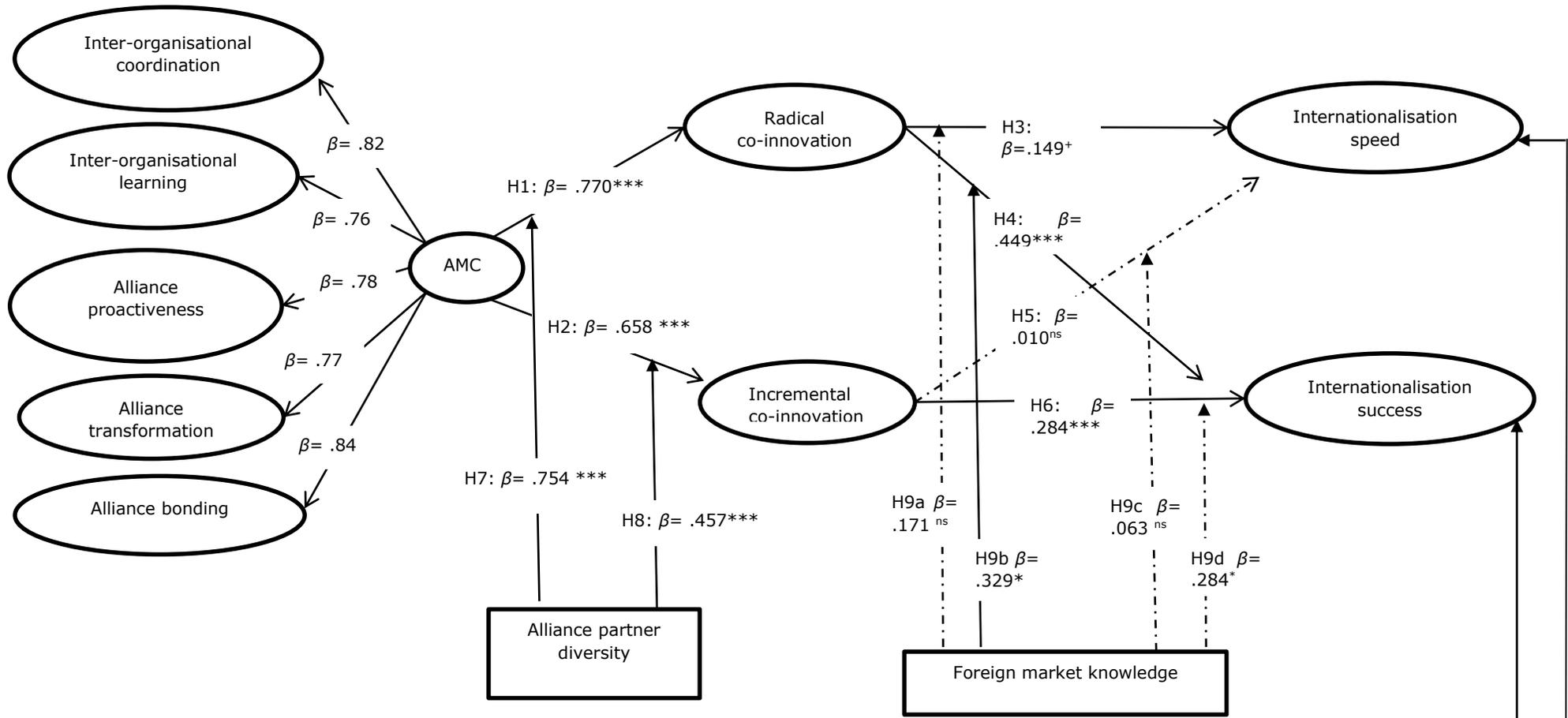
First, despite acknowledgement of the importance of AMC for firm performance (Kauppila, 2015; Schreiner et al., 2009), question surrounding the process through which AMC leads to internationalisation performance remains unresolved and underexplored. This is a major limitation in the existing literature, as just possession of resources is not enough, because firms need to undertake suitable actions to make use of the resources (Kraaijenbrink et al., 2010).

Second, research to date has focused on large firms, while leaving the gap in the context of SMEs. Since SMEs suffer due to the limited size and vulnerable resources, they often involve in IOC to gain access to additional resources and enter new markets in ways not possible for small firms (Belgraver & Verwaal, 2017; Cowling, Liu, Ledger, & Zhang, 2015). Despite the advantages offered by IOC, the literature stresses that SMEs face difficulties in establishing relationships with social networks (family and friends) and closest networks (suppliers and customers) (Masiello, Izzo, & Canoro, 2013). Empirical evidences point out that several factors hinders the IOC in SMEs in that SMEs have difficulties to coordinate activities with partners (Brunetto & Farr-Wharton, 2007). Furthermore, SMEs not only have limited financial resources, but also human resources, which means there is a limit to what percentage of the limited size of employees can be devoted to manage collaborations (Narula, 2004). In addition, SMEs tend to have the low absorptive capacity, which hinders their ability to effectively manage external knowledge flows and distribute it internally (Macpherson & Holt, 2007; Spithoven, Clarysse, & Knockaert, 2011). IOC challenges suggest the relevance of AMC for SMEs to successfully manage the collaboration relationships. Given the unique characteristics of SMEs (Berends, Jelinek, Reymen, & Stultiëns, 2014; van de Vrande et al., 2009), the existing AMC (that focused on larger firms) is difficult to apply in the context of small firms. This suggests that AMC research should explicitly differentiate on firm size, rather than prescribing large firm practices to small firms.

To address the above-mentioned gaps and to gain insights into what is involved in leveraging AMC for internationalisation performance, this study posits this central question: how AMC leads to internationalisation performance of SMEs. In answering this question, the effect of AMC on innovation activities (as strategic actions) and the latter effect on internationalisation performance (as an outcome) are investigated.

In line with the research question and research objectives, a quantitative research approach is adopted. A pilot study is performed to collect data for purifying the measurement scales as well as to ensure their validity. The main study is conducted in the UK manufacturing industry. Following on this, data analysis is performed using SPSS and

AMOS software through two steps of data reduction: EFA and CFA. Based on the EFA and CFA results, all constructs and sub-constructs have adequate reliability, convergent validity and discriminant validity. Finally, SEM is employed to test the model fit and structural paths. The summary of quantitative findings is mapped out according to relevant research questions and the research hypotheses, as presented in Figure 8-1. This Figure indicates that quantitative findings mapped out well with the respective research questions and relevant hypotheses.



**Notes:**

- 1: → Represents significant paths
- 2: ----- > represents not significant paths
- 3: <sup>a</sup> The Figure exhibits only the effect of those control variables that are significantly related to performance outcomes including firm size and industry type.

Control variables <sup>a</sup>

Firm size \_\_\_\_\_

Industry type \_\_\_\_\_

Figure 8-1: Summary of the research findings

### **8.3 Interpretation of the analysis outcomes**

Using the RBV and relying on the strategic management and international business literature, the relationship between AMC, strategic actions and internationalisation performance was proposed. The empirical findings confirm that leveraging AMC yields superior radical and incremental co-innovation, which ultimately supports internationalisation speed and internationalisation success. The succeeding section discusses the findings of these relationships in detail.

#### **8.3.1 AMC as a second order construct**

Prior to testing the hypotheses of this study, the underlying conceptualisation assumptions of AMC construct was tested. The central premise of this assumption is that AMC as a second-order construct works better in contrast to the direct effect model (Schilke & Goerzen, 2010). More specifically, AMC is considered as a multidimensional concept and is measured by seemingly distinct, but related first-order constructs and each of the first-order construct is measured by several indicators. Therefore, in this study, AMC is conceptualised as a second-order construct reflected by five first-order routines: inter-organisational coordination, inter-organisational learning, alliance proactiveness, alliance transformation and alliance bonding. While each of these routines plays a unique role in the management of alliances, these can be perceived as being theoretically linked and equally headed towards the common alliance's goals (Schreiner et al., 2009). The superior AMC that expressed in these routines allow firms to pursue strategic actions and improve performance.

The empirical analysis of a reflective second-order model was performed using CFA. The primary objective of using CFA is to estimate the overall fit of the second-order factor model that best represents the relationships. The results of CFA support the researcher's assumption that AMC can actually be conceptualised as a second-order construct that includes five first-order routines (see Figure 8-1). These first-order routines also emerged as distinct, but highly interconnected, hence suggesting that they signify the separate aspects of second-order construct that underlies them.

Previous studies on the conceptualisation of AMC also reported the existence of distinct skills or routines that underlie the AMC (Schilke & Goerzen, 2010; Schreiner et al., 2009). However, the previous literature is limited to the extent that they do not include the routines required to address other issues during the alliance life-cycle, such as conflict management or enriching the relational ties. In order to expand the scope of existing studies, this study adds to the AMC literature and considers additional routines as the

constituent of AMC. Specifically, five distinct AMC routines are assessed that are acknowledged in the AMC literature, but never been evaluated in one study. By doing so, the current study provides a better and more comprehensive conceptualisation of AMC construct. The results also confirm that firms need to possess relevant routines to effectively manage any individual alliance when it is running up, and hence these routines include inter-organisational coordination, inter-organisational learning, alliance proactiveness, alliance transformation and alliance bonding.

The results contradict other empirical studies that employed AMC as an infrastructure, process or a system to support the tasks of managing an individual alliance (see for example, Hoffmann, 2005; Ireland et al., 2002). Specifically, these studies considered the alliance structure (such as dedicated alliance function, alliance experience and so on) as a determinant of AMC rather than actual conceptualisation of AMC. The prior work on determinants is important, but it does not provide insights regarding the routines/skills that are required to successfully manage the alliances. but it does not acknowledge that what knowledge is accumulated through the alliance structures. By considering the routines that comprise a firm's AMC, this study shifted the focus from factors that determine the development of AMC, to understanding the fundamental dimensions of AMC to manage any individual alliance.

Further, the result implies that the notion of AMC (including the five first-order routines) is relevant to SMEs setting. Although SMEs engage in IOC, certain factors can hinder the collaboration relationships, such as low absorptive capacity, lack of compatibility between cooperating partners and absence of frequent interactions (Patton, 2013; Swoboda et al., 2011). In fact, Franco and Haase (2015) revealed that good relationship and frequent interactions among partners is fundamental for alliance success. Ultimately, it seems that having alliance management routines augments the success of SMEs' alliances. The result of this study confirms the value of AMC for SMEs and finds that mere possession of inter-organisational coordination, inter-organisational learning, alliance proactiveness and alliance transformation is not sufficient, but SMEs needs to embed alliance bonding routines to manage an individual alliance.

Thus, the results underscore the fact that the full value of AMC in SMEs can only be realised by effective implementation of five distinct, but related alliance management routines.

### **8.3.2 The effect of AMC on strategic actions: hypothesis 1 and 2**

In today's rapidly changing world, current competition is driving SMEs to produce high-quality products faster and cheaper than competitors (Nieto & Santamaría, 2007). Meeting

this challenge has led researchers and practitioners to take an interest in the different strategies that help to achieve innovation benefits. SMEs may not simply depend on exploitation of in-house skills for innovation. On this basis, scholars have claimed that IOC provides access to external resources, technologies and helps firms to launch innovations (van de Vrande et al., 2009). In recent decades, firms, particularly SMEs, have begun to use IOC to complement their internal knowledge bases (Beamish & Lupton, 2009; Subramanian et al., 2016a). IOC reflects a recognition that innovation is less the outcome of firm's independent efforts (Hottenrott & Lopes-Bento, 2016).

Despite the growing importance of IOC, many SMEs experience challenges to effectively manage IOC for innovation (Lichtenthaler, 2008). Thus, practitioners and academics started to understand the dynamics through which the innovation benefits can be grasped while avoiding potential negative side effects. Accordingly, previous literature suggests the role of management mechanisms for innovation (Lichtenthaler, 2011). Yet, AMC has been advocated to be a firm-level organisational capability that can contribute to firm-level competitive advantage (Ireland et al., 2002). While prior research has suggested some evidence that alliance experience positively effects on new product innovation (Hoang & Rothaermel, 2005), research that empirically investigates the effect of AMC on innovation is scarce due to substantial methodological issues. The empirical work in this area has relied on the structure (that is dedicated alliance function, alliance experience and so on) as a proxy for AMC (Kale et al., 2002). However, in recent years, scholars conceptualised AMC as a second-order construct with five first-order routines. While there is clear conceptualisation of AMC (Schilke & Goerzen, 2010), there is a dearth of empirical studies to assess the impact of AMC on innovation.

In order to build theoretical support for AMC and innovation linkage, the researcher turned attention towards the relationship between resources and actions (Grimm & Smith, 1997). Literature suggests that it is an important decision for managers to design actions to manipulate resources (Holcomb, Holmes Jr, & Connelly, 2009; Sirmon et al., 2007). The resources alone are not sufficient to make the effective operations as using the same resources for different purposes in different ways to provide different benefits (Bridoux, Smith, & Grimm, 2011). Thus, the action that firms take to exploit resources make a significant difference to firm performance (Sirmon, Hitt, Ireland, & Gilbert, 2011). Thus, innovation activity is considered as an important strategic action to exploit AMC. It is consistent with RBV, which suggests that firm's resources facilitate the strategic actions (Newbert, 2007). Particularly, two types of innovation activities are considered: radical co-innovation and incremental co-innovation (Hurmelinna-Laukkanen, Sainio, & Jauhainen, 2008; Song & Thieme, 2009). The point of interest in this research suggests

that instead of considering a single action, investigating the range of actions is appropriate (Ferrier, 2001). A range of actions expands the ability of a firm to pursue new opportunities due to the breadth of resources (Ndofor et al., 2011). In particular, radical co-innovation refers to joint pursue of innovation with partners that are new to the market (Vuola & Hameri, 2006). In turn, incremental co-innovation is the modifications in existing innovation with the support of collaboration partners (Ritala & Hurmelinna-Laukkanen, 2009).

Radical co-innovation is usually characterised by high level of ambiguity and involve the transmission of tacit and complex knowledge. The high level of knowledge ambiguity surrounding radical co-innovation commensurately demands AMC. The importance and potential of knowledge in radical co-innovation is evolving, and thus needs regular monitoring and evaluation for effective task execution (Enkel & Heil, 2014; Oerlemans et al., 2013). Given these circumstances, hypothesis H1 posits that AMC is positively related to radical co-innovation. Incremental co-innovation is motivated by the desire to modify existing innovation and create economies of scale. In contrast to radical co-innovation, incremental co-innovation involves the knowledge-bases that are more familiar to firms (Dunlap-Hinkler, Kotabe, & Mudambi, 2010). This implies that incremental co-innovation involves a relatively low level of complexity and ambiguity (Song & Thieme, 2009). Since incremental co-innovation involves the participation of external partners, it also demands AMC to effectively execute incremental co-innovation (Bougrain & Haudeville, 2002). Thus, hypothesis H2 predicts that AMC is positively related to incremental co-innovation.

To test H1 and H2, two models were developed: (1) a first-order model where the dimensions of AMC were directly linked to radical and incremental co-innovation and (2) a second-order model where AMC is conceptualised as a second-order model and linked to radical and incremental co-innovation. The results of a first-order model produced the insignificant beta coefficients. In contrast, the second order model produced positive and significant beta coefficients, as in Figure 8-1. The results are sufficient to conclude that AMC is a second-order construct that is linked to strategic actions. In addition, these results offered strong support for both hypotheses H1 and H2 indicating that AMC can significantly improve the radical co-innovation and incremental co-innovation of SMEs. However, it is clear that AMC has more explanatory power with regard to radical co-innovation than to incremental co-innovation. This is theoretically expected since SMEs struggle to allocate sufficient internal resources to radical innovation (Parida et al., 2012). Therefore, Lasagni (2012) suggests that collaboration with external partners can help SMEs to enhance the radical innovation. As radical innovation involves complexity, SMEs often perceive research universities or other technology firms as a suitable partner whose

primary function is to create and disseminate knowledge (Zeng et al., 2010). However, research universities are characterised by the bureaucratic structures (Rothaermel & Deeds, 2006). Accordingly, SMEs need to expand significant resources to manage their collaborations with research universities since these collaborations are important to introduce radical innovations (Hill & Rothaermel, 2003; Rothaermel & Deeds, 2006). Thus, radical co-innovation requires commensurable more AMC to manage the radical co-innovation as compared to incremental co-innovation.

Clearly, the results of H1 and H2 indicate that AMC have clear implications for both radical co-innovation and incremental co-innovation in SMEs. Prior research relating to alliance management has not linked AMC to radical and incremental co-innovation, in particular. For instance, considering alliance experience as the antecedent of AMC, Hoang and Rothaermel (2005) suggest that general alliance experience positively influence the joint R&D project performance. Along the similar line, Anand and Khanna (2000) find that firms often learn to manage the alliance that effect on the value creation of R&D alliances. In addition, Wu and Cavusgil (2006) extend the organisational learning enquiry and conceptualise the valuable skills needed in the alliance formation stage. Wu and Cavusgil (2006) suggest that alliance formation skills can reinforce the joint activities (i.e., organisational commitment). Taken together, it appears that firms that are able to utilise factors for the creation of AMC can achieve joint innovation benefits. However, research to date has not empirically relate AMC to strategic actions. Against this backdrop, empirical results of current study provide evidence that an AMC exists and it is important for strategic actions, namely: radical co-innovation and incremental co-innovation. In addition, this study's findings add to the SMEs based AMC literature (Mohannak, 2007), suggesting that SMEs must develop AMC to make the strategic actions efficient and effective.

Yet, the results of H1 and H2 are consistent with RBV literature, which argues that the attributes of a firm's resources enable this firm to excel in strategic actions (Ray, Barney, & Muhanna, 2004). In fact, Espino-Rodríguez and Padrón-Robaina (2006) adds to the RBV debate by contending that firms must identify the appropriate strategic actions that are a potential candidate for the firm's resources. The aforementioned arguments suggest a clear linkage between resources and strategic actions. Thus, this is sufficient to conclude that AMC as a resource is sufficient to leverage the strategic actions (i.e., radical and incremental co-innovation).

### **8.3.3 The effect of strategic actions on internationalisation performance: hypothesis 3, 4, 5 and 6**

Internationalisation provides opportunities for market growth and access to technology (Autio, George, & Alexy, 2011). However, it is difficult for firms to take the advantage of these opportunities due to liability of foreignness (Zhou & Guillén, 2015). Firms are exposed to liability of foreignness when they expand to relatively distant markets (Berry, Guillén, & Zhou, 2010), because distant markets creates costs due to relational risks and lack of legitimacy in foreign markets (Denk, Kaufmann, & Roesch, 2012). SMEs, particularly suffer from liability of foreignness because they do not possess enough resources, including managerial and financial resources, required for international expansion (Brouthers et al., 2015; Brouthers, Mukhopadhyay, Wilkinson, & Brouthers, 2009). SMEs also lack knowledge needed to gain legitimacy in international markets (Musteen et al., 2010).

During the last decade, researchers have attempted to explicate that how SMEs can mitigate the liability of foreignness and gain internationalisation performance (Lu & Beamish, 2006; Wright, Westhead, & Ucbasaran, 2007). Recently, scholars reported the variations in internationalisation performance of SMEs due to two factors: innovation (Ganotakis & Love, 2011; Ito & Lechevalier, 2010; Shearmur et al., 2015), and IOC (Felzensztein et al., 2015; Kim & Hemmert, 2016). Earlier studies suggest that innovation allows the SMEs to offer novel products or processes to recognise opportunities in foreign markets and gain international performance (Knight & Cavusgil, 2004). Firms with superior innovation processes have more refined knowledge creation routines and learning the mechanism that leads to internationalisation (Filatotchev et al., 2009; Lewin & Massini, 2004). Further, research suggests SMEs may not possess sufficient organisational capability to compete in international markets and thus IOC help to achieve internationalisation performance (Boehe, 2013; Child & Hsieh, 2014).

Although research on internationalisation notion has focused on the role of the IOC and innovation in isolation, these lines of inquiry do not help to understand how SMEs can overcome the liability of foreignness and improve internationalisation performance through both innovation and IOC simultaneously. Realising that SMEs have lack of resource and small size, scholars have urged more attention to strategic actions that involves value co-creation (Romero & Molina, 2011; Sang, David, & Silvana, 2012). External partners possess knowledge that enhances the innovation process and thus create more value (Nambisan, 2002; Romero & Molina, 2009). To draw attention to integrated approach, this study considers the role of strategic actions (i.e., innovation activity) for

internationalisation performance. Strategic actions refer to the degree to which alliance partner carries out innovation activities in a cooperative manner to achieve common goals (Frazier & Rody, 1991). Prior studies indicated that strategic actions reduce uncertainties, resolve conflicts and mitigate the problems of safeguarding (Heide & John, 1990; Vesper, van der Wel, Knoblich, & Sebanz, 2011). Owing to the aforementioned arguments, this study assumes that innovation activities can improve internationalisation performance of SMEs.

The recent scholarly advancement has barely touched upon the issue of internationalisation performance in terms of internationalisation speed and success, but it is an emerging phenomena in the international literature (Musteen et al., 2010). Yet, studies express concern about how SMEs can gain advantage of internationalisation speed and internationalisation success. This study, therefore, explores the role of radical and incremental co-innovation for internationalisation speed and internationalisation success. Notably, radical co-innovation and incremental co-innovation is examined as mediating factors between AMC and internationalisation performance.

Hypothesis H3 postulates the positive relationship between radical co-innovation and internationalisation speed. The results of empirical analyses suggest the positive and significant effect of radical co-innovation on internationalisation speed. The rationale for this relationship could be explained based on learning literature. Radical co-innovation is a form of learning that encourage firms to take risks that are inherent in the development of radical innovations and seek external knowledge (Menguc & Auh, 2006). In this way, firms build and nurture the distinctive routines of learning for the acquisition and dissemination of market information. Radical co-innovation, therefore, represents an important activity that increases the confidence of SMEs to overcome the liability of foreignness and enter international markets soon after the founding of the firm (Chetty & Stangl, 2010). Another possible explanation of link between radical co-innovation and internationalisation lies in the conditions of the market. In the case of hostile climate within home markets, small firms need to quickly access the international markets for the financial viability of radical co-innovation (Acs, Morck, & Yeung, 2001; Oesterle, 1997). Thus, in the presence of adverse market conditions, radical co-innovation leads to internationalisation speed of SMEs.

Similarly, hypothesis H4 posits the positive relationship between radical co-innovation and internationalisation success. The empirical results confirm a positive and significant effect for H4. The relationship between radical co-innovation and internationalisation success can be rationalised from the perspective of environmental uncertainty. The growth of

international trade, along with globalisation, has reinforced the environmental uncertainty (Torkkeli et al., 2012). The environmental uncertainty involves the risks associated with foreign markets, including the enforcement of contracts and control over political risks (Gatignon & Anderson, 1988). If a small firm desire increased control in international markets, it needs to commit additional resources (Brouthers & Nakos, 2004). Therefore, by adopting the radical co-innovation as a strategic action, SMEs can be more conducive to internationalisation success. Radical co-innovation can provide SMEs competitive advantage through differentiation of their goods from their counterparties (Martín-Tapia, Aragón-Correa, & Rueda-Manzanares, 2010). It may be considered different and unique by international markets in uncertain environments (Zahra et al., 2000) and therefore important predictor of internationalisation success in SMEs (Baldauf, Cravens, & Wagner, 2000). Prior research on the SMEs has provided some support for the relationship between radical innovation and internationalisation success. For example, Hortinha, Lages, and Lages (2011) survey the manufacturing firms in Portugal and find that explorative innovation capability helps the firms to develop new competencies and thus achieve superior internationalisation success. Lisboa et al. (2011) further argues that innovative and differentiated products place the firms ahead of competitors and attract customer attention, thus increase the market effectiveness. This study adds to the previous literature by providing the positive and significant relationship between radical co-innovation and SMEs' internationalisation success.

Hypothesis H5 suggests a positive relationship between incremental co-innovation and internationalisation speed. The results of H6 suggested a positive, but insignificant effect of incremental co-innovation on internationalisation speed. This finding, contrary to what this study expected, is not completely surprising. The literature (e.g. Crossan & Berdrow, 2003; March, 1991, 2006) provide evidence that radical innovation, in many instances, may be more beneficial than incremental innovation particularly for internationalisation speed. While incremental co-innovation offers the modifications, these innovations are not sufficient for SMEs to compete in the dynamic markets (Freeman & Cavusgil, 2007). The insignificant relationship can be further justified based on the RBV (Barney, 1991) and behavioural theory of the firm (Cyert & March, 1963). According to these perspectives, internationalisation is seen as a process of increasing a firm's international involvement as a result of different resources and learning. As SMEs have limited resources and lack of experiential knowledge (Mitja et al., 2006), they may have limited strategic options available (O'Cass & Weerawardena, 2009). It is, therefore, understandable that incremental co-innovation may not lead to internationalisation speed due to minor modification of existing products or services. In the competitive marketplace, therefore,

manufacturing SMEs need to offer the radical innovations in order to achieve the internationalisation speed (Kiss & Danis, 2008).

Hypothesis H6 posits a positive relationship between incremental co-innovation and internationalisation success. With respect to the results, the findings indicate a positive and significant relationship between incremental co-innovation and internationalisation success. Several possible explanations exist for this relationship. For one, while incremental co-innovations are minor modifications, they also provide an advantage to manufacturing SMEs to imitate and rectify the mistakes of large counterparts. Indeed, as Child and Hsieh (2014) argue that informational and resource limitations faced by SMEs implies that they are bound to follow satisficing principles for internationalisation success. Given the limitations that lack of experience, unfamiliarity with foreign markets, and resource constraints can impose on a small firm, reliance on incremental co-innovation can have a positive role to play in internationalisation success. Prior scholars also suggest that incremental co-innovation generates more positive and predictable returns (Garcia & Calantone, 2002; Levinthal & March, 1993), which are perceived in terms of internationalisation success.

### **8.3.4 The mediation effect of strategic actions on the relationship between AMC and internationalisation performance**

The thesis addresses the question of 'how AMC leads to internationalisation performance of SMEs'. Providing an answer to this question is vital it focuses on the processes perspective in the RBV theory (i.e., how resources and capabilities are leveraged). Many scholars acknowledge that studies of competitive advantage using RBV require different approaches because resources themselves have no potential to provide competitive advantage (Tippins & Sohi, 2003). It can be due to the fact that resources can be commoditised through competitive imitation (Clemons & Row, 1991). However, the resources can be protected by embedding them in doing something; i.e., exploiting through processes, which ultimately act as a source of competitive advantage (Kearns & Lederer, 2003; Newbert, 2008). Stalk, Evans, and Shulman (1992), for instance, state that the competitive success depends on the transformation of capabilities into processes. Porter (1991, p. 108) argues that "*resources are not valuable in and of themselves, but they are only meaningful in the context of performing certain activities to achieve certain competitive advantage.*" RBV logic, therefore, suggests that the processes that exploit valuable, rare and difficult-to-imitate resources can be a source of sustained competitive advantage (Barney, 1991). In addition, Barney and Wright (1998) point that a firm must organise the processes efficiently to realise the full potential of its resources and

capabilities. In doing so, this study contributes specifically to AMC literature by exploring the role of strategic actions as mediator between AMC and internationalisation performance. This also helps to make the RBV as a robust theory by explaining its boundary conditions.

Rather than paying attention on strategic actions, the previous studies considered the direct empirical link by focusing on the impact of AMC on alliance performance (Kale & Singh, 2007; Schilke & Goerzen, 2010) or firm performance (Schreiner et al., 2009). Radical and incremental co-innovation as strategic actions is particularly important since SMEs actively seek IOC for the generation of innovation (Colombo, Laursen, Magnusson, & Rossi-Lamastra, 2012; Narula, 2004). This study shows that understanding of strategic actions is useful, because although AMC underlies different types of firm performance, the benefits that firms actually gain depends on the types of strategic actions that a small firm undertake. This is consistent with the viewpoint of Priem and Butler (2001) and Ray et al. (2004) suggesting that a firm's overall performance depends on the implementation of particular strategic actions. This study, therefore, paid attention to radical and incremental co-innovation as appropriate strategic actions to leverage the value of AMC for SMEs' internationalisation performance.

The discovery of the partial and full mediation effect is perhaps one of the most important contributions to the AMC literature. Until now, the AMC literature concluded that AMC is related to inter-organisational interaction quality and new product development (Emden, Calantone, & Droge, 2006; Leischnig et al., 2014). Also, there are handful studies to examine exploration/exploitation to leverage AMC for firm performance (Kauppila, 2015). However, the previous studies are salient with respect to the mediation effect of strategic actions for the relationship between AMC and internationalisation performance of SMEs. Using a number of mediation tests, this study confirmed that radical co-innovation mediates the relationship between AMC and internationalisation performance. In terms of effect size, radical co-innovation fully mediates the relationship between AMC and internationalisation speed. In turn, radical co-innovation partially mediates the relationship between AMC and internationalisation success. Support of this mediated model suggests that both AMC and strategic actions are necessary antecedents for the internationalisation performance of SMEs. Possession of AMC allows the successful execution of strategic actions, which enhance internationalisation performance. Stating differently, greater complexity of strategic actions needs the AMC to successfully manage the joint actions, which ultimately result in internationalisation performance of SMEs. Hence, it can be concluded that both internationalisation speed and internationalisation success can be strengthened by raising the level of radical co-innovation.

With respect to the mediating effect of incremental co-innovation, this study found that incremental co-innovation has no mediation effect on the relationship between AMC and internationalisation speed. On the contrary, incremental co-innovation has a partial mediation effect on the relationship between AMC and internationalisation success. These results suggest that incremental co-innovation strengthens the internationalisation success, but not internationalisation speed. Although incremental co-innovation refines the existing innovations, internationalisation speed require the ground-breaking innovation by SMEs (Chetty & Stangl, 2010; Laanti, Gabrielsson, & Gabrielsson, 2007). Therefore, the risk and cost of foreign entry speed makes the SMEs' incremental co-innovation as a less desirable strategy for internationalisation speed (Vasilchenko & Morrish, 2011).

### **8.3.5 The moderation effect of alliance partner diversity and foreign market knowledge**

Several factors have been investigated in this study as potential moderators of the relationship between AMC, strategic actions and internationalisation performance. Specifically, two moderating factors are considered: 1) alliance partner diversity and 2) foreign market knowledge. The alliance partner diversity exerts a moderating influence on the linkage between AMC and strategic actions. Foreign market knowledge has a moderating effect on the relationship between strategic actions and internationalisation performance. The following section discusses the effect of each moderating factor.

First, while scholars have recently begun to examine the AMC-joint actions relationship, there has been no study to date that has studied the role of alliance portfolio characteristics between AMC and strategic actions. Recently, a number of studies have argued that alliance portfolio characteristics need to be considered to evaluate the main effect of AMC (see for example, Duysters et al., 2012; Schilke & Goerzen, 2010). Given the emerging nature of this field, one of the objectives of this study was to integrate AMC and alliance portfolio literature to explore the moderating role of alliance partner diversity for the relationship between AMC and strategic actions in manufacturing SMEs. Accordingly, the hypothesis H7 predicted and confirmed that partner diversity positively moderates the relationship between AMC and radical co-innovation in SMEs such that high level of partner diversity increases the AMC that maximise radical co-innovation. Moving on, hypothesis H8 posited and established that partner diversity positively moderates the relationship between AMC and incremental co-innovation in SMEs such that low level of partner diversity increases the AMC that maximise incremental co-innovation.

In brief, the above mentioned results indicate that not all diversity levels are valued equally. AMC is more fruitful for incremental co-innovation when alliance partner diversity is lower, but AMC is linked to radical co-innovation when alliance partner diversity is high. Perhaps, some prior studies that focused on the direct effect of alliance partner diversity without accounting for its moderating effect and produced conflicting findings. For instance, Oerlemans et al. (2013) considered the effect of alliance portfolio partner diversity on both radical and incremental innovation. They found that level of alliance portfolio partner diversity that maximises innovation is higher for incremental innovation than radical innovation (Oerlemans et al., 2013). This is in line with the reasoning that radical innovation is more unpredictable and thus the creation of radical innovation requires the access to scarce capabilities from limited partners (Feller, Parhankangas, & Smeds, 2006; Laursen & Salter, 2006). However, this study suggests that, in manufacturing SMEs, the inflow of diverse knowledge brings novelty to the firm. From the RBV perspective, IOC helps the smaller firms to complement their internal innovation efforts (Zeng et al., 2010). Since resource and capabilities differ between partners, different relationships lead to diverse resources and information (Belderbos et al., 2004). Due to these characteristics, the features of radical innovation can be more easily recognised by small firms through a high degree of alliance partner diversity (Bougrain & Haudeville, 2002; Classen et al., 2012). However, high alliance partner diversity has a difficulty of inferences because the alliances differ in many aspects (Zollo & Winter, 2002). Also, at high level of diversity, too many ideas can reach to the focal firms and thus firms have difficulty in managing those ideas (de Leeuw et al., 2014). Therefore, AMC helps to manage the partnerships and choose the best ideas from the diverse portfolio to take optimal advantage. Thus, it can be inferred that AMC is positively linked to radical co-innovation at a high level of alliance partner diversity. With respect to incremental co-innovation, it is less risky and require less specialised external actors (Ritala & Hurmelinna-Laukkanen, 2013). SMEs can benefit from a low portfolio of partners. In this case, AMC allows the small firms to effectively exchange knowledge from a limited portfolio of alliances to make incremental co-innovation.

Second, the international business literature apprehended the concept of foreign market knowledge and widely linked to internationalisation performance (Musteen et al., 2014; Zhou, 2007). In addition, the research considered market knowledge as a moderating factor for radical innovation performance (Zhou & Li, 2012). However, researchers, to date, have not considered the role of market knowledge for the relationship between strategic actions and internationalisation performance. Therefore, this study considers foreign market knowledge as a moderating factor between strategic actions and

internationalisation performance. Accordingly, H9a, H9b, H10a and H10b are suggested to regress the dependent variables, namely, internationalisation speed and internationalisation success on foreign market knowledge. The result shows that relationship of radical co-innovation on internationalisation success is strengthened by the degree of foreign market knowledge, such that high level of foreign market knowledge strongly moderates the positive relationship between radical co-innovation and internationalisation success. This insight is consistent with Zhou and Li (2012) argument that the strong knowledge base of the firm helps to combine and use disparate knowledge for radical innovation. Therefore, SMEs can use foreign market knowledge to develop radical co-innovations, according to the desires of foreign customers, which provides a base for internationalisation success. The results, however, have not provided support for the moderating effect of foreign market knowledge on the relationship between radical co-innovation-internationalisation speed (H9a), incremental co-innovation-internationalisation speed (H10a) and incremental co-innovation-internationalisation success (H10b). One possible explanation is that foreign market knowledge is less sensitive to the technological developments created by strategic actions.

### **8.3.6 The effect of control variables on hypothesised relationships**

This study considered some profiling variables and strategic factors as control variables, which allowed to control for endogeneity (that is omitted variable bias) and to draw further implications of hypothesised relationships (Abbott & Klaiber, 2011; Eshima & Anderson, 2017). Literature has widely considered three variables that might potentially confound the results: industry type, firm size and R&D intensity (Berchicci, 2013; Wu, Chuang, & Hsu, 2014). Firm size and industry type have been important contingency factors and are important for SMEs (Grimpe & Kaiser, 2010; Håkonsson, Burton, Obel, & Lauridsen, 2012; Tsai, 2009) because large firms in the high-technology industry can dedicate more resources to develop routines for firm performance (Camisón & Villar-López, 2014). Strikingly, this study found that firm size and industry type has a significant effect on the study's relationships. However, there was no significant effect of R&D intensity. These findings have important insights.

First, differentiating SMEs with regard to their industry type leads to significant observation. The beta coefficients for industry dummies are significant, indicating that sectoral variations affect the co-innovation and internationalisation of SMEs. This is consistent with the previous studies that considered the industry type as a control variable (Nakos & Brouthers, 2002). More specifically, in this study, AMC causes a variety of influences on strategic actions, which ultimately effect on internationalisation performance

under different industry types. For instance, by looking at Table 8-1, it can be inferred that SMEs operating in high-technology pay more attention to AMC for radical as well as incremental co-innovation and to radical co-innovation for both internationalisation speed and success. In fact, high-technology SMEs do not need to spend a lot of time to develop radical innovations and achieve internationalisation performance. The results are consistent with previous studies arguing that high-technology firms hiring external R&D services are more likely to internationalise (Martinez-Gomez, Baviera-Puig, & Mas-Verdú, 2010). On the other hand, medium-technology firms appreciate the role of AMC for radical as well incremental co-innovation, see Table 8-1. In addition, incremental co-innovation has an overwhelming role in the internationalisation success in the medium-technology SMEs. This is consistent with the view of Tsai (2009), who argues that firms working in medium technology industry adopt a reactive strategy and focuses on marginal modification of innovation to meet customer needs. This strategy leaves the SMEs to the tyranny of the served markets in which they perceive higher success. Finally, SMEs in low-technology industry tended to prefer radical co-innovation for internationalisation success. Although previous studies argue that innovation is common among high-technology firms (Thornhill, 2006), this study confirms that manufacturing SMEs in low-technology industry have potential for radical co-innovation and internationalisation success. This is consistent with RBV that access to unique resources of external partners is a source of competitive advantage.

Table 8-1: Summary of the discussion for industry type as control variable

No:	Relationship	Industry			Discussion
		High-Tech	Medium-Tech	Low-Tech	
1	AMC ----- > Radical co-innovation	✓	✓	✓	IOC exposes a firm to different partners and environments. The possession of AMC allow manufacturing SMEs' to have potentially rare resource combination that supports the engagement in unorthodox strategic actions (Schrettle, Hinz, Scherrer -Rathje, & Friedli, 2014). Results confirm that AMC is vital for radical co-innovation in every manufacturing industry.
2	AMC ----- > Incremental co-innovation	✓	✓	✓	Incremental co-innovation is important for manufacturing firms to remain competitive (Ye, Marinova, & Singh, 2007). However, the effective implementation of incremental co-innovation requires the synchronisation with firm resources (Wei, Samiee, & Lee, 2014). Therefore, AMC is critical for incremental co-innovation in low, medium and high technology firms.
3	Radical co-innovation ----- > Internationalisation speed	✓	✗	✗	In high-technology firms, competitive pressure can quickly alter the firm's competitive context (Ndofor et al., 2011). Therefore, complexity of strategic actions can increase the firm performance because underlying strategic actions effectively utilise the technology potential of firms. Thus, radical co-innovation (as a complex strategic action) allow the high-technology SMEs to internationalise soon after the inception.
4	Radical co-innovation ----- > Internationalisation success	✓	✗	✓	While high-technology industries stress on R&D and commitment of resources, low-technology industries also use high-technology knowledge in the radical innovation tasks in collaboration with partners (Santamaría, Nieto, & Barge-Gil, 2009). The findings reveal the great importance of radical co-innovation for internationalisation success of high-technology and low-technology industries.

No:	Relationship	Industry			Discussion
		High-Tech	Medium-Tech	Low-Tech	
5	Incremental co-innovation ----- > Internationalisation speed	*	*	*	Since incremental co-innovations are minor modifications in the existing products, it is favoured by existing customers, but forgo exploration of new markets (Zhou & Li, 2012). Consistent with this argument, the results suggest that incremental co-innovation has insignificant influence on internationalisation speed of technology-intensive and non-technology SMEs.
6	Incremental co-innovation ----- > Internationalisation success	*	✓	*	Firms working in medium technology industry adopt a reactive strategy and focuses on marginal modification of innovation to meet customer needs, which ultimately result in internationalisation success.

**Notes:**

- 1: ✓ Represents significant relationship  
2: \* Represents not-significant relationships

Second, firm size significantly moderates all the study's relationships. This is consistent with previous studies, which argue that firm size is an important determining factor for innovation and internationalisation (Filatotchev et al., 2009). In this study, firm size is considered as a dichotomy between small-sized firms and medium-sized firms. The results suggested that radical co-innovation has a stronger influence on internationalisation speed in medium-sized firms. Medium-sized firms tend to be entrepreneurial (Fernández & Nieto, 2006), which is not surprising as they are usually better-off than small-sized firms. As a result, they find it easy to find resources, launch radical innovations and rapidly enter into foreign markets. On the other hand, radical co-innovation has a slightly higher impact on the internationalisation success of small-sized firms. This study submits that small-sized are in an advantageous position to capitalise on radical co-innovation. Given the informal and centralised decision-making nature of small-sized firms, it can be relatively easier for them to communicate and develop the innovations according to foreign needs (Pangarkar, 2008). In addition, being unconstrained by the established routines, small firms possess the learning advantages of radical innovation for internationalisation success (Autio, Sapienza, & Almeida, 2000). The results of the relationship between incremental co-innovation – internationalisation success suggested a slightly higher impact for the medium-sized firms. This can be rationalised based on the learning perspective, which suggest that internationalisation is a process of learning and accumulation of knowledge accumulation (Basly, 2007; Bruneel et al., 2010). This study found that incremental co-innovation has no significant effect on internationalisation speed of both sized firms – small as well as medium. This is somewhat consistent with prior literature. For instance, Acs et al. (1997) argue that internationalisation of SMEs' innovation can be intimidated by large firms. This suggests the too little diffusion of SMEs' incremental co-innovation for internationalisation speed.

Finally, R&D intensity has insignificant effect on the radical co-innovation and incremental co-innovation. This study confirms that R&D intensity has no effect on the relationship between AMC and strategic actions. For SMEs, the involvement in external innovation efforts is independent of internal innovation activities. This may imply that due to the resource-constraints of SMEs, they need to leverage their counterparts' resource to leverage radical and incremental innovation, in line with the RBV (Barney, 1991; Gnyawali & Park, 2009). Previous studies also suggest that internal R&D efforts are not necessarily related to the nature of knowledge exchanged in the collaboration relationships (de Jong & Freel, 2010).

## **8.4 Study contributions**

This section summarises the contributions of study at two different levels: theoretical and methodological. Below, these contributions are demonstrated in detail.

### **8.4.1 Study theoretical contribution**

Overall, six key theoretical contributions are provided to the existing RBV literature in general, and IOC and AMC literature in specific.

First, following the RBV logic, the effect of resources on actions and ultimately on performance is investigated. AMC are regarded as resources that are valuable, rare, difficult to imitate and non-substitutable. In addition, these resources are vital for the creation of firm's competitive advantage. However, mere possession of resources is not sufficient condition to develop the competitive advantage or create the value (Barney & Arian, 2001; Sirmon et al., 2007). To realise the value potential of resources, firms need appropriate actions to exploit the resources (Ray et al., 2004; Sirmon & Hitt, 2003). The static RBV researchers take a frequent strategic approach to link resources with performance without opening the black-box of processes (Priem & Butler, 2001). Stating differently, it is still unclear as to how AMC lead to the performance of SMEs. The ambiguity of this question could limit the usefulness of RBV for strategy research. This study alleviates this ambiguity by extending the RBV logic to explain the link between resources, actions and performance. In doing so, innovation activities - namely radical co-innovation and incremental co-innovation - are conceptualised as unique forms of strategic actions that are needed to leverage resources for performance. Thus, this study focused on the interrelationship between AMC, strategic actions and performance within the context of SMEs. In this way, this study has contributed to the extension of RBV logic.

Second, this study adds to the body of knowledge by investigating how SMEs can capitalise on strategic actions to leverage the potential value of AMC for internationalisation performance. This part of the research, therefore, contributes to AMC, IOC, and innovation and internationalisation literature. Notwithstanding the significant literature advocated the role of the AMC for innovation and internationalisation performance of SMEs (see section 2.3.2) (Bougrain & Haudeville, 2002; Ritter & Gemünden, 2003; Tolstoy & Agndal, 2010), the interplay between AMC, strategic actions and internationalisation performance has received scant attention (Filatotchev et al., 2009). Acedo and Jones (2007, p. 248) argue that "external factor may influence the speed with which internationalisation is commenced." Therefore, one of the important contributions to the pertinent literature would be to investigate the role of collaborative innovation in the internationalisation

performance of SMEs. This study, thus, aimed at addressing this gap to link the resources with strategic actions (that is radical co-innovation and incremental co-innovation), which ultimately lead to internationalisation performance (i.e. internationalisation speed and internationalisation success). By doing so, the first empirical support was found for the significant full and partial mediating effect of radical and incremental co-innovation for the relationship between AMC and internationalisation performance.

Third, the contribution is towards the extant AMC literature by empirically testing the AMC construct and its dimensions (that are inter-organisational coordination, inter-organisational learning, alliance transformation, alliance proactiveness and alliance bonding) in the context of SMEs. Despite extensive research in the AMC literature acknowledges the second-order nature of AMC construct (Kauppila, 2015; Leischnig et al., 2014) and identifies a number of its constituent dimensions (Schilke & Goerzen, 2010; Schreiner et al., 2009), there is a dearth of research to integrate the AMC's dimensions in one study, particularly in the context of SMEs. While the critical importance and advantages of IOC for SMEs has long been recognised, the apparent benefits of AMC for IOC of SMEs has been neglected area of research. Thus, the study widened the scope of AMC research and provided the sufficient evidences for the appropriateness of AMC for small-sized firms. The findings also confirm the package nature of AMC that makes alliance management capability particularly relevant for SMEs.

Fourth, the study contributes to the antecedents and outcomes of radical co-innovation and incremental co-innovation. In terms of outcome, this study provides empirical support for the assumption that radical co-innovation increases internationalisation speed as well as internationalisation success, but incremental co-innovation increases only internationalisation success. The results add to the findings that it takes strong technological efforts to attain internationalisation speed. SMEs can attain the benefits of internationalisation speed with radical co-innovation, while, in contrast, incremental co-innovation is only useful to attain internationalisation success. Besides providing an overview of outcomes of strategic actions, the study adds to the understanding of the antecedents of strategic actions. Prior studies have documented the role of perceived customer benefits for innovation co-creation (i.e. product support) (Nambisan & Baron, 2009). However, it has been missing that involvement in IOC for innovation activities is dependent on organisational capabilities for managing such relationships. Considering the fact that SMEs depend upon firm-level capabilities for managing IOC (Löfgren, 2014), it is surprising that it has been overlooked by researchers for radical co-innovation and incremental co-innovation. This study, therefore, considers the role of the AMC for radical co-innovation and incremental co-innovation. Specifically, SMEs using IOC for radical

activity needs to have high AMC to help the radical co-innovation. At the same time, SMEs need to possess AMC to support the IOC for incremental activities, resulting in incremental co-innovation. However, the results suggest that AMC has increased effect on radical co-innovation as compared to incremental co-innovation. This is consistent with the argument of the Rothaermel and Deeds (2006), suggesting that the bureaucratic nature of partners who involves in radical co-innovation demands effective management routines. The result contributes to the IOC and innovation literature such that SMEs need to make strategic decision as to whether choose radical co-innovation or incremental co-innovation.

Fifth, the contribution of this research is to IOC literature. Particularly, the role of alliance partner diversity is widely acknowledged in the IOC literature (de Leeuw et al., 2014; Jiang et al., 2010). However, to date, there is no empirical research to investigate the moderating effect of alliance partner diversity on the relationship between AMC and strategic actions. Schilke and Goerzen (2010) argue that it is worthwhile to examine the moderating effect of alliance portfolio characteristics since it is difficult to manage the alliances. Thus, this study is first to test the moderating effect of alliance partner diversity, specifically in the context of small firms. The results provide a unique contribution to this research in terms of understanding the effect of low/high level of alliance partner diversity on the relationship between AMC and radical/incremental co-innovation.

Finally, sixth, the study contributes to the empirical record of ways. An empirical evaluation of the role of context for the relationship between AMC, strategic action and internationalisation performance is presented. Several different sources of contexts have been utilised and evaluated, including SMEs, manufacturing industries and UK economy. The results suggested that hypothesised relationships vary depending on the size of firms, where medium-sized firms are advantaged. In terms of manufacturing industry, this study considered the technology intensity of SMEs and observed three categories: high-technology, medium technology and low-technology. The results of the multi-group analysis suggested that technology intensity of firm's matters for the study's relationships. In the most cases, high-technology SMEs are favoured to gain better internationalisation performance.

#### **8.4.2 Contribution to methodology**

This study offers some methodological contributions by developing, operationalising and empirically testing the scales to assess strategic actions. In particular, the development of multi-item measures for radical co-innovation and incremental co-innovation is worthy of

report. Although researchers have previously alluded to the notion of co-exploration and co-exploitation (Kauppila, 2015; Parmigiani & Rivera-Santos, 2011), to date, studies did not attempt to operationalise the constructs of radical and incremental co-innovation. Therefore, it is argued that to advance the comprehension of radical co-innovation and incremental co-innovation, new scale development is essential. Accordingly, measures for radical and incremental co-innovation are developed for this study and are based upon Bierly and Daly (2007) and Parmigiani and Rivera-Santos (2011). By testing these scales across a range of manufacturing industries, the study has shown that developed scales provide a good degree of generalizability. Also, by developing, evaluating and validating the measures, methodological opportunities are provided for researchers in this area to expand the understanding of radical and incremental co-innovation.

### **8.5 *Practical implications***

The central argument and finding of the study is that SMEs can capitalise on strategic actions to leverage the potential value of AMC for internationalisation performance. In particular, the specific alliance management routines are identified that are fundamental for the success of alliances in the context of SMEs. In addition, strategic actions are identified as a bridge between AMC and internationalisation relationship. Finally, a number of moderators are recognised to impact on the relationship between AMC, strategic actions and internationalisation performance. Accordingly, a number of managerial and practical implications can be drawn from the results of the study.

First, this study provides guidance regarding the success of collaboration relationships. Managers can analyse the alliance management routines of their own company, which helps in deciding if alliances are a success-promising option for the company. On the other hand, weak management routines that require further improvement can be detected and developed. The adherence of these alliance management routines is shown to have a significant association with strategic action. Based on this knowledge, managers will be able to fine tune their alliance management routines and significantly improve their joint actions. In particular, inter-organisational coordination, alliance bonding and alliance proactiveness are core routines to establish alliance transformation and inter-organisational learning routines. SMEs need to have a corporate culture that is characterised by high alertness with the external environment. Alliance proactiveness routines can help managers to identify the potential opportunities in the external environment. SMEs should possess effective routines to establish close ties with partners and facilitate the bonding routines. With respect to alliance transformation, SMEs are characterised as flexible, but they need openness to transform the existing practices and

alliance structures if required. In addition, SMEs need adequate routines to transfer the knowledge across organisational boundaries and thus improve inter-organisational learning. By developing the routines for coordinated interactions, SMEs can develop AMC that lead to efficient strategic actions, which in turn improve internationalisation performance.

Second, the findings of this study also suggest that managers should develop value creation mechanisms. It helps to realise the strategic objectives that are mutually beneficial for allying partners. For instance, radical and incremental co-innovation are strategic actions that are based on the value creation mechanism. In addition, SMEs' managers should always strive towards developing AMC by considering the nature of strategic actions. The immediate insight from this finding for managers is that where possible, alliance department/managers should benchmark the value of AMC for strategic action considering its complexity.

Third, managers should recognise that different type of alliance partners has different type of requirements in terms of AMC and strategic actions. Specifically, alliance partner diversity in this study could be seen as a strategic road map for managers who attempt to develop strategic actions. Exposure to high level of partner diversity appears to provide tangible benefits of radical co-innovation. Consequently, AMC provides benefits for radical co-innovation when alliance partner diversity is high. In contrast, incremental co-innovation is minor modification and thus AMC leads to incremental co-innovation when alliance partner diversity is low. In combination with the point made above, managers need to gather general information about the diversity of partners and accordingly develop AMC routines for strategic actions.

Fourth, this study has implications for policy-makers in developed countries like UK. There is growing need to increase the internationalisation performance of SMEs as the competition in the global marketplace is increasing. The results suggest that SMEs can achieve internationalisation performance through strategic actions. To this end, SMEs need to develop innovation through external linkages. Therefore, an important implication for policy-makers who want to stimulate the upgrading of SMEs' innovation and internationalisation is that they should offer flexible public mechanisms for efficient provision of collaborative activities.

Fifth, as a final point, this study has implication to develop and support manufacturing SMEs for the fourth industrial revolution (i.e., digital manufacturing, smart manufacturing, cloud manufacturing and the internet of things). According to McGregor (2017), SMEs

need to develop a balanced innovation plan to drive competitiveness, productivity and growth using digital manufacturing approaches. In addition, digital transformation is required to support the process of design, the production procedure and the life cycle of products (LCR4.0, 2017). The findings of this study suggest that manufacturing SMEs can utilise AMC to manage collaborative innovation activity, which ultimately leads to internationalisation performance. In accordance with this, it is sufficient to argue that AMC allow the SMEs to utilise digital technologies with external partners, which make SMEs more responsive and capable of responding to changing demands of customers, supplier conditions and technology availability (McGregor, 2017).

### **8.6 Limitations and future research**

Despite the extensive contribution of this study and both theoretical and practical implication, there are some unavoidable limitations. It is important to acknowledge that most of the limitations stem from the arrangements made during the design of the study, which result in a number of promising avenues for future research.

First, this study focused on the manufacturing SMEs in the UK. Although the focus on a specific industry avoided the turbulence caused by uncontrollable factors in cross-industry studies (Weigelt & Sarkar, 2012), the distinctiveness of this research setting limits the generalisability of findings to the significantly different population, given the fact that environmental and cultural differences prevail among industries and countries (Hughes & Morgan, 2008). Therefore, an apparent limitation of this study could be the generalisability of result. However, the research believes that the similarities between this study context and others, such as the context of SMEs in other European countries will make the study's findings reliably generalizable to such contexts. Future research could extend the study by testing the generalisability of findings in other countries and services industries.

Second, this study is cross-sectional in nature and does not apprehend the changes in internationalisation performance across times. In addition, the study does not capture the longitudinal alliance related data, such as information about AMC and also data about internationalisation process of SMEs. Longitudinal data is critical, as the SMEs performance change from year to year in varying degree across countries. Future studies can fill this void by developing the longitudinal profile of alliance capabilities and internationalisation process of SMEs.

Third, a single key-informant approach was adopted to collect data for both dependent and independent variables, as opposed to multiple-informant approach. To safeguard against the issue of common method bias, a number of procedural remedies were

incorporated when designing the questionnaire (Podsakoff et al., 2003). For example, separate scale formats were used for dependent and independent variables. The attention was paid to select the well-qualified respondents with sufficient knowledge about the variables of this study. In addition, the possible impact of common method bias was assessed using a number of statistical tests were (Podsakoff et al., 2003). The results suggested that the common method bias is not an issue in this study. In addition, this study focused on very specific activities (as vs. broader activities such as culture of organisation where heterogeneity exists), which mitigate the weaknesses associate with single-informant approach (Venkatraman & Grant, 1986). To provide the support for the single-informant approach, earlier studies suggest that single-informant approach can generate reliable data (Zhou, Tse, & Li, 2006). However, single informant is acknowledged as a possible limitation because one person's reality cannot represent the quality/characteristics of the organisation (Kumar, Stern, & Anderson, 1993; Van Bruggen, Lilien, & Kacker, 2002). Future studies can consider multiple-informants while collecting the cross-sectional data.

Fourth, this study represents an initial attempt to uncover the resource-actions-performance model generally in the context of AMC and particularly in the context of SMEs. In doing so, this study considered alliance characteristics as important moderator of the relationship between AMC and strategic actions. However, some important contingent factors are missing, such as environmental uncertainty and social capital. Particularly, it may be worthwhile to examine the role of environmental uncertainty, since high environmental uncertainty generates many unexpected contingencies (Wang, Yeung, & Zhang, 2011). Therefore, in case of environmental uncertainty, AMC may help firms to cope with inevitable uncertainties and generate appropriate rents from joint actions. Further research should model additional contingent factors.

Finally, this study examines the effect of AMC on strategic actions, which ultimately lead to internationalisation performance. However, it should be noted that another stream of literature investigated the concept of learning-by-exporting and found that internationalisation can derive the innovation performance of SMEs (Higón & Driffield, 2011; Love & Ganotakis, 2013). In contrast, some scholars have advanced the idea that innovation and internationalisation are complementary strategies for SMEs growth (Damijan, Kostevc, & Polanec, 2010; Golovko & Valentini, 2011). Particularly, it has been argued that internationalisation promotes the learning of firms, and thus enhances innovation performance. At the same time, firms can enter new international markets with novel products. Of particular interest to this study has been the significance of innovation for internationalisation performance of SMEs. In fact, innovation helps SMEs' to transform

ideas, knowledge and resources into new products and processes that create value for internationalisation (Caldera, 2010; Vicente, Abrantes, & Teixeira, 2015). Furthermore, this study finds strong evidence of the importance of joint innovation activities for increased internationalisation performance. Notwithstanding, it is logical to believe that SMEs learn by internationalisation and thus improve innovation performance. Although this arrangement was beyond the scope of this study, further research can consider the impact of internationalisation on innovation performance of SMEs.

## **8.7 Conclusion**

The IOC has become an increasingly popular aspect of firm's strategy particularly for innovation and internationalisation (Andersson et al., 2013; Boso, Story, Cadogan, Micevski, & Kadić-Maglajlić, 2013; Mesquita & Lazzarini, 2008). Despite the popularity, however, IOC has high failure rate and early termination (Madhok et al., 2015). The reasons for failure are manifold and a number of explanations are provided in the literature, like lack of resource complementarity. Particularly in the context of SMEs, many collaborations fail due to lack of coordination mechanisms and insufficient absorptive capacity (Berends et al., 2014).

With interest growing in collaboration failures, researchers turned the attention to organisational level capabilities, known as AMC, to effectively manage the IOC. On the one hand, this previous advancement in AMC is credible, given that firms develop routines/capabilities to cooperate with partners to achieve collaboration goals (Howard et al., 2016; Zaremba, Bode, & Wagner, 2017). However, on the other hand, the previous studies have important shortcomings. Indeed, there is prior evidence that AMC can promote alliance success as well as firm performance (Schreiner et al., 2009). However, it is still unclear how actions facilitate the link between AMC and firm performance. This is also an important shortcoming in the RBV researcher because researchers contend that resources alone are not sufficient to provide competitive advantage (Newbert, 2007). In contrast, firms need to undertake actions in order to utilise the value of resources for performance (Ketchen, Hult, et al., 2007). Further, the prior AMC research is limited to large firms, thus leaving the SMEs as potential area of research given the unique challenges of small firms to manage IOC.

To address these gaps, the study sets out to investigate the role of strategic actions to leverage AMC for the internationalisation performance of SMEs. Strategic actions are conceptualised in terms of innovation activities: radical co-innovation and incremental co-innovation. The extant literature on the interrelationship between IOC, innovation and

internationalisation in SMEs was reviewed in a systematic way. The systematic review suggested that the path from innovation to internationalisation is of greater importance rather than the internationalisation to innovation. This is due to the fact that small resource-constrained firms need unique ways of overcoming the liability of smallness and foreignness for internationalisation (O'Cass & Weerawardena, 2009). The literature on internationalisation suggests that SMEs with innovative products or process challenge the conventional wisdom and directly enter into foreign markets (Shearmur et al., 2015). This view reflects the need to conceptualise the link between innovation and internationalisation of SMEs. Further to this, the study critically reviewed the literature on AMC and its performance implications. Next, the conceptual model was developed relying on the RBV as theory and, IOC, AMC and international business literature.

The study adopts the quantitative approach and survey data is collected from UK manufacturing SMEs. The survey was launched using Qualtrics platform where a unique link was sent to the participants. 278 valid responses were received, which represents a satisfactory response rate. The data is analysed using two factor analysis techniques: EFA and CFA. Overall, the results of both techniques suggest the reliability and validity of measurement scales. In addition, the results of CFA suggest a good measurement model.

The findings of the study provide support for the majority of hypotheses relationships. The relationship between AMC and radical co-innovation as well as the link between AMC and incremental co-innovation is supported. However, the results suggest that AMC have larger positive impact on radical co-innovation compared to incremental co-innovation. In addition, alliance partner diversity moderates the linkage between AMC and strategic actions such that 1) high level of partner diversity strongly moderates the positive relationship between AMC and radical co-innovation and 2) low level of partner diversity strongly moderates the positive relationship between AMC and incremental co-innovation. Following on this, the relationship between strategic actions and internationalisation performance is tested. The results provide the support for the link between 1) radical co-innovation and internationalisation speed, 2) radical co-innovation and internationalisation success and 3) incremental co-innovation and internationalisation success. However, the relationship between incremental co-innovation and internationalisation speed is not supported significantly in the sample. Next, with respect to foreign market knowledge, results suggest that high level of foreign market knowledge strongly moderates the positive relationship between radical co-innovation and internationalisation success. However, the moderating effect of foreign market knowledge is not supported for the following paths: 1) radical co-innovation to internationalisation speed, 2) incremental co-innovation to internationalisation speed and 3) incremental co-innovation to

internationalisation success. Controlling for the firm size, some relationships are not proven significant in small firms as compared to medium-sized firms. Considering industry type as a control variable, the model relationships are more effective for high technology and medium-technology firms. The potential explanation for the study's results is discussed in previous sections.

This study makes four key contributions. First, this study adds to the RBV research and establishes a link between resources, actions and firm performance. This is an important contribution to existing RBV research, since empirical representation of the path between resources and performance has been missing. This study adheres to the recommendation of Newbert (2007) and Kraaijenbrink et al. (2010) and includes the mediating role of strategic actions between resources and performance. Second, this study sheds light on strategic actions between resources and performance by contributing to AMC literature. Earlier AMC literature employed a straight-forward approach to link AMC with alliance success (Schilke & Goerzen, 2010) or firm performance (Schreiner et al., 2009). The study examines radical co-innovation and incremental as relevant strategic actions to gain the benefits of AMC. It is shown that AMC is appropriate for internationalisation performance of SMEs through strategic actions. Third, from an empirical perspective, this study examines the relationship between AMC, strategic actions and internationalisation performance in the context of SMEs. The results suggest that it is not appropriate to implement the practices of AMC for the large in the context of small firms. Finally, this study also sheds light on the moderating effect of some of the structural and strategic factors such as, partner diversity and foreign market knowledge, as suggested in the future recommendations of previous studies (Schilke & Goerzen, 2010). In particular, the results suggested that alliance partner diversity moderates the relationship between AMC and strategic actions.

The study has implications for managers and policy makers. The focus on strategic actions should be analysed as to whether it matches to organisational capabilities in order to provide the performance benefits. Therefore, SMEs need to match resources with strategic actions in order to yield the benefits of performance. Particularly, to manage the IOC based actions, SMEs need to develop effective organisational routines to manage the collaboration relationships. Despite the important implications, this study has some limitations. The study relies on cross-sectional data collected from single informants. This can create a potential bias in the study's results.

To conclude, despite the limitations, it is believed that this study has extended prior knowledge by providing valuable insights about the link between AMC, strategic actions

and internationalisation performance of SMEs. It is expected that the conceptual model of this study will guide the future research in this area.

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# Appendices

## Appendix 1 - List of journals used in systematic review and numbers of articles

Journal title	Article count	Journal ranking (ABS 2015)
<b><i>Entrepreneurship and Small Business</i></b>		
Entrepreneurship Theory & Practice	2	Grade 4
Strategic entrepreneurship journal	1	Grade 4
Entrepreneurship & Regional Development	4	Grade 3
International Small Business Journal	1	Grade 3
Journal Of Small Business Management	12	Grade 3
Small Business Economics	2	Grade 3
<b><i>General Management/ Strategic Management/Organisation Studies/ Regional Studies Journals</i></b>		
Academy of Management Journal	1	Grade 4*
Journal of Management	1	Grade 4*
Strategic Management Journal	4	Grade 4*
Journal of Management Studies	1	Grade 4
Long Range Planning	2	Grade 3
European Management Review	1	Grade 3
Regional Studies	1	Grade 3
<b><i>Innovation and Operations Research Journals</i></b>		
Journal of Product Innovation Management	4	Grade 4
R&D Management	7	Grade 3
Technological Forecasting and Social Change	3	Grade 3
Technovation	14	Grade 3
International Journal of Production Economics	2	Grade 3
<b><i>Marketing Journal</i></b>		
Journal of Marketing research	1	Grade 4*
European Journal of Marketing	1	Grade 3
Industrial Marketing Management	5	Grade 3
Journal of Business Research	9	Grade 3
Journal of International Marketing	1	Grade 3
International Marketing Review	2	Grade 3
<b><i>Economics/ International Business Journals</i></b>		
Journal of International Business Studies	3	Grade 4*
Journal of World Business	5	Grade 4
Research Policy	12	Grade 4
Oxford Economic Paper	1	Grade 3
International Business Review	13	Grade 3
World Development	1	Grade 3
Total	117	

## Appendix 2 - Keywords and search strings

No:	Category	Search strings
1	Group string 1	"Inter-organisational collaboration " OR "Inter-firm cooperation" OR "Strategic alliances" OR "Network" OR "Partnership" OR "Cooperation" OR
2	Group string 2	"Innovation" OR "Innovativeness" OR "New product development" OR "Research & Development" OR "R&D" OR
3	Group string 3	"Exporting " OR "Internationalisation " OR "Foreign market entry" OR
4	Group string 4	"Small and medium-sized enterprises " OR "SMEs " OR "Small enterprises " OR "Small companies" OR "New small ventures" OR
5	Combined string 1	"Inter-organisational collaboration " OR "Inter-firm cooperation" OR "Strategic alliances" OR "Network" OR "Partnership" OR "Cooperation" AND "Innovation" OR "Innovativeness" OR "New product development" OR "Research & Development" OR "R&D" AND "Small and medium-sized enterprises " OR "SMEs " OR "Small enterprises " OR "Small companies" OR "New small ventures" OR
6	Combined string 2	"Inter-organisational collaboration " OR "Inter-firm cooperation" OR "Strategic alliances" OR "Network" OR "Partnership" AND "Exporting " OR "Internationalisation " OR "Foreign market entry" OR "Foreign direct investment" AND "Small and medium-sized enterprises " OR "SMEs " OR "Small enterprises " OR "Small companies" OR "New small ventures" OR
7	Combined string 3	"Inter-organisational collaboration " OR "Inter-firm cooperation" OR "Strategic alliances" OR "Network" OR "Partnership" AND "Innovation" OR "Innovativeness" OR "New product development" OR "Research & Development" AND "Exporting " OR "Internationalisation " OR "Foreign market entry" AND "Small and medium-sized enterprises " OR "SMEs " OR "Small enterprises " OR "Small companies" OR "New small ventures" OR

## Appendix 3 – Introductory cover letter



Nadia Zahoor

PhD Researcher in Management

The Business School

University of Huddersfield, United Kingdom

Email: [Nadia.Zahoor@hud.ac.uk](mailto:Nadia.Zahoor@hud.ac.uk)

Doctoral Research Project

Dear Sir/Madam,

Thank you for agreeing to take part in this research study that examines a significant topic related to the field of business management and is part of the requirements of the doctorate degree from The Business School, University of Huddersfield, United Kingdom.

**Purpose of Research Study.** Given the increasing importance of small and medium-sized enterprises in the development of any economy particularly United Kingdom, this study is timely. In this study, particularly 3000 owners/managers of firms will be invited to complete a survey questionnaire. The research study endeavours to identify the role of alliance management capabilities for strategic action and their impact on internationalisation performance in UK. The outcomes will benefit governments, policy-makers, practitioners, and academics nationally and internationally.

**Instructions.** This research study involves the completion of an anonymous survey questionnaire about alliance management, innovation and internationalisation as they apply to your firm and your experience with small and medium-sized enterprises. You are kindly requested to consider all questions as preceded with instructions on how to answer them. Please read the instructions and make your selection as requested. The survey questionnaire should take approximately 15-20 minutes.

**Definition of Terms.** The term *small and medium-sized enterprises* refer to all independent firms with more than 10 and less than 250 employees. The term *alliances/inter-organisational collaborations* refer to voluntary inter-organisational interactions between companies. They focus on joint goal setting, share innovation cost, exchange innovation ideas and working together to reduce cost of R&D. It improves innovations and competitive advantages through the combination of resources (e.g., specialist knowledge)

across company boundaries. The term innovation describes new products and processes or improvement in existing products and processes that have prevailed successfully in the market or a company. Internationalisation refers to the process whereby goods produced in one country are shipped to another country for future sale or trade.

**Ethical Concerns.** The research study involves the completion of an anonymous survey questionnaire. The University of Huddersfield Research Ethics Committee approved the questionnaire.

**Confidentiality.** Efforts will be made to keep your personal information confidential. The survey will be stored on personal storage device where only the researcher will have access to data. You will not be identifiable by name or description in any reports or publication about this study. Your answers will be grouped with the information from other participants.

**Right as a participant.** Taking part in this study is volunteer. You may choose not to take part or may leave the study at any time. If you agree to take part and then decide against it, you can withdraw any time.

**Whom to contact with questions or problems.** If you have any questions about the study, please contact me at +44 7476260603 or via email [nadia.zahoor@hud.ac.uk](mailto:nadia.zahoor@hud.ac.uk). Alternatively, you may wish to contact my academic supervisors Dr Omar Al-Tabbaa (+44 1484 473984/ [o.al-tabbaa@hud.ac.uk](mailto:o.al-tabbaa@hud.ac.uk)) and Professor John Anchor (+44 1484 472462/ [j.r.anchor@hud.ac.uk](mailto:j.r.anchor@hud.ac.uk)).

**Summary of Results.** If you would like to receive a summary of the results, please indicate your information below.

Address: .....

Email: .....

Thank you in advance.

Sincerely,

Nadia Zahoor

## Appendix 4 – Questionnaire for final study

### General demographic information

1. What is your position in the firm?
  - Owner/ Top management
  - Middle management
  - Lower management
  - Non-management/operative
2. How long have you been with your firm?
  - Less than 3 years
  - 3 to 5 years
  - More than 5 years
3. When was your firm established?  
Year: .....
4. How many full-time employees did your firm had in the last financial year?  
Number: .....
5. How many R&D employees did your firm had in the last financial year?  
Number: .....
6. Please specify your firm type
  - A private limited firm
  - A public limited company
  - An unlimited company
  - Other (please specify) -----
7. In which industrial sector does your firm operate in primarily?
  - Aircraft and spacecraft
  - Pharmaceuticals
  - Office, accounting and computing machinery
  - Radio, TV and communication equipment
  - Medical, precision and optical instruments
  - Electrical machinery and apparatus
  - Motor vehicle, trailers and semi-trailers
  - Chemicals excluding pharmaceuticals
  - Railroad equipment and transport equipment
  - Machinery and equipment
  - Building and repairing of ships and boats
  - Rubber and plastic product
  - Coke, refined petroleum products and nuclear fuel
  - Other non-metallic mineral products
  - Basic metals and fabricated metal products
  - Recycling
  - Wood, pulp, paper, paper products, printing and publishing
  - Food products, beverages and tobacco
  - Textiles, textile products, leather and footwear
  - Other (please specify)
8. Is your firm exporting to other countries?
  - Yes
  - No
9. When did your firm start operating/ exporting abroad?  
Year: .....
10. How did your firm enter foreign markets when it started to internationalise?
  - Equity modes (such as wholly owned foreign subsidiaries and joint ventures)
  - Non-equity modes (such as licensing, franchising, and exporting)
11. Has your firm entered in alliance during last three years?
  - Yes
  - No
12. Does the alliance include equity participation?
  - No
  - We have minority
  - 50%
  - Majority participation

**13. Please indicate your level of knowledge on the following aspects:** [1 (very low knowledge) ... 3 (neutral) ... 5 (very high knowledge)]

a.	Your firm and its product/service programs	1	2	3	4	5
b.	Your firm's business strategy	1	2	3	4	5
c.	Your firm's alliance management system	1	2	3	4	5
d.	Your firm's alliance partners	1	2	3	4	5

**Please refer all the following statements to your firm's overall experience for alliance(s) during the 3 years' period *1<sup>st</sup> January 2014 to 31<sup>st</sup> December 2016!***

<b>A. Management of the alliance with your partner(s): To what extent do you agree with the following statements: [1 (strongly disagree) ... 4 (neither disagree nor agree) ... 7 (strongly agree)]</b>								
1.	Our activities with our partners are well-coordinated.	1	2	3	4	5	6	7
2.	We ensure that our work is synchronised with the work of our partners.	1	2	3	4	5	6	7
3.	There is a great deal of interaction with our partners on most decisions	1	2	3	4	5	6	7
4.	We have skills to learn successfully from our partners.	1	2	3	4	5	6	7
5.	We have the managerial competencies to absorb new knowledge from our partners.	1	2	3	4	5	6	7
6.	We have effective routines to analyse the information obtained from our partners.	1	2	3	4	5	6	7
7.	We can successfully integrate our existing knowledge with new information acquired from our partners.	1	2	3	4	5	6	7
8.	We strive to prevent our competition by entering into alliance opportunities.	1	2	3	4	5	6	7
9.	We often take the initiative in approaching firms with alliance proposals.	1	2	3	4	5	6	7
10.	Compared to our competitors, we are proactive and responsive in finding and "going after" partnerships.	1	2	3	4	5	6	7
11.	We actively monitor our environment to identify alliance opportunities.	1	2	3	4	5	6	7
12.	We are willing to put aside contractual terms to improve the outcome of our alliances.	1	2	3	4	5	6	7
13.	When an unexpected situation arises, we would rather modify an alliance contract than insist on the original terms.	1	2	3	4	5	6	7
14.	Flexibility, in response to a request for change, is characteristic of our alliance management process.	1	2	3	4	5	6	7
15.	Even in difficult situations, we signal readiness for discussion toward our partners.	1	2	3	4	5	6	7
16.	We stand by our partners' side even in difficult situations.	1	2	3	4	5	6	7
17.	We care about the concerns of our partners even if we do not expect any advantages to arise for us in the short term.	1	2	3	4	5	6	7
18.	When discussing points of disagreement, we always try to see our partner point of view.	1	2	3	4	5	6	7
19.	During conversations, we feel intuitively what our partner actually wants.	1	2	3	4	5	6	7

<b>B.</b>	<b>Please indicate the alliance partner your firm collaborates with:</b>							
1.	Other businesses within your enterprise group	Yes	No					
2.	Suppliers of equipment, materials, services or software	Yes	No					
3.	Clients or customers	Yes	No					
4.	Competitors or other businesses in your industry	Yes	No					
5.	Consultants or commercial labs	Yes	No					
6.	R&D institutes	Yes	No					
7.	Universities or higher education institutions	Yes	No					
8.	Other, please specify: -----							
<b>I am interested in information about innovation related activities with your alliance partner(s) during the 3-year period 1<sup>st</sup> January 2014 to 31<sup>st</sup> December 2016. Please refer the following statements to this!</b>								
<b>C.</b>	<b>Innovation activity with your alliance partner(s): To what extent do you agree with the following statements about radical/incremental innovation: [1 (strongly disagree) ... 4 (neither disagree nor agree) ... 7 (strongly agree)]</b>							
1.	The important driver of our alliance is to use new, breakthrough technologies.	1	2	3	4	5	6	7
2.	The intent of our alliance is to create radical new ideas or ways of doing things.	1	2	3	4	5	6	7
3.	Our alliance helps us to come up with creative ideas that challenge conventional ideas.	1	2	3	4	5	6	7
4.	The aim of our alliance is to improve efficiency.	1	2	3	4	5	6	7
5.	We can rationalise our business operations with alliance.	1	2	3	4	5	6	7
6.	Our alliance facilitates the improved quality of existing innovations.	1	2	3	4	5	6	7
<b>I am interested in information about internationalisation of your firm during the 3-year period 1 June 2013 to 1 June 2016. Please refer the following statements to this!</b>								
<b>D.</b>	<b>Knowledge about foreign market: Please evaluate your knowledge about foreign markets relative to main competitors [1 (much worse than main competitors) ... 4 (neutral) ... 7 (much better than main competitors)]:</b>							
1.	Our manager's knowledge about foreign competitors	1	2	3	4	5	6	7
2.	Our manager's knowledge about the needs of foreign clients/customers	1	2	3	4	5	6	7
3.	Our managers' international business experience	1	2	3	4	5	6	7
4.	Our managers' ability in determining foreign business opportunities	1	2	3	4	5	6	7
<b>E.</b>	<b>General assessment of your performance: [1 (strongly disagree) ... 4 (neither disagree nor agree) ... 7 (strongly agree)]:</b>							
1.	I am satisfied with the success I have achieved during my career.	1	2	3	4	5	6	7
2.	I am satisfied with the progress I have made towards achieving my income goals.	1	2	3	4	5	6	7
<b>F.</b>	<b>Performance of your firm in international markets? [1 (very low) ... 4 (neutral) ... 7 (very high)]:</b>							
1.	Market share relative to its stated objectives	1	2	3	4	5	6	7
2.	Sales relative to its stated objectives	1	2	3	4	5	6	7
3.	Profit margin relative to its stated objectives	1	2	3	4	5	6	7
4.	Return on investment relative to its stated objectives	1	2	3	4	5	6	7

## Appendix 5 - Inter-item correlation matrix

<b>Inter-organisational coordination</b>			
<b>Inter-Item Correlation Matrix</b>			
	COD1	COD2	COD3
COD1	1.000		
COD2	.700	1.000	
COD3	.507	.620	1.000

<b>Alliance proactiveness</b>			
<b>Inter-Item Correlation Matrix</b>			
	PRT2	PRT3	PRT4
PRT2	1.000		
PRT3	.575	1.000	
PRT4	.477	.609	1.000

<b>Alliance bonding</b>			
<b>Inter-Item Correlation Matrix</b>			
	BND3	BND4	BND5
BND3	1.000		
BND4	.560	1.000	
BND5	.489	.589	1.000

<b>Incremental co-innovation</b>			
<b>Inter-Item Correlation Matrix</b>			
	II1	II2	II3
II1	1.000		
II2	.507	1.000	
II3	.476	.522	1.000

<b>Foreign market knowledge</b>				
<b>Inter-Item Correlation Matrix</b>				
	FBK1	INTK1	INTK2	FBK2
FBK1	1.000			
INTK1	.557	1.000		
INTK2	.552	.636	1.000	
FBK2	.576	.464	.475	1.000

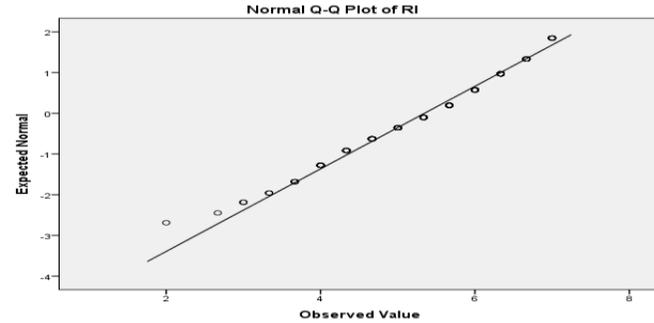
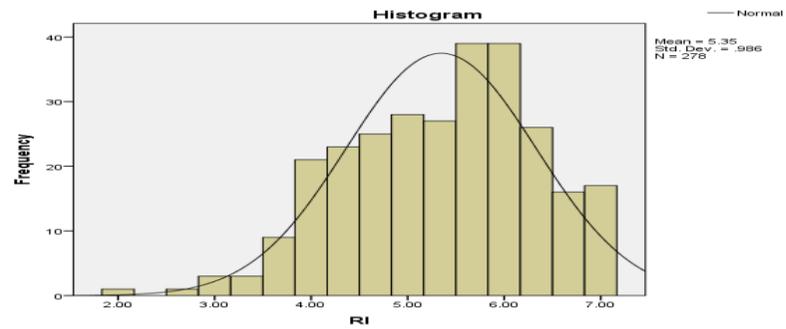
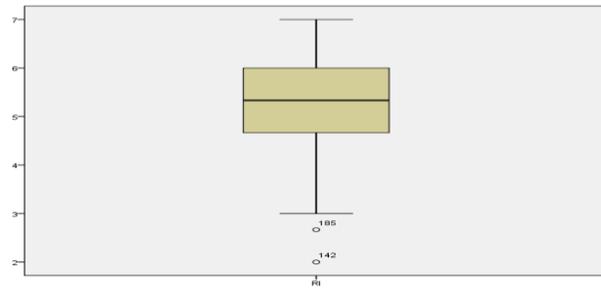
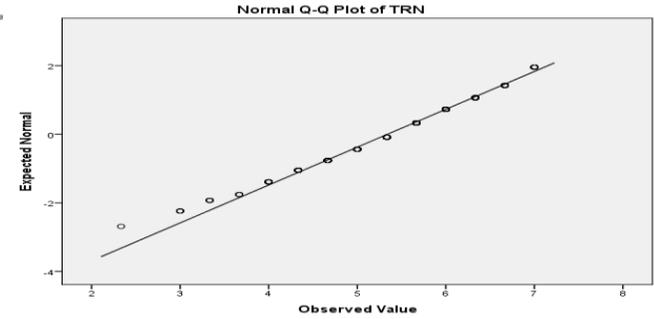
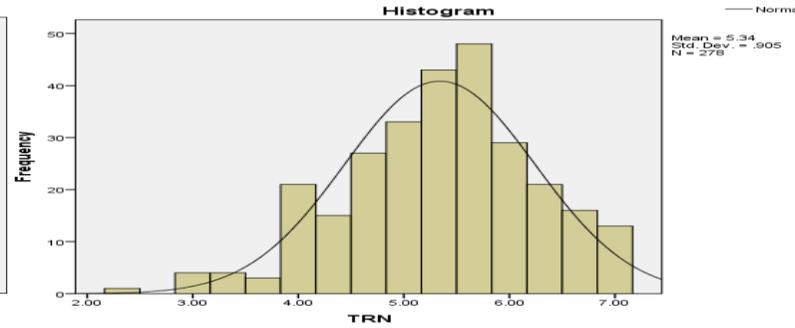
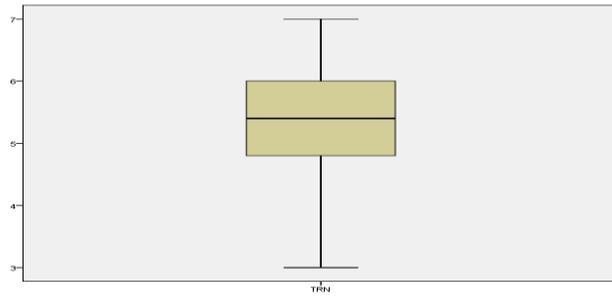
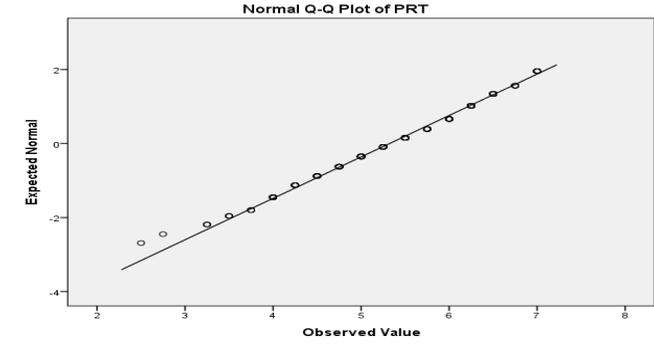
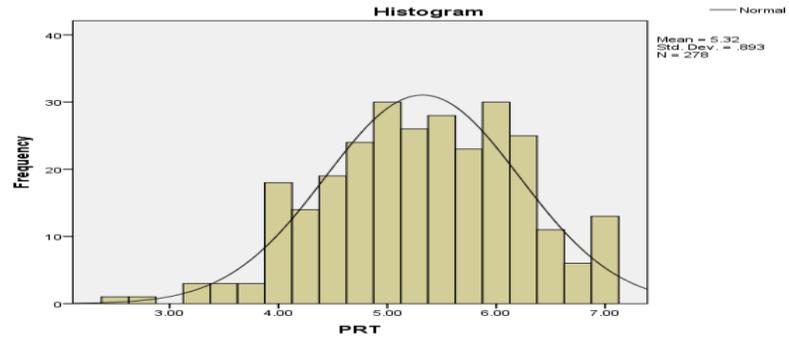
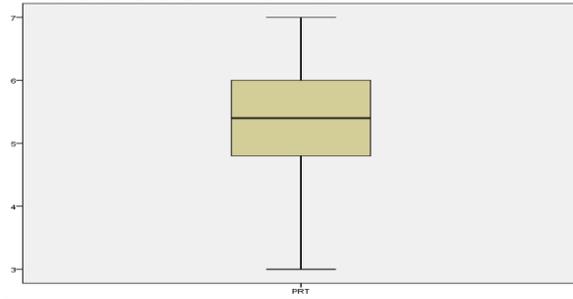
<b>Inter-organisational learning</b>				
<b>Inter-Item Correlation Matrix</b>				
	LRN1	LRN2	LRN3	LRN4
LRN1	1.000			
LRN2	.805	1.000		
LRN3	.655	.626	1.000	
LRN4	.653	.614	.595	1.000

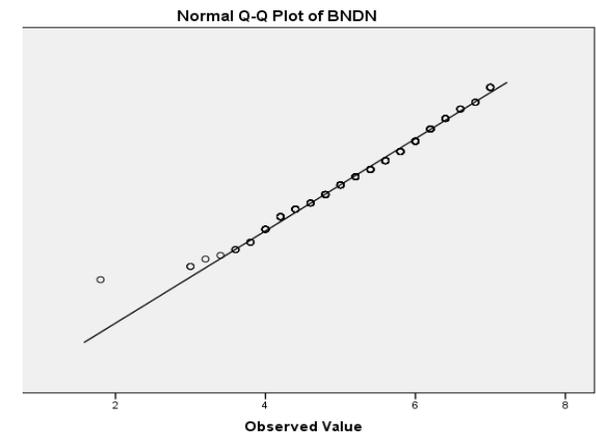
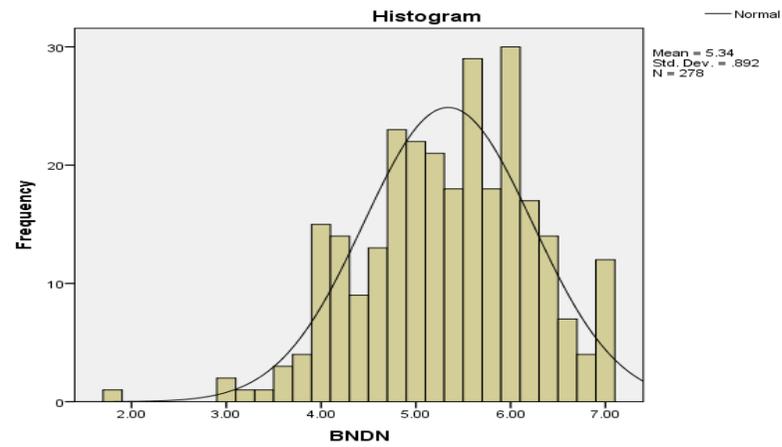
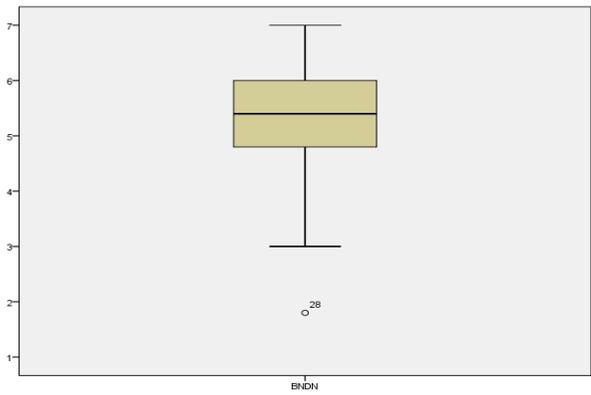
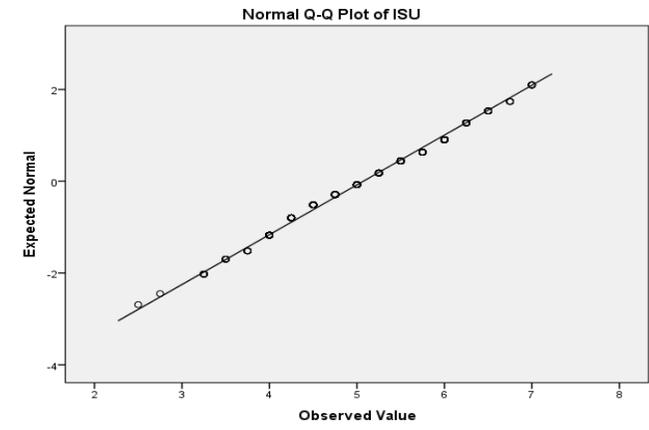
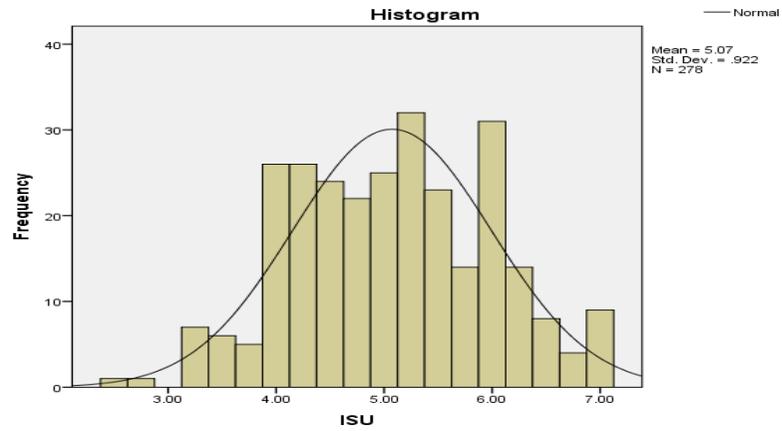
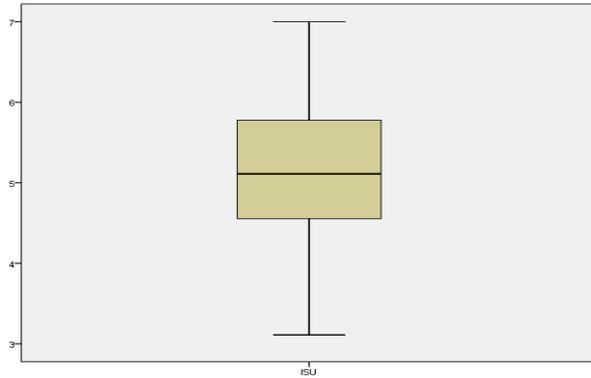
<b>Alliance transformation</b>			
<b>Inter-Item Correlation Matrix</b>			
	TRN1	TRN2	TRN3
TRN1	1.000		
TRN2	.601	1.000	
TRN3	.521	.585	1.000

<b>Radical co-innovation</b>			
<b>Inter-Item Correlation Matrix</b>			
	RI1	RI2	RI3
RI1	1.000		
RI2	.587	1.000	
RI3	.416	.554	1.000

<b>Internationalisation success</b>				
<b>Inter-Item Correlation Matrix</b>				
	ISU1	ISU2	ISU3	ISU4
ISU1	1.000			
ISU2	.493	1.000		
ISU3	.547	.660	1.000	
ISU4	.517	.521	.583	1.000

# Appendix 6 - Box-plot (outliers), Histogram and Q-Q plot for normality assessment





## Appendix 7 - Normality assessment based on Skewness and Kurtosis

Descriptive		Statistic	Std. Error
CORD	Mean	5.4281	.06085
	Skewness	-.673	.146
	Kurtosis	.195	.291
LRNG	Mean	5.4415	.06205
	Skewness	-.665	.146
	Kurtosis	.250	.291
PRTN	Mean	5.3228	.05355
	Skewness	-.221	.146
	Kurtosis	-.282	.291
TRN	Mean	5.3405	.05428
	Skewness	-.359	.146
	Kurtosis	.014	.291
BNDN	Mean	5.3403	.05347
	Skewness	-.370	.146
	Kurtosis	.167	.291
RI	Mean	5.3465	.05915
	Skewness	-.364	.146
	Kurtosis	-.319	.291
II	Mean	5.2386	.05796
	Skewness	-.459	.146
	Kurtosis	.288	.291
ISU	Mean	5.0728	.05528
	Skewness	.008	.146
	Kurtosis	-.508	.291

## Appendix 8 - Variance inflation factor for multicollinearity assessment

Coefficients <sup>a</sup>				Coefficients <sup>a</sup>				Coefficients <sup>a</sup>			
		Tolerance	VIF			Tolerance	VIF			Tolerance	VIF
1	PRTN	.467	2.140	1	PRTN	.479	2.090	1	PRTN	.479	2.090
	BNDN	.426	2.345		BNDN	.425	2.353		BNDN	.457	2.190
	CORD	.480	2.084		CORD	.476	2.102		CORD	.479	2.087
	LRNG	.548	1.823		LRNG	.554	1.806		LRNG	.550	1.817
	TRN	.562	1.779		TRN	.563	1.776		II	.698	1.434
	RI	.613	1.632		II	.726	1.377		RI	.589	1.697
a. Dependent Variable: II				a. Dependent Variable: RI				a. Dependent Variable: TRN			
Coefficients <sup>a</sup>				Coefficients <sup>a</sup>				Coefficients <sup>a</sup>			
Model		Tolerance	VIF	Model		Tolerance	VIF	Model		Tolerance	VIF
1	PRTN	.479	2.087	1	PRTN	.476	2.103	1	PRTN	.485	2.063
	BNDN	.430	2.327		BNDN	.431	2.319		II	.712	1.404
	CORD	.502	1.990		II	.713	1.403		RI	.599	1.669
	II	.697	1.434		RI	.596	1.677		TRN	.615	1.626
	RI	.594	1.684		TRN	.574	1.743		LRNG	.565	1.771
	TRN	.564	1.773		LRNG	.587	1.704		CORD	.485	2.062
a. Dependent Variable: LRNG				a. Dependent Variable: CORD				a. Dependent Variable: BNDN			
Coefficients <sup>a</sup>											
Model		Tolerance	VIF								
1	II	.703	1.422								
	RI	.608	1.646								
	TRN	.580	1.723								
	LRNG	.567	1.764								
	CORD	.482	2.076								
	BNDN	.437	2.290								
a. Dependent Variable: PRT											